E-Mobility Skills Assessment - Tanzania

Port of Dar es Salaam – Transport and Trade Improvement Project
T-GATE Tanzania Gateway for Transport, Trade and Environment

Funded by:
Global Gateway

Wuppertal Institut

Contents

ABOUT
This report has been prepared for the Port of Dar es Salaam – Transport and Trade Improvement Project - T-GATE Tanzania Gateway for Transport, Trade and Environment. The project has received funding from the Global Gateway Initiative.

SUGGESTED CITATION
Martin, E., Mwakifumbwa, O., Pranawengkapti, K, Silva, A. (2026) E-Mobility Skills Assessment Tanzania. Wuppertal Institute/Urban Living Lab Center.

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ACKNOWLEDGMENTS
The authors would like to thank all participants in the surveys, interviews, and focus groups held during the skill validation workshop for generously sharing their views, which formed the basis of this assessment.

LAYOUT
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List of Figures

Abbreviations

3FPT	Fonds de Financement de la Formation professionnelle et technique
AAMUSTED	Akenten Appiah-Menka University
AfEMA	Africa E-Mobility Alliance
ASEAN	Association of Southeast Asian Nations
B2B	Business-to-Business
BEVs	Battery Electric Vehicles
BMS	Battery Management Systems
BOOST	Boosting e-Mobility Jobs in Africa
BRT	Bus Rapid Transit
CATL	Contemporary Amperex Technology
CFMPL	Centre de Formation aux Métiers portuaires et de la Logistique
CKD	Complete Knock Down
CNG	Compressed Natural Gas
CO2	Carbon Dioxide
COSTECH	Tanzania Commission of Science and Technology
CQS	Common Qualification System
CTCN	UN Climate Technology Centre and Network
DART	Dar Rapid Transit Agency
DIT	Dar es Salaam Institute of Technology
E-mobility	Electric Mobility
E2&3W	Electric two- and three-wheelers
EAC	East African Community
EPR	Extended Producer Responsibility
ESS	Energy Storage Systems
EU	European Union
EV	Electric Vehicle
EVIDA	Electric Vehicle Industry Development Act
EVIS	Electric Vehicles Incentive Scheme
EWURA	Energy and Water Utilities Regulatory Authority
FCEV	Fuel Cell Electric Vehicle
FDC	Folk Development Colleges
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HEV	Hybrid Vehicles
ICE	Internal Combustion Engine
ICEVs	Internal Combustion Engine Vehicles
KNQF	Kenya National Qualifications Framework
KNUST	Kwame Nkrumah University of Science and Technology
MHESI	Ministry of Higher Education, Science, Research and Innovation
NGO	Non-Governmental Organization
NIT	National Institute of Transport
NITA	National Industrial Training Authority
NSC	National Skill Certificate
NTA	National Technical Award
NVTA	National Vocational Training Awards
OSHT	Occupational Safety & Health Training
P4T	Pamoja for Transformation
PHEV	Plug-in Hybrid Electric Vehicle
R&D	Research and Development
RTB	Rwanda TVET Board
TESDA	Technical Education and Skills Development Authority
TET	Technical Education and Training
TQF	Tanzanian Qualifications Framework
TVET	Technical And Vocational Education and Training
UCA	Université Cadi Ayyad
UDSM	University of Dar es Salaam
UEMI	Urban Electric Mobility Initiative
ULLC	Urban Living Lab Center
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VCT	Vocational Training Centers
VET	Vocational Education and Training
VETA	Vocational Education and Training Authority

Highlights

Tanzania E-Mobility Skills Assessment

- **This report examines the e-mobility skills landscape in Tanzania**, identifying the most pressing current challenges and the need for qualified human resources over the next two to five years. It offers practical recommendations on training activities and policy measures for strengthening e-mobility capacities.
- **It is based on input from key Tanzanian stakeholders in the e-mobility and education ecosystem**, including companies, education institutions, sectoral associations, government entities, and NGOs. Primary data was captured through quantitative and qualitative methods and completed by regional and international benchmark analysis.

Local, Regional and Global Context

- **E-mobility is at an early stage of development in Tanzania, with most of the growth taking place in the electric two- and three-wheeler segment**. E-mobility presents significant environmental and economic gains, resulting from the transition from fossil fuel to electricity. It also presents opportunities for industrial development and skills enhancement, provided these areas are addressed proactively. Although no ad-hoc policy framework is currently in place, ongoing sectoral discussions over the past two years signal growing interest in the development of e-mobility.
- **Skill development initiatives in the e-mobility sector remain in their formative stages in most African e-mobility markets**. However, positive developments can be observed in a number of more advanced markets including Kenya, Rwanda, Uganda, South Africa, and Ghana. This report includes a non-exhaustive overview of e-mobility skills developments driven by education institutions, training organisations, and e-mobility companies in various sub-Saharan African countries.
- **The report also identifies a set of e-mobility skill-developing activities and measures implemented in countries with advanced e-mobility markets** or with a strong presence of electric two- and three-wheelers, such as the Philippines and Indonesia. These measures include skill-mapping exercises, the development of national competency frameworks and certifications, the identification of workforce qualification requirements, government-supported training programmes, and regional harmonization efforts.

Current E-mobility Skills Landscape in Tanzania

- **The e-mobility sector in Tanzania is currently characterised primarily by small enterprises that recruit locally and through referrals. Recruiting qualified staff for e-mobility in Tanzania is perceived as challenging in nearly all segments of the value chain**. Capacity gaps are particularly strong at the technician level. Recruitment challenges stem from three interconnected issues: insufficient training provided for workers involved in e-mobility; a lack of suitable training programmes matching the needs of e-mobility companies; and a lack of awareness of e-mobility among students and institutions. These issues result in a very limited pool of candidates with knowledge in e-mobility and verifiable experience.
- **E-mobility companies currently fill most of the knowledge and experience gap**. Nearly all companies surveyed (88%) provide technical training for their staff and users of their EVs. Companies collaborate with garages and workshops for the assembly, maintenance and repairs of their electric two- and three-wheelers. Some view the critical role played by companies as a challenge that slows down execution, while others see it as a future commercial opportunity.

- **Standalone curricula on e-mobility do not yet exist. Education institutions in Dar es Salaam and in Arusha have recognised the growing importance of e-mobility by engaging in pilot demonstrations and research efforts**. Cooperation between e-mobility companies and education institutions exists to some extent (provision of assembly workshops, student internships) but is still limited. Some institutions have integrated limited e-mobility related topics within their current training programmes.
- **Further challenges include a general lack of awareness** of the prerequisites for a safe and environmentally sustainable roll-out of e-mobility, the difficulty posed by the absence of a national e-mobility framework, and challenges to strengthen the links between companies and education institutions.

Forecasts on Value Chain Growth and Skill Needs

- **Over the next two years, strong to very strong growth is expected in five segments**: sales (EV and charging infrastructure), services (charging and fleet management), assembly (vehicle and battery), aftermarket support (maintenance and repairs), and vehicle financing. The same areas are expected to grow over the coming five years, with higher confidence levels in a strong to very strong growth. Companies are more optimistic than the rest of the ecosystem on the growth potential.
- **Skills will be particularly needed for aftermarket support, assembly, sales and services in the coming two years**. Medium to smaller demand is expected for company management, end-of-life management, vehicle and battery production, and in input resources, both marked by lower growth expectations.
- **An acute demand for EV technicians is expected across all levels** of vehicle, battery and infrastructure during this period, followed by operators and engineers to a lesser extent. This perception of a very high demand for skilled technicians in e-mobility is homogenous across the ecosystem (81% of the companies, 72% of the other ecosystem players).
- **Four education backgrounds are particularly needed**: electrical and electronics skills, followed by computer systems, IT and software, mechanical skills, and logistics and supply chain management. Companies place a particularly strong emphasis on electrical and electronics skills, which is consistent with skill mapping conducted in other countries.
- Representatives of the Tanzanian education ecosystem consider short and professional courses to be simpler entry points for the next five years, as well as the integration of e-mobility topics within existing modules. Standalone long courses on e-mobility are envisaged once the market has developed further and is supported by a national policy framework.

Training Recommendations

- **A wide array of training and capacity-building activities is required to address the short, medium and long-term needs of the e-mobility transition**.
- Training activities should address the most pressing challenges identified in the study. These include the lack of basic training on e-mobility suited to the needs of e-mobility companies and available to students and garage workers, as well the lack of awareness on e-mobility fundamentals among students, limiting the recruitment pool.
- **As a first step, practical technical training on EV diagnostic, maintenance and repairs is essential for building hands-on skills of technicians**, since aftermarket support has been identified as a critical segment of the value chain with regards to growth, skills needs and gaps. This training should focus on upskilling current motor vehicle technicians, e.g., garage workers, and on training students at VETA centres and institutions offering ordinary diploma levels, to strengthen technician-level competencies. Training activities could focus first on electric two-and three-wheelers, as the most dynamic market segment, and ensure gender inclusion.
- **In addition, training on the fundamentals of e-mobility is essential to both strengthen knowledge and raise awareness to ensure robust and sound roll-out of e-mobility**. This training shall cover fundamentals of EVs, rationale and pre-requisite of e-mobility, charging infrastructure technologies and

standards, battery technologies and end-of-life management, and policies, with a focus on electric- and three-wheelers. Such introductory training has also been implemented as a foundational step in other contexts, for instance at KNUST in Ghana. This can be completed by specialised, deep-dive, training based on specific demand from Tanzanian institutions, provided either directly to beneficiaries or by training trainers (ToT).

- **In the medium to long term, key objectives should include consolidating and expanding e-mobility skills to increase locally created value**, for example through activities that support local vehicle manufacturing as well as battery design and assembly. International study and research placements are recommended to expose students to the research and equipment present in other countries in the region or in advanced markets characterised by similar electric vehicle types.
- **Complementary activities to develop soft skills are necessary** to support students and mechanics transform small pilots into viable businesses, for instance via training on business development and management. Further training on basic competences such as team communication, problem-solving or occupational safety and health policy, a typical area included in qualification frameworks of other countries, e.g. the Philippines, shall be provided.

Skills-Related Policy Recommendations

- **Policy support and sectoral exchanges are needed to develop an e-mobility skills development framework for e-mobility in Tanzania**, leveraging insights from the Tanzania E-Mobility Association (TAEMA) and the National Council for Technical and Vocational Education and Training (NACTVET), to strengthen workforce readiness across the EV value chain.
- **The following policy recommendations have been identified** for further discussion within the Tanzanian e-mobility sector: (i) the development of a comprehensive e-mobility policy roadmap that integrates human resource development, (ii) the definition of occupational profiles, (iii) the development of competency standards for technicians, (iv) the identification of requirements regarding the workforce involved in charging infrastructure services, as done for CNG, and support for e-mobility courses and equipment at TVET and higher education institutions.
- **The establishment of a taskforce on human capacity for e-mobility is recommended** to (1) regularly update and report on respective training activities (e-mobility companies, education institutions, garages and workshops), including the set-up of a centralised database; (2) exchange on the development of courses at various education institutions located across Tanzania (3) exchange on curriculum development, definition of occupational profiles, and development of competency standards, thereby deepening this initial skills assessment for each segment of the value chain. Exchanges with relevant foreign authorities having developed their own certification frameworks or e-mobility curriculum (e.g. Kenya, Ghana, Philippines, etc.) should be encouraged and supported.

Executive Summary

The European Union (EU) supports Tanzania through "T-Gate: Transport, Trade and Environment", a four-year project funded under the EU's Global Gateway strategy. The project aims to support optimisation of the operations of the port of Dar es Salaam (Pillar 1), enhance trade efficiency to ensure a more competitive and interconnected regional economy (Pillar 2) and support Tanzania's low-carbon transport system, particularly through the promotion of electric mobility (Pillar 3). The project embodies the EU's Global Gateway strategy, by aiming to modernize critical transport infrastructure, improve efficiency, sustainability, and competitiveness while contributing to Tanzania's broader development goals.

The project started in January 2025 and will be implemented until early 2029. It is coordinated by Enabel, jointly with implementing partners (UN-Habitat, TradeMark Africa, the Port of Antwerp-Bruges International, and for Pillar 3, UN Environment Programme, and the Wuppertal Institute).

As part of Pillar 3 on electric low-carbon urban mobility, the Urban Living Lab Center of the Wuppertal Institute supports capacity-building efforts in collaboration with project partners and external organizations. These efforts concentrate on two interrelated thematic areas:

Electric mobility (hereafter, e-mobility), aiming to support the nascent e-mobility ecosystem, policy and knowledge in Tanzania, and Dar es Salaam more specifically, and,

Low-carbon urban mobility planning in a broader sense, aiming to catalyse the ambitious steps taken by Tanzanian authorities towards a sustainable urban mobility system in Dar es Salaam, embodied by the BRT backbone, transport-oriented development and support to active mobility.

Capacity-building efforts on e-mobility are structured into three key phases.

Phase 1: Skills Assessment

Phase 1, the *Skills Assessment*, focuses on identifying existing capabilities, challenges and gaps across the Tanzanian e-mobility sector, drawing on systematic stakeholder engagement and benchmarking with international reference cases. As detailed in the methodology section, this phase is based on a participatory assessment of the current situation and expected forecasts, via quantitative and qualitative data collection jointly with Tanzanian stakeholders. This assessment will be regularly updated throughout the project's life-cycle.

Phase 2: Development of Training Activities

Phase 2, the *Development of Training Activities*, translates these insights into targeted training programmes developed in partnership with multiple Tanzanian education institutions (technical and vocational education and training (TVET) institutions, universities), and with local and international partner organizations including UN-Habitat, Enabel, and UNEP, among others. Beneficiaries will include students, mechanics, trainers, teaching students, as well as staff of public authorities involved in shaping and managing Dar es Salaam's public transport system. The training sessions will cover a broad range of thematic areas, identified as necessary for the update and reinforcement of electric and low-carbon urban mobility in Dar es Salaam.

Phase 3: Implementation of Training Activities

Phase 3, the *Implementation of Training Activities*, operationalizes the developed modules through a variety of open-access formats to reach out to the widest possible audience. This will include in-person and online activities, training of trainers, TVET workshops, international student and staff exchanges, and thematic training events during Africa E-Mobility Forums.

The E-Mobility Skills Assessment

Objectives

The E-Mobility Skills Assessment aims to examine the current landscape of e-mobility-related skills in Tanzania, identify emerging needs over the medium term (two to five years), and offer practical recommendations for strengthening national and local capacities.

It represents both a key analytical foundation for the T-Gate's capacity-building activities on e-mobility, to be used as a structured evidence base and a reference point for the design of training activities. In addition, it aims to be used as a broad landscape analysis that may support stakeholders of the e-mobility ecosystem to develop further, complementary initiatives.

Structure

The assessment is organized into four complementary analytical sections.

Section 1, *Context,* places Tanzania's e-mobility developments within wider global and regional e-mobility market trends and skills assessment, in particular in relationship with Sub-Saharan and East Africa developments.

Section 2, *Current State of Play in Tanzania*, reviews the current characteristics of human resources within e-mobility companies, the key challenges to recruit and train qualified staff, and current training activities.

Section 3, *Forecast for the Next Two-Five Years*, explores expected changes in workforce and educational requirements across nine key segments of the e-mobility value chain.

Section 4, Training Needs Analysis, outlines priority areas for the project's capacity-building activities, curriculum design, TVET strengthening, and student exchange initiatives.

Methodology

The E-Mobility Skills Assessment uses the input from Tanzanian stakeholders as the primary data to ensure robustness and local ownership of the findings, completed by regional and international benchmark analysis. To that aim, it adopts a multi-method and participatory approach combining desk research, surveys, interviews and a validation workshop. It combines quantitative and qualitative data to ensure both methodological rigour and practical relevance.

As a first step, the desk research establishes a benchmark by reviewing global experience with e-mobility skills development, particularly in Sub-Saharan and East Africa as well as comparable Global South economies.

This is followed by structured surveys and interviews designed to capture the perspectives of Tanzanian stakeholders. A first survey was addressed to companies operating within the e-mobility ecosystem, seen as the primary entry point to identify the sectoral skill challenges and needs. A second survey was then addressed to further stakeholders of the ecosystem (e-mobility and energy sectoral associations, education institutions including TVET and universities, government bodies, think tanks, NGOs, etc.), using a snowball sampling method. In-person interviews helped to refine statements at a qualitative level and collect additional input.

The interim findings are then refined through a participatory validation workshop, where diverse representatives of industry stakeholders, policymakers, and public education institutions discussed, validated, and prioritised the results. This collaborative approach ensures a representation of the diversity of the skills needed and opinions on the best way forward, which partly differ between stakeholders.

Scope

The scope of the E-Mobility Skills Assessment covers the entire electric vehicle (EV) value chain, reflecting the interconnected nature of activities, technologies, skills and business processes involved in the transition to e-mobility. EVs are here understood as Battery Electric Vehicles (BEVs) that may have two, three- or four wheels. This category includes, among others, electric motorcycles (commonly referred to as electric "bodas"), electric tuk-tuks (or electric "bajajis"), pedal-assist electric bicycles, electric cars and light-duty vehicles, as well as electric minibuses and buses.

The study delineates a series of nine interconnected segments representing the sequential processes that underpin the e-mobility ecosystem. Seven of the segments are of technical nature, while two correspond to two cross-cutting support activities. This segmentation draws from an analysis regional and international benchmark studies, adjusted to consider the specific market characteristics in East Africa (Dalberg, 2023; Republic of Rwanda, Ministry of Public Service and Labour, 2024; UNEP, ILO, UNDP, UNIDO, UNITAR, 2024; Angosta Lopez, 2023).

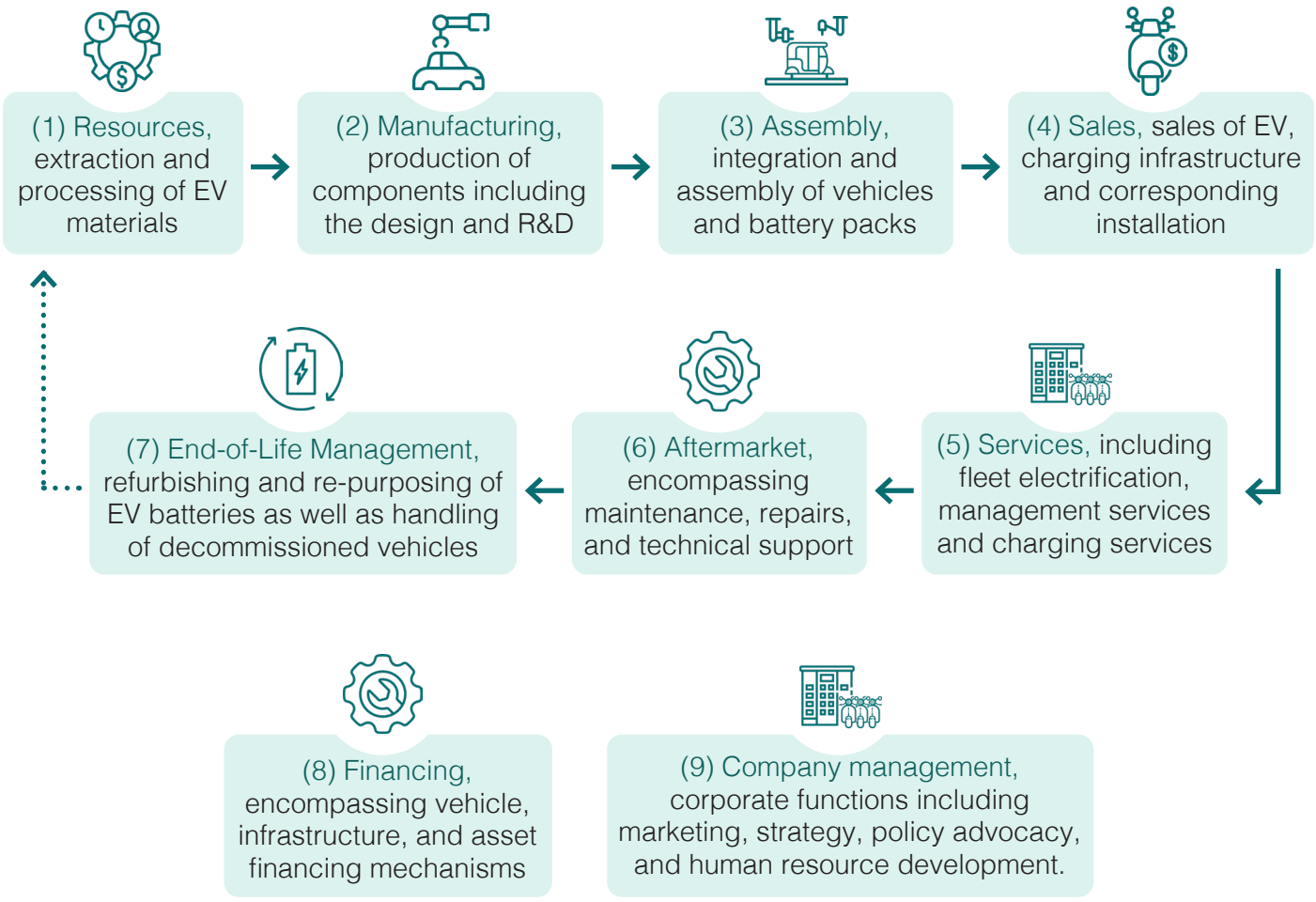


Fig 1: Value chain segments considered in the study

This segmentation considers all BEVs used for different applications (private, commercial, public transport, etc.). It does not focus on Plug-in Hybrid Electric Vehicle (PHEV), Hybrid Vehicles (HEV) due to negative side effects identified in other markets, nor Fuel Cell Electric Vehicle (FCEV). The study does not cover the segments of electricity generation and supply.

Representativity

Following the desk research, surveys were administered to key informants of the e-mobility ecosystem, selected for their known expertise of the transport, education, or industrial context in Tanzania. The surveys were open to further recommended stakeholders based on snowball sampling. The surveys achieved a representative distribution of responses from key informants within Tanzania's e-mobility sector, totalling 41 answers. The respondent pool comprised 16 e-mobility companies - spanning local startups to larger international enterprises - alongside 12 respondents from education institutions (TVET, universities, other educational stakeholders) located in Dar es Salaam and Arusha, 6 members of sectoral associations, 3 staff of government agencies, and 4 non-governmental organizations. This diversity in participation underscores the robustness and inclusivity of the survey's findings, providing a holistic perspective on the e-mobility ecosystem. To expand on the results, interviews were conducted with four additional education institutions in Dar es Salaam.

To confirm and refine the survey results, a validation workshop was held in Dar es Salaam, gathering 22 participants, most of them having answered the surveys. During this workshop, interim results were presented and put up for discussion. Six breakout participatory sessions enabled participants to refine the findings on six key topics identified in the surveys: Expected Growth of the EV Value Chain Segments; Job Positions Needs; Current TVET & Education Offers; Cooperation Modalities between Education Institutions and Companies; Future Curricula on E-Mobility; Policy Recommendations.

While the number of 16 e-mobility companies may appear limited, it is considered representative given the current size of the market and the participation of the key active companies in terms of fleet size and operational maturity. In subsequent phases of the project, periodic updates will help capture evolving perceptions and skill needs and include additional companies as they enter the market. During the project lifetime, further investigation into informal segments of the value chain (e.g. possible handling of defective or retired EV batteries by waste pickers), or stakeholders less visible than formal e-mobility start-ups (e.g. dealerships or markets), will be important to capture the full breath of the stakeholders and their needs.

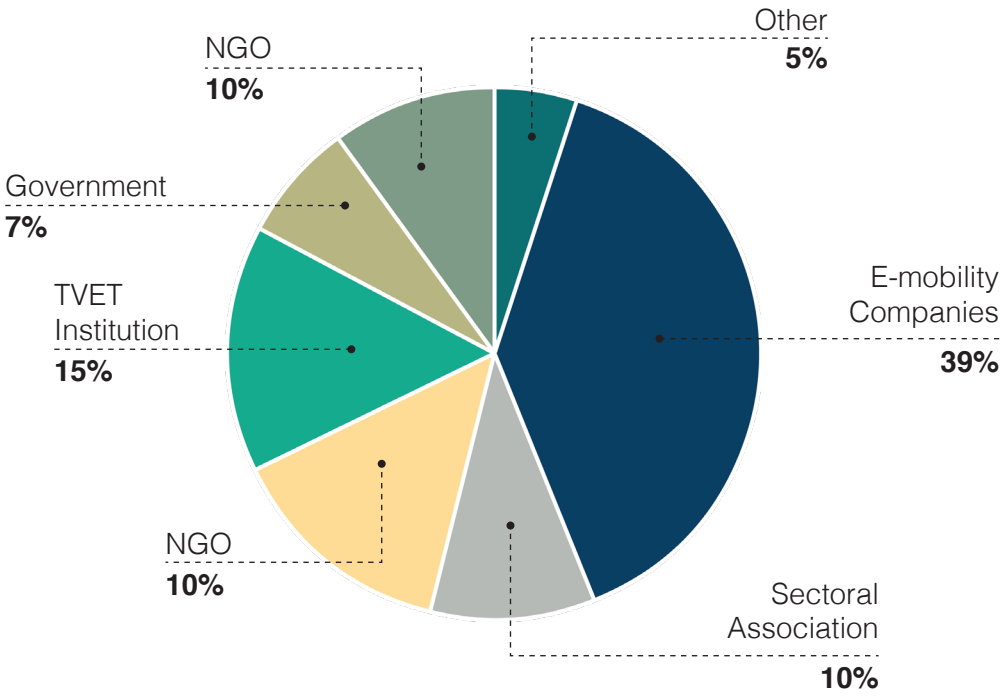


Fig 2: Survey respondent distribution

The National, Regional and Global Context

E-mobility Development in Tanzania

E-mobility is in an early stage of development in Tanzania but presents substantial opportunities for economic, environmental, and industrial advancement. The country hosts a small yet growing ecosystem of companies introducing various types of EVs, predominantly in the form of electric mopeds, motorcycles, and three-wheelers, followed by much smaller numbers of other EV types such as electric cars or pedal-assist electric bicycles (COSTECH, 2024; AfEMA and SOLUTIONSplus, 2023).

Most of the growth occurs in the segment of electric two and three-wheelers, driven by companies importing and assembling E2&3Ws (e.g. TRI/Ziotio UN Limited, Linkall, AG Energies, Sinoray, Ekoglobe, SESCOM, Spiro, TILO, AfricroozE, eMo, etc., cf. Figure 3). The exact number of electric two- and three-wheelers is however not known, due to a reported lack of registration of smaller electric moped models. In the segment of four-wheelers, E-Motion, Kaypee Motors, Knights Energy and Go Electric have been providing various electric models including passenger vehicles for tourism purposes (safari vehicles), passenger cars and cargo trucks. In addition to companies involved in the segments of EV and infrastructure sales and services, further companies are active in the field of asset financing for EVs (e.g. WaTu) or second life of batteries (Waga). Charging infrastructure and battery swapping are other critical areas showing progress. Currently, 8 companies have installed EV chargers and 6 offer battery swapping services for two- and three-wheelers in urban areas (T-GATE E-Mobility Sector Mapping, 2025) .

Fig 3: Illustration of some of the e-mobility solutions developed in Tanzania for EVs, charging infrastructure and batteries. Non-exhaustive selection; from top left to bottom right: TRI (PREO, 2025), AG Energies (AG Energies Co. Ltd Tanzania, 2025), Ekoglobe (Habitat Media, 2024), TILO, Africrooze (SOLUTIONSplus, 2024b), eMotion (E-Motion, 2025), electric cars (Tanzania's Eenergy Efficiency Action Plan, 2025), WAGA (WAGA, 2025)

While there is no policy supporting and regulating e-mobility in Tanzania yet, discussions have been initiated over the past two years, with growing attention from various organisations including the Ministry of Transport, the Tanzania Commission of Science and Technology (COSTECH) with support from UN Climate Technology Centre and Network (CTCN); the EU-funded SOLUTIONSplus project partners including UN-Habitat, UNEP, Dar Rapid Transit Agency (DART) and the Wuppertal Institute; the United Nations Development Programme (UNDP)'s project on Energy Efficiency, and the Embassy of the Netherlands in Tanzania. The T-GATE project will further strengthen institutional actors to develop and implement e-mobility policy frameworks in Tanzania. Alongside policy discussions, some organisations have also played a role in developing pilots and strengthening awareness on e-mobility, for instance, through the organisation of the first Africa E-mobility Forum ever in Dar es Salaam in 2023 through SOLUTIONSplus, gathering Tanzanian stakeholders but also representatives from 20 sub-Saharan countries.

The adoption of e-mobility offers significant environmental and economic benefits. For instance, the SOLUTIONSplus project found out that electric three wheelers in Tanzania show emissions that are 76% lower than their internal combustion engine (ICE) counterparts (SOLUTIONSplus, 2024a). If by 2030, 70% of the three-wheelers that are sold are electric ones, CO2 emissions of the fleet could drop by 29% from the benchmark scenario. In addition, the calculation showed a very good value for e-mobility companies, based on data from manufacturers (22.49% of internal rate of return). There is interest among vehicle drivers, with 82% of surveyed drivers initially interested in moving to electric three-wheelers, and after the pilot, 69.2% satisfied and 15.4% of drivers very satisfied with the electric three-wheelers.

Beyond climate and user benefits, the transition to e-mobility also holds promise for industrial development, especially if leveraging synergies with Tanzania's rich endowment of natural resources and minerals critical for battery production, such as graphite, copper or nickel (COSTECH, 2024).

Realising these opportunities will require concerted efforts to establish policy support, raise awareness on the potentials of e-mobility and prerequisites for a robust roll-out integrating dimensions of safety, standardisation and environment, develop skilled human capital, and attract supporting investment.

E-mobility Market Development in East Africa

Experiences from other African markets, particularly within the East African Community (EAC), offer valuable comparative insights for Tanzania's policy and industry e-mobility development.

Regional trends indicate that electric two-wheelers have served and continue to act as the primary entry point for e-mobility adoption in East Africa, demonstrating that affordable and small-scale mobility solutions can catalyse early adoption. Companies providing electric motorcycles are starting to expand, particularly in countries with a large motorcycle market, (e.g. Kenya and Uganda in East Africa, but also Nigeria or Togo in West Africa), and driven by companies including Ampersand, Roam, or Spiro, targeting commercial fleets (moto taxi drivers) and a combination of pure battery swapping or a combination of swapping and plug-in. Electric motorcycles have been followed in fleet sizes by electric buses, driven by new acquisition models developed by BasiGo in East Africa and public innovative models, such as the electric BRT system in Dakar, Senegal. Further EV types, including electric three-wheelers, electric cars, electric bicycles, or electric trucks and vans, are being developed with smaller fleet sizes or in specific countries, e.g. electric light-duty vehicles in South Africa or Egypt (AfEMA, 2025).

Policy responses in more advanced countries have included national strategies, fiscal and non-fiscal incentives aimed at reducing the higher upfront costs of EVs by facilitating imports, while attempting at the same time to support local manufacturing and local value creation, or by reducing electricity tariffs for EV charging. Simultaneously, bolder policy commitments intend to limit the growth of internal combustion engine vehicles (ICEVs), or to ban them in Ethiopia and Kigali, Rwanda. Lastly, the entire value chain

is being more thoroughly scrutinised, through companies supporting the second-life use of retired EV batteries as stationary energy storage systems, completed by regulatory mechanisms addressing end-of-life management through Extended Producer Responsibility (EPR) in South Africa or Kenya.

Tanzania can draw important lessons from these experiences, particularly by fostering cross-country collaboration and regional knowledge exchange within the EAC.

E-Mobility Skills Development in Africa

Skill development initiatives in the e-mobility sector remain in their formative stages, even in more mature markets (Dalberg, 2023). Emerging examples of progress can be observed in a group of more advanced countries including Kenya, Rwanda, Uganda, and Ghana. In these countries, targeted programmes are being spearheaded by e-mobility training organisations (e.g., AfricaNEV, WTS Foundation, etc.), e-mobility companies (e.g. Spiro, BasiGo), education institutions (e.g., Polytechnique Rwanda, Strathmore University), or development organizations (e.g., Siemens Foundation, GIZ, UEMI). Tanzania is situated in a second-tier group of countries that show some evidence of skills initiatives, yet less numerous (Dalberg, 2023).

The examples below shed light on the growing diversity of capacity-building stakeholders, ranging from training on the fundamentals of EVs and charging infrastructure, to hands-on training on maintenance and repairs, more advanced training on battery systems, or to drivers and users of various EVs including e-buses. Multiple beneficiaries are targeted, from students to mechanics, but also assemblers, charging operators or drivers. These examples are not exhaustive but aim to portray the diversity of organisations and initiatives.

Education institutions

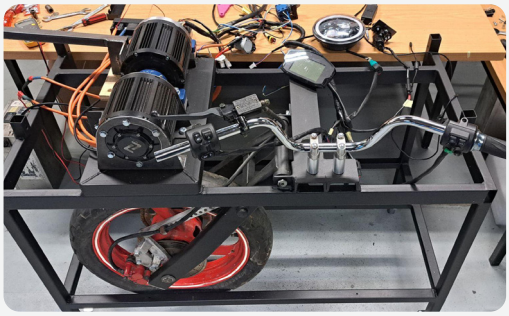
Kwame Nkrumah University of Science and Technology (KNUST)
Ghana

In Ghana, the Brew Hammond Energy Centre, a a multidisciplinary Centre at the College of Engineering of the Kwame Nkrumah University of Science and Technology (KNUST) Department of Mechanical Engineering launched in 2024 the Electric Vehicle Technician Certification Program, under the GIZ and UEMI's BOOST Project (Brew Hammond Energy Centre KNUST, 2024). This three-level programme equips students with the essential knowledge and skills required to operate, maintain and troubleshoot EVs. It was the first EV certification training programme of its kind in Ghana. Level 1 training (Electric Vehicle Awareness Training) provides a comprehensive introduction to EVs, their rationale, and the EV landscape in Ghana. Upon completion of this training and a compulsory six-month internship, participants can progress to Level 2 (High Voltage EV Technician Training) and subsequently to Level 3 (High Voltage EV & Battery Technician Training). Participants are required to complete a mandatory three-month internship after both Levels 2 and 3.

Training at the Brew Hammond Energy Centre, KNUST (Pictures: Brew Hammond Energy Centre, 2024)

Stellenbosch University
South Africa

Stellenbosch University launched in 2024 its Electric Mobility Lab, a fully equipped workshop dedicated to converting ICEVs to electric, with a specific focus on vehicles operating in Africa such as minibus taxis or motorbikes. The Lab enables engineering students to simulate and develop powertrains and electrical systems for EVs. It is equipped with measurement tools and equipment similar to those in mechanic workshops, providing an hands-on training platform. Several vehicles were already converted, including a minibus taxi, a 65-seater bus and a motorcycle.



Electric Mobility Lab at Stellenbosch University (Stellenbosch University, 2024; Booysen, 2025)

Rwanda Polytechnic

Rwanda Polytechnic delivers e-mobility related programs, in the mechanical engineering department / automobile program, with 11 modules ranging from Level 6 (Advanced Diploma) to Level 7 (Advanced Diploma) to Level 8 (BTech) (Republic of Rwanda, 2025). This covers various topics including basic electricity and electronics, EV system, power-train system maintenance of electric cars, vehicle computer programming, etc.

Training organisations

AfricaNEV
Ghana, Nigeria, Kenya

Africa New Energy and Vehicles (AfricaNEV) is a continental non-profit organization founded in 2019 by a team in Ghana, Nigeria and Kanya, with the mission of accelerating the adoption of sustainable e-mobility solutions across Africa's transportation landscape.

AfricaNEV has developed a series of activities in the 3 countries including educational webinars, partnership with over 50 organisations in the electric mobility sector (startups, civic organizations, associations, and established companies), policy advocacy, and technical training. A series of Electric Mobility Technical Training have been conducted in Ghana and in Kenya, targeting a wide range of stakeholders who interact with or make decisions related to e-mobility, and covering technical aspects, safety protocols, and insurance considerations.

AfricaNEV Electric Mobility Technical Training (AfricaNEV, 2025)

WTS Foundation
Kenya

The WTS Foundation is a nonprofit organization established by WTS Energy Global. Dedicated to promoting a green transition in East Africa, the WTS Foundation designs fully certified curricula and provides technical courses in Kenya. These courses equip professionals with the skills needed in the renewable energy and e-mobility industries.

Its e-mobility course in Kenya provides participants with practical and theoretical training on the technical, regulatory, and business aspects of e-mobility. Topics include the fundamentals of EV systems, battery storage and management, charging infrastructure development, vehicle maintenance and troubleshooting, Kenya's policies and regulatory frameworks for e-mobility, and e-mobility business opportunities.

In 2025, WTS participated in developing the E-Mobility Curriculum for Electric Vehicle Assistant Technician II — National Skill Certificate (NSC) II, KNQF Level 3 in partnership with Pamoja for Transformation (P4T) within the GIZ-WE4D project, collaborating with the WTS Foundation and the National Industrial Training Authority (NITA) (Pamoja, 2025). The initial Training of Trainers has been completed, and the program is set to begin piloting at the start of 2026.

Training activities in Kenya and Rwanda (WTS Foundation, 2025)

Advanced Mobility Center
Kenya

The Advanced Mobility Centre is a training organisation based in Kenya working on fleet management, road safety, driver training and electric mobility. It provides training through various methods including e-learning modules, in-person training (classroom theory and on-field practical training), EV driving training, and specific training such as eco-driving.

Its EV training programme covers a large range of topics and activities, including familiarisation with EV technologies including teardown of EVs and reassembly, introduction to battery chemistries, wiring layouts, voltage systems, charging standards & other parameters. It is combined with an industry tour for introduction to e-mobility players.


E-Mobility Training in Kenya (Advanced Mobility, 2025)

ULLC (UEMI, Wuppertal Institute)
Rwanda, Tanzania, Ghana, Togo, Morocco

The Urban Living Lab Center (ULLC), through the Urban Electric Mobility Initiative (UEMI/BOOST project) and the Wuppertal Institute (SOLUTIONSplus project), has supported and implemented various capacity-building activities in Rwanda, Tanzania, Ghana and Morocco, covering a broad range of topics, covering EV assembly and battery installation to operations, maintenance and last-mile logistics.

In Tanzania, the EU-funded SOLUTIONSplus project supported training on the assembly of electric three-wheelers and pedal-assist electric bicycles at the Dar es Salaam Institute of Technology (DIT), training on their use and maintenance, as well as training to local technicians.

As part of the Boosting e-Mobility Jobs in Africa (BOOST) Project under GIZ's Special Initiative on Training and Job Creation, UEMI worked with academic institutions and private companies in Rwanda, Ghana and Morocco to strengthen the e-mobility skills base. Partners included the University of Rwanda, Université Cadi Ayyad (UCA), the Kwame Nkrumah University of Science and Technology (KNUST), the Akenten Appiah-Menka University (AAMUSTED), which introduced new courses on electric vehicle technology, high-voltage safety, and battery maintenance, for inclusion in national TVET curriculum. Nearly 500 people were trained through university courses, vocational programs, and 232 internships, connecting students directly with e-mobility firms.



Training under the BOOST and SOLUTIONSplus projects (BOOST, 2025; ibid; SOLUTIONSplus, 2023)

Siemens Foundation
Nigeria, Kenya, Ghana

The Siemens Foundation has supported various organisations to provide training covering a wide array of topics, including road side mechanics training, battery training, charging infrastructure, or carbon crediting.

For instance, the Siemens Stiftung supported the Electric Mobility Promoters Association of Nigeria, in collaboration with AfricaNEV and Orbit Electric Automobile Limited, for hands-on roadside mechanics training. The Siemens Stiftung also hosted Human-Centered Design workshops for entrepreneurs in Kenya, facilitated by Mideva Labs. The workshops aimed to equip participants with the tools to develop sustainable solutions to advance the e-mobility transition and they explored real-world challenges, exchanged ideas, and co-created solutions through a collaborative, user-centered approach.

Participants at the workshops in Nigeria and Kenya (Siemens Foundation, 2024, 2025)

CFMPL, Dakar Mobilité and 3FPT
Senegal

Dakar Mobilité, the 3FPT (Fonds de Financement de la Formation professionnelle et technique) and the CFMPL (Centre de Formation aux Métiers portuaires et de la Logistique) have been jointly implementing a work and training programme to train women to drive the electric buses of Dakar's BRT system. Women who pass the various exams will be hired by Dakar Mobilité at the end of the training programme. Women are not only trained as drivers of the electric buses, but also as traffic controllers, mechanics, or transport controllers, taking active part into the operation and regulation of the electric BRT system.

Cohort of women trained to drive the electric BRT buses in Dakar, Senegal (SunuBRT, 2024)

E-mobility companies

BasiGo
Kenya, Rwanda

BasiGo is a leading provider of electric buses in Sub-Saharan Africa, with a rapidly expanding fleet in Kenya and Rwanda. Training takes different aspects and involves various types of partnerships.

BasiGo started by taking an active role in training the workforce operating electric public transport, by training the first cohort of electric bus drivers in Rwanda in partnership with the Advanced Mobility Center.
In 2025, following the launch of the first dedicated assembly line for electric buses, BasiGo launched its Manufacturing Development Program (MDP), offering 6-month internship program for engineering graduates, providing on-the-job training in various manufacturing areas, including chassis and body assembly, paint, trim, quality control, and data analytics.

Lastly, BasiGo is also a receiver of training. Appointed as authorised Battery Service Agent in sub-Saharan Africa for CATL, a global leader in battery manufacturing, Basigo's service teams in Kenya and Rwanda will receive specialized training and equipment from CATL to provide local maintenance and support for CATL battery technology.

First cohort 1 of electric bus drivers trainees in Rwanda (BasiGo, 2023); Basigo assembly line at KVM, Kenya (2024)

We Tu
Kenya

WeTu is a social enterprise committed to enhancing the quality of life in rural Western Kenya through the provision of sustainable solutions in key areas – safe water, clean energy, electric mobility, electronic waste management and smart agriculture.

In particular, WeTu Kenya electric mobility training to local communities, equipping individuals with the skills to become mechanics, technicians, and riders. This training is part of a broader initiative that includes practical skills development in assembly, maintenance, and the operation of electric motorcycles, along with entrepreneurship and business management training. A specific focus lies on the training of women on assembly, repair of electric motorcycles, as well as on STEM in general.

Training on assembly and repair of electric motorcycles at Homa Bay, western Kenya (WeTu, 2025)

Siemens Foundation
Nigeria, Kenya, Ghana

Solar Taxi (Ghana) and Mbay Mobility (Senegal), in partnership with MG UNIVERSALAUTO and InnoVent, have been cooperating to provide practical training in electric car maintenance.

As part of the Nuffic-funded project 'Maintenance des Véhicules Electriques', Solar Taxi Ghana trainers have provided training to 17 automotive mechanics specialists from 8 pilot establishments across Senegal in 2023.

Training to 17 automotive mechanics specialists in Senegal (CINOP, 2023)

Strengthening integration of these capacity-building initiatives within a certification framework, aligned with industrial development targets, will be crucial to ensure that emerging training programmes align with market needs, manufacturing priorities, and broader sustainability goals.

Some countries have initiated the assessment of which job positions, in which segments of the e-mobility ecosystem, will be needed for the e-mobility transition. In Rwanda, a wide range of jobs were identified, covering all segments of EVs, batteries and charging infrastructure, with ancillary segments of policy and data, as shown in Figure 4.

Vehicle	Battery	Infrastructure	Cross-cutting
• **Skilled technicians** to assemble and maintain a diversity of EV types • **Electric powertrain engineers** to design and optimise EV powertrains • **Software developers and data analysts** to develop software solutions for EVs, charging stations, battery swapping software and mobility platforms • **Supply chain managers** in facilitating the supply chain for EV parts and batteries	• **Battery specialists** to design, manufacture and manage batteries, with a desired emphasis on lithium-ion batteries • **Trainers and educators** to develop and deliver skill-enhancement programs and raise awareness • **E-waste management specialists** for handling, and disposal of electronic waste, including batteries	• **Charging infrastructure technicians and operators** to install, maintain and manage EV charging points (battery swapping and plug-in charging) • **Renewable energy specialists** to integrate renewable energy sources in charging points	• **Policy and regulatory experts** to navigate and discuss e-mobility policies and incentives • **Cyber-security specialists** to safeguard against potential cyber threats • **Environmental impact assessors** to assess impacts and support sustainable practices.

Fig 4: Jobs identified as required in Rwanda (Republic of Rwanda, 2025)

In addition, the importance of including e-mobility within education policies and curricula is starting to be recognised, especially in countries with a dynamic e-mobility market or opportunities for automobile industry development. One example is the draft National E-Mobility Policy in Kenya, which foresees the development of e-mobility curriculums or modules within TVETs and universities, the promotion of research & development, a mandatory user training and user manuals, and the promotion of knowledge sharing. In Ghana, the Kwame Nkrumah University of Science and Technology KNUST already has three programmes that incorporate EV training, at bachelor, masters level as well as through a Mechatronics Technician program (William Davidson Institute, 2024). Yet, integration of EV-related modules in curricula beyond an introduction to the topic, is mostly an exception or at inception stage in most sub-Saharan Africa countries.

E-Mobility Skills Development in Other Regions

While both ICEVs and EVs rely on core manufacturing skills, the EV transition introduces new technical skills in three main fields in particular: electrical, chemical, and software skills (UNEP, ILO, UNDP, UNIDO, UNITAR, 2024). Segments such powertrain design, production, and assembly will largely depend on new technologies and thus require different skill sets. Designing batteries and Battery Management Systems (BMS) is a crucial area of work. In addition, the integration of automation and digitalization heightens the need for advanced competencies in computer science, coding, and data analytics to support system optimization, R&D, and operational management. Comparatively, processes such as interior and body production are likely to be less impacted, requiring largely similar workforce capabilities.

Assessing the skills needed for the e-mobility transition shall be done at the local level, to ensure relevance of the findings. Yet, inspiration can be drawn from countries with advanced e-mobility markets and policy frameworks, especially if those exhibit similar income levels and types of EVs. In the case of Tanzania, looking at India, China and ASEAN countries appears sensible due a similar strong presence of electric two- and three-wheelers as entry points to the e-mobility transition. In addition, e-mobility skills mapping exercises have already been conducted in some of these countries, for instance, the Philippines (Angosta Lopez, 2023), and Indonesia (UNEP, ILO, UNDP, UNIDO, UNITAR, 2024).

In the aforementioned countries, inspiring developments can be observed:

- **E-mobility skills mapping exercises** assessing expected growth in specific value chain, gaps and needs for specific jobs in the value chain, required skills and education background. Studies done in the Philippines and Indonesia were used as benchmark reference documents to design this assessment's methodology
- **National e-mobility frameworks that integrate the development of skills.** For instance, in the Philippines, the Electric Vehicles Incentive Scheme (EVIS) and the Electric Vehicle Industry Development Act (EVIDA) provide that EV users can to avail the training programs of the Technical Education and Skills Development Authority (TESDA) on EV assembly, use, maintenance, and repair available for its employees (Republic of the Philippines, 2022)
- **National competency frameworks and certifications**, defining competency levels and are often required for employment or public procurement. For instance, in the Philippines, the TESDA developed the Pure Battery Propelled Electric Vehicle Servicing Level II Qualification, which cover a wide range of technical and non-technical competencies needed to perform periodic maintenance of EV components (two, three- or four-wheeled BEVs), including troubleshooting and repair of electronic parts and components
- **Requirements for regulatory or inspection staff**. Some tasks, such as charging station installation, or high-voltage work, may require authorised or licensed installers under national energy or transport regulatory frameworks, imposing technical and safety requirements
- **Government backed training programmes**. For instance, in Thailand, the Ministry of Higher Education, Science, Research and Innovation (MHESI) launched in 2025 the "EV Ready+" programme to develop a skilled workforce to support the development

of the EV industry, offering free training through a public website, combining self-paced online theory modules and hands-on practical training, organised by the Ministry in partnership with two universities

- **Regional harmonisation efforts towards standards on training and certification**. In the 2023 "ASEAN Leaders' Declaration on Development Regional Electric Vehicle Ecosystem", the ASEAN association adopted a declaration to "encourage the harmonisation of regional standards for the electric vehicle ecosystem as well as training and certification based on international standards".

Current e-mobility skills landscape in Tanzania

Finding #1: The current e-mobility skills landscape is characterised by recruitment challenges, on-the-job training, and very nascent integration of e-mobility in courses.

E-mobility human resources

The e-mobility sector in Tanzania is predominantly characterized by small enterprises that rely on local recruitment and referral networks, according to the survey results. Geographically, 76% of the staff of surveyed companies are recruited domestically, with 19% originating from East Africa and 5% from other foreign countries (see Figure 5). Most recruitment are done through referrals (46%), with 25% via partnerships with education institutions and 21% via online platforms.

The median staff size stands at 11.5 employees, with a notable gender disparity: men constitute 72% of the overall workforce, rising to 89% in technician positions. The segment with the largest representation of women is found at the management level, with 40% of women.

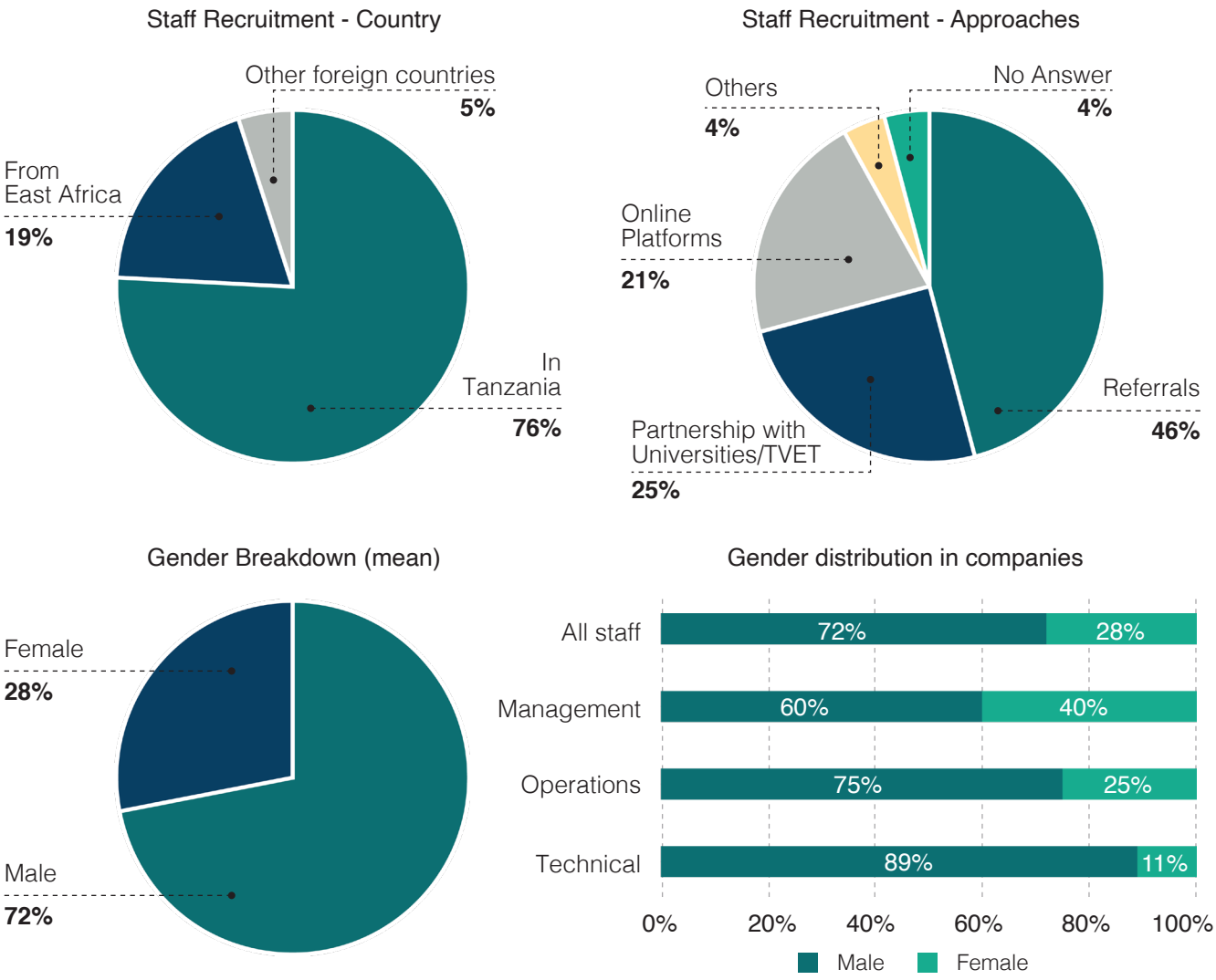


Fig 5: Staff recruitment approaches and gender distribution

Recruiting qualified personnel

Recruiting qualified staff for e-mobility in Tanzania is perceived as challenging in nearly all segments of the value chain. Overall, as expressed by one e-mobility company, the talent pool is "limited" in all job levels. Recruitment challenges are particularly acute for technical segments, including vehicle and battery manufacturing and assembly, after market (maintenance and repairs), end of life management, or charging services. For these segments, over 3/4 of all respondents indicate that it is challenging to very challenging to recruit qualified staff. Transversal segments such as company management or sales are also marked by recruitment challenges, yet to a lesser extent.

Capacity gaps are particularly pronounced at the technician level. Technicians are needed on all segments of the vehicle (EV Technicians, EV Maintenance and Repair Technicians), as well as the battery (battery technician), and the infrastructure (Charger Design Technicians, Charging Installation Technicians). Close terms are sometimes interchangeably used with technicians, such as "mechanics", and "artisan" or the Swahili term of "fundi", designating skilled tradesperson or technician providing practical repair, maintenance, or construction services, often based on experience and hands-on training rather than formal technical education. While survey respondents and workshop participants homogeneously designate the technical level as the most pronounced gap, the lack of uniform terminology shows the absence of clear framework and defined professional occupations in the field of e-mobility.

Gaps are also identified on the level of Operators (e.g. EV Operators), Engineers (e.g. Battery Management System Engineers, Battery Engineers) and Trainers, but less frequently mentioned.

	Technician	"Artisan"	Mechanics	Operators	Engineers	Trainers
Vehicles	●●●●●● EV Technicians ● EV Maintenance and Repair Technician	● EV Artisan	● EV Mechanics	● EV Operators		
Battery	● Battery Technicians				● Battery Management System Engineers ● Battery Engineers	
Infrastructure	●●●●● Charger Design Technicians ●●●●● Charging Installation Technicians	● Charger Design Artisan ● Charger Installation Artisan				
Management						
Use						
Others						● EV driver trainers ● EV users trainers

Fig 6: Critical job gaps according to the survey respondents

Causes of recruitment challenges

The recruitment of qualified e-mobility personnel in Tanzania is impeded by a series of critical challenges. Respondents identify three most pressing issues, tightly interconnected:

- **Insufficient training provided to workers involved in e-mobility**, such as technicians, garages, assemblers (cited by 88% of respondents)
- **Lack of suitable training courses aligning with the needs of e-mobility companies** (84%). This inadequacy stems from the absence of approved curricula and specialised courses or programmes covering e-mobility, the current focus of education institutions on ICE vehicles – e-mobility being nascent phenomenon, with a small market and perceived to be "not popular"- a lack of teaching facilities for e-mobility, a lack of qualified and certified instructor, and challenges within education institutions to keep up with the pace of e-mobility innovations
- **Low awareness of e-mobility among students and institutions** (76%). This was stressed in individual interviews as an important issue limiting the pool of potential workers and the need to develop a curriculum (as put by one education institution, "most students don't know about EVs"; or another, "in order "to have students creating e-mobility start-ups, they need the basics and awareness-raising").

Further challenges include a substandard quality of TVET offerings in general (56%), the absence of effective mechanisms to match graduates with companies, e.g. via apprenticeship (48%). Financial constraints are less frequently seen as an issue but still exacerbate the aforementioned challenges, with 24% of respondents reporting high costs for in-house training and 16% noting limited participation in TVET programs due to affordability concerns.

E-mobility companies stress the lack of experience of candidates on e-mobility, as well as the lack of verifiable experience. While some do not have any experience, others possess self-acquired knowledge, which however necessitate substantial on-the-job training. As put by one company, "most technicians on the ground can claim to have experience mostly through DIY (Do-it-Yourself) and self-taught", leading companies to "accept them, onboard, train them to acquire skills and work on e-mobility." This lack of experience, or of certified experience on e-mobility, spans all organizational levels, including technicians, operators, director and engineer. It is the critical issue for the e-mobility companies responding to the survey.

"Most operators have general and basic understanding, but no experience, so sometimes it's a trial-and-error method before getting the right one." An e-mobility company active in Dar es Salaam.

Prevalence of on-the-job training

Due to the lack of experience of recruits on e-mobility, e-mobility companies fill the knowledge gap by providing on-the-job training to their staff, but also external training to users of their EVs.

Nearly all companies surveyed (88%) engaged in technical training to their staff, but also to users of their EVs and externals (see Figure 7). The most prevalent form is on-the-job training offered by the companies to their own staff, in order to build their capacities in a practical way on various critical areas for companies operations, such as vehicle assembly, or maintenance and repairs of EVs. There is increasing interest in local assembly and training on the staff on assembly, as fiscal incentives are granted to local assembly activities through the industrial license for the assembling of vehicles for both ICEVs or EVs (reduction of import duty from 25% to 0%, and tax relief for goods installed at the assembly plant). Indeed, 44% of the surveyed companies reported importing some or all their vehicle models as Complete Knock Down (CKD), versus 38% as fully assembled.

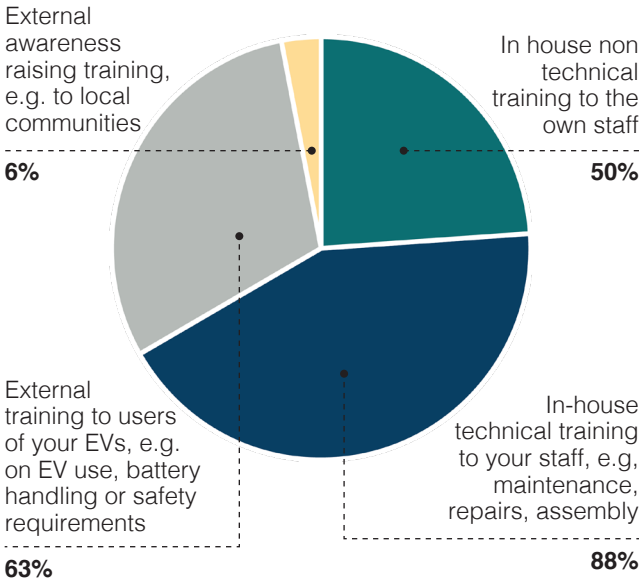


Fig 7: Training provided by e-mobility companies

Some companies have engaged with garages and workshops for the assembly, maintenance and repairs of electric two- and three-wheelers.

For instance, TRI is partnering with 21 garages located in various areas of Dar es Salaam, including Kisutu, Kimara, Mbezi, Mbagala, Gongo la Mboto, and Temeke, which have been trained to service these specific types of EVs (see Figure 8). Garages located in Magomeni and central Dar es Salaam specialize in welding, fitting and assembling parts for electric three-wheelers (e-bajaj) when repairs or modifications are needed. Ekoglobe is also partnering with 7 garages in Dar es Salaam, who have been trained on repair and maintenance of EVs. According to companies, these collaborations help develop models better suited to operations in Dar es Salaam as well as reduce the need for maintenance, as more fragile parts from imported models can be replaced robust and locally available parts needed to operate on challenging road conditions, for instance for the use of rubber components to protect shock absorbers.

In addition to garages, workshops provide another space for assembling and maintaining, for instance the e-bajaj workshop established at the DIT Spare Parts Factory as a collaboration between the Dar es Salaam Institute of Technology (DIT) and TRI (see Figure 9). The facility also accommodates students to gain hands-on experience in e-mobility.

In addition to internal staff training, more than half of the companies currently provide external technical training, that is to users of their EVs, e.g. on EV use, battery handling or safety requirements (63% of the companies). A minor number of companies engage into external awareness-raising training activities e.g. to local communities (6%). An education institution reported during the validation workshop that an e-mobility company has provided training to students on the assembling and maintenance of their EVs.

Lastly, half of the companies (50%) provide additional non-technical training to their own staff, yet without specifying the areas covered by these training or formats.

Fig 8: Tandala garage area at Magomeni (Mwakifumbwa, 2025)

Fig 9: E-bajaj assembly workshop on DIT campus (Mwakifumbwa, 2025)

Essential role played by companies

Companies currently play a critical role in providing both internal and external training. This responsibility is diversely appreciated by respondents:

On one hand, some see this role as a challenge, which adds up to the multiple tasks that e-mobility companies currently endorse (example of typical activities: imports, assembly, asset financing, development of IT systems for the Battery Management Systems (BMS), regulatory and legal activities, customer aftermarket care, investment sourcing, etc.), especially as the market is still nascent and lack specialisation. This combination of responsibilities may also lead to delays or longer implementation timelines for training or EV roll-out. This issue is exacerbated by the lack of verifiable control of prior experience with e-mobility or of the quality of self-taught experience.

"Start-ups are therefore forced to provide extensive on job training."
„On-the-job learning is much more prevalent, which slows down execution."

On the other hand, others identify this as a future commercial opportunity. Interviews indicate that some companies may be interested in leveraging their in-house capacities, or their expertise developed jointly with garages, as future commercial activities. They consider themselves best placed to do so, as they are on the frontline of e-mobility implementation and the most immediately exposed to challenges of imports of high-quality EV and batteries, feedback from users, design iterations, and maintenance and repairs, thus in a good position to provide training on these matters.

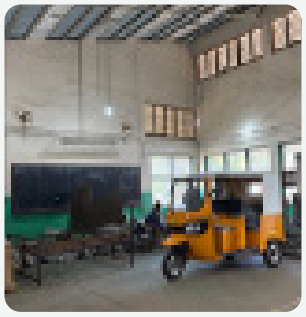
Emerging role of education and training institutions

As of the present assessment, Tanzania does not possess formally approved standalone curricula dedicated to electric mobility. However, some education and training institutions have started to recognise the growing importance that e-mobility is likely to take in the coming years, alongside or complementary to the current policy focus of the country on Compressed Natural Gas (CNG).

This takes the form of diverse and complementary activities, as highlighted below:

- **Engagement in pilot demonstrations and research efforts**, for instance by the Dar es Salaam Institute of Technology (DIT), the National Institute of Transport (NIT), the University of Dar es Salaam (UDSM), the VETA Center RVTSC Pwani, accompanied by research work conducted by staff and students
- **Provision of internship opportunities to students to work with e-mobility companies**, for instance between the Arusha Technical College (ATC) with E-motion Africa and LOTI to assemble EV parts at their workshops
- **Some initial integration of topics related to e-mobility in some modules**, for instance in various degrees in electrical, mechanical or automobile engineering (ATC, UDSM, NIT) corresponding to a broad range NTA levels 4-9 spanning from more technical levels (ordinary diplomats) to higher-education levels (e.g. bachelor, master)
- **Yet, no short or long standalone courses on e-mobility developed so far**, due to a lack of policy support, demand for the time being, and funding for curricula development, modernisation of labs or development of assembly training workshops
- **Marked interest of education institutions to expand on e-mobility activities and exchange on respective initiatives**. One of the positive feedbacks of the validation workshop was on the possibility to exchange current research, pilots and future plans for courses and facility development, especially through dialogue between Dar es Salaam- and Arusha-based TVET and higher-education institutions.

Dar es Salaam Institute of Technology (DIT)
Dar es Salaam


- **Involvement in several e-mobility pilots and training activities**, including SOLUTIONSPlus (UN-Habitat/UEMI/Wuppertal Institute) or companies e.g. Auto Truck, TRI, MANGU & Sons, SESCOM with a focus on electric three-wheelers as well as pedal-assist electric bicycles; capacity-building activities for garage technicians and FASTA Cycle Messengers.
- **Use of DIT workshops** for the design, assembly, services and maintenance of electric three-wheelers as well as pedal-assist electric bicycles, with involvement of bachelor's students in the design and assembly of the vehicles used as teaching support
- **Multifaceted e-mobility research** conducted by scholars and students through the Postgraduate Studies department, looking at diverse aspects of transport electrification, including the electric rail system SGR, the assessment of potentials of introducing electric buses in the BRT system, the assessment of impacts of shifting to electric three-wheelers, and studies on pedal-assist electric bicycles
- **Intention to develop long courses on e-mobility in the future** (ordinary diplomas, bachelor and master's levels), combined with short courses based on demand.

University of Dar es Salaam
(UDSM)
Dar es Salaam


- **E-mobility-related topics integrated in electrical engineering programmes** (undergraduate level already approved, upcoming for master's level); no standalone programme on e-mobility
- **Involvement in research projects and pilots**, e.g. EV developed at the UDSM Technology Development and Transfer Centre (see. Figure above)
- **Existence of initial equipment for e-mobility, e.g. EV lab simulator** at UDSM's Department of Electrical Engineering (see. Figure above). Intention to develop competencies and further modernise the labs if additional funding is available, e.g. EV motor test bench, dynamometer, battery cell testing rigs, battery pack assembly area, AC and DC chargers of various charging standards

(e.g. CCS, CHAdeMO, GB/T) for hands-on work, testing bench to vary input, load, measure efficiency of inverters/motor controllers, various measurement and diagnostic tools, and diverse modelling and simulation software, e.g. for motor design, battery or thermal modelling

- **Students conducting research** on EVs or fuel cell hybrid EVs, with further proposals to study the workforce competencies and technical capacity for the maintenance of a government EV fleet, or the GIS-based site selection model for EVs Commercial Charging stations in Tanzania.

National Institute of Transport (NIT)
Dar es Salaam

- **Involvement in e-mobility pilots with different EV types** (electric cars, scooters, and three-wheelers): EV maintenance & training garage, EV solar-powered charging station run by students, EV training facilities (training model, simulators), EV Conversion Centre, etc
- **Integration of some e-mobility related topics within a few modules at various levels of the Tanzanian Qualifications Framework**: diploma at NTA levels 4 or 5 (e.g. automobile layouts for basic technician certificate in automobile engineering, or electrical and electronic systems for technician certificate), degree at NTA levels 7 to 8 (e.g. automotive electrical and electronic systems in bachelor's degree in mechanical or automotive engineering), postgraduate at NTA level 9 (e.g. electric and hybrid vehicle technologies, in master of mechanical engineering).

Arusha Technical College (ATC)
Arusha

- **Established Center of Excellence in Renewable Energy and Energy Efficiency**, with the intention to be recognised by the Government as one of the strategic locations in the e-mobility sector
- **Incorporation of some e-mobility topics within the main modules, with the intention to develop short and long courses:**

	professional short courses (2 weeks to 6 months targeting a specific area, e.g. batteries or charging facility, as well as long courses (diplomas and degree for automotive, electrical and mechanical students) • **Cooperation with e-mobility companies and provision of internship opportunities for students** to work with e-mobility companies such as E-motion Africa in converting ICE vehicles to electric, or LOTI on electric two- and three-wheelers, to allow students to assemble the e-vehicles parts at their workshops. A hybrid solar powered containerised charging/swapping station was designed at TILO and fabricated by ATC and Photons Energy (see Figure above) • **Plan to establish an e-mobility assembly and training workshop** to build local capacity in the e-mobility sector. The initiative aims to address the shortage of qualified technicians by developing fully equipped classrooms and laboratories for hands-on EV training, alongside the installation of EV charging and battery-swapping stations for two-, three-, and four-wheelers within the ATC campus, leaning on current pilots (e.g. see Figure above on the conversion of an ICE motorcycle to electric). The project will also include an assembly facility and the development of competent trainers, with ATC seeking technical and financial support to implement the plan within a realistic timeline • **Knowledge sharing partnerships with other colleges in East Africa** such as Strathmore University (Kenya) on e-mobility, and KGRTC (Zambia) on energy efficiency and e-mobility topics, for knowledge transfer and collaboration.
RVTSC Pwani (VETA Center) Dar es Salaam	• **Development of an EV in 2010** • Courses on electronics, electrical, vehicle mechanics and automobile up to NTA level 3 but no e-mobility modules yet.

Cross-cutting challenges

On top of the challenges for recruitment and technical skill gaps mentioned above, stakeholders reported further difficulties during bilateral interviews:

- **Multifaceted consequences of a lack of awareness on e-mobility**: a general lack of knowledge is frequently reported, not only among mechanics or students, but also among public institutions, for instance on standards, especially related to safety, or processes for safe disposal of retired batteries limiting negative environmental consequences. A lack of knowledge is reported about battery technologies and the environmental impacts of battery-lead batteries, which are used in the cheaper electric moped models. In addition, some interviewees noted that even certain e-mobility companies lack sufficient knowledge about what constitutes a robust and safe battery. As a result, these companies sometimes import sub-standard batteries with inadequate specifications, for example, batteries with too little capacity for local needs, very low-cost batteries of poor quality, or batteries not matching the motor specifications. Further awareness raising on both the opportunities of e-mobility and the pre-requisites for a safe and sustainable deployment - charging safety and standards, battery technologies, end-of-life management - appears necessary.
- **Willingness to strengthen the links between companies and education institutions, yet facing challenges**: collaboration in the form of student internships, mutual training or assembly activities has been in place between a few education institutions and companies (e.g. ATC - Spiro, TILO). Stakeholders not yet engaged in such activities reported challenges during the workshop, such as long decision timeframes or lack of flexibility from education institutions, limited capacity of small e-mobility companies to pay for the fees requested by education institutions, fear of political interferences, or potential criticisms that education institutions could be exposed to if partnering with private entities. Nevertheless, interest to further explore bidirectional collaboration was expressed by various stakeholders, in order to benefit from the students' labour and knowledge, increase their practical exposure and training, and use existing workshops at the education institutions.
- **Consequences of the absence of an adopted policy framework on e-mobility**: several education staff stress that the absence of a policy framework on e-mobility in Tanzania limits or impedes their capacity to propose new modules of e-mobility or standalone courses to their institution, although they would be keen on developing those.
- **Support is needed primarily on technical skills but should also include support on soft skills**: while most challenges identified covered technical dimensions, the importance of supporting business skills for the transition from pilots to commercialisation, for instance of pilots developed at education institutions, was stressed by these institutions.

Forecasts on Growth & Skill Needs in Tanzania

Finding #2: Upskilling is needed to accompany the expected e-mobility growth, especially in aftermarket support, vehicle and battery assembly, sales, and services.

Expected growth of e-mobility

Over the next 2 years, a strong to very strong growth is expected in 5 key areas: sales (EV and charging infrastructure), services (charging and fleet management), assembly (vehicle and battery), aftermarket support (maintenance and repairs), and vehicle financing, according to the surveyed e-mobility ecosystem stakeholders (see Figure 10). Growth is also anticipated in end-of-life management, vehicle and battery production, and input resources, but more modestly.

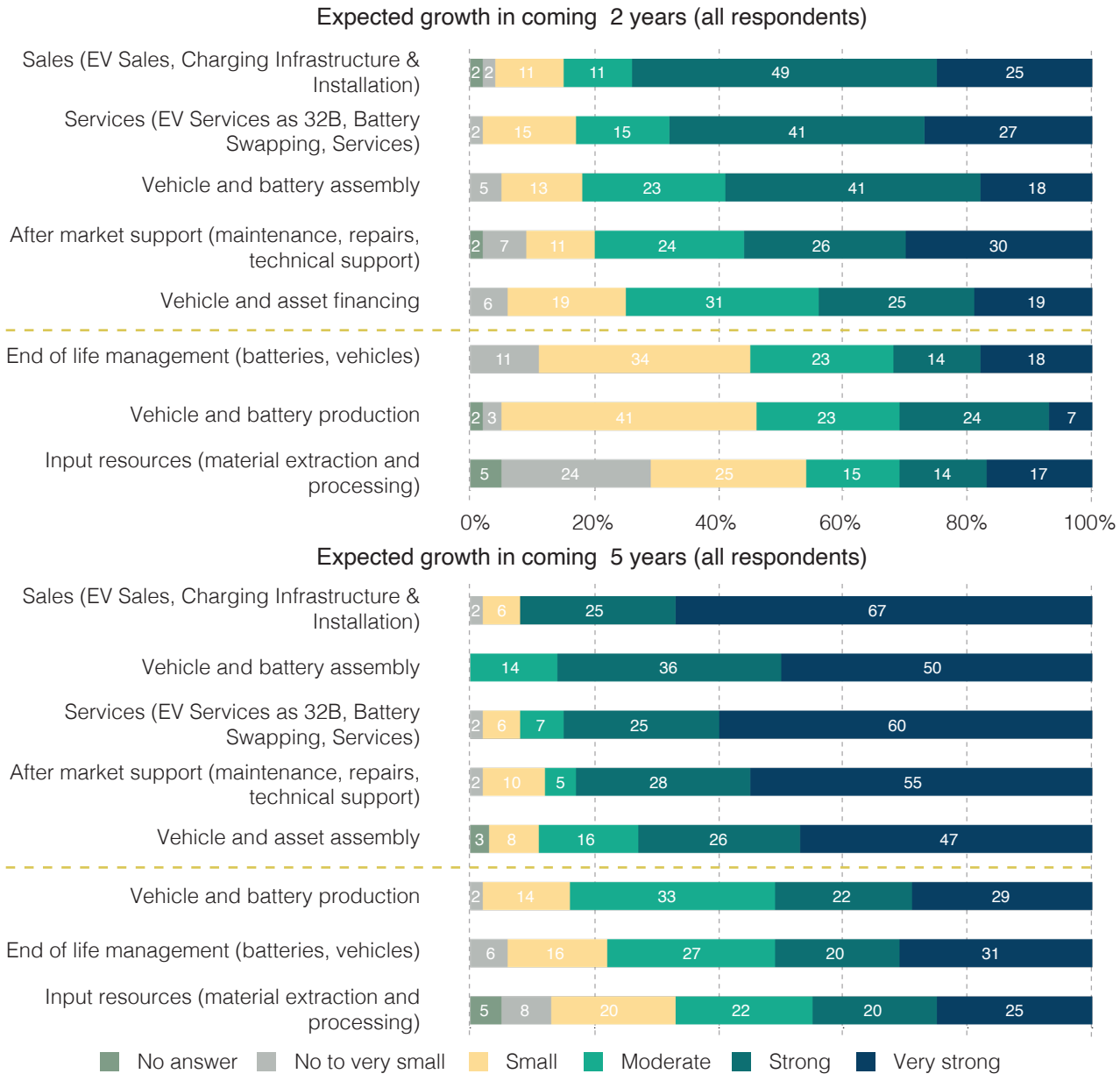


Fig 10: Expected growth of e-mobility value chain segments in the coming 2 years (top) and 5 years (bottom) according to the surveyed ecosystem representative

These findings on the most dynamic segments of the value chain are coherent with other analyses conducted in East Africa (Dalberg, 2023). Workshop participants validated the findings on the growth expected in the coming two years. Indeed, sales have been growing importantly, driven by imports; they are expected to continue, along with the asset financing required. The assembly of EVs is also expected to grow, supported by the fiscal incentive in place for local assembly of ICEVs and EVs, yet, still with implementation challenges and delays reported by participants. Participants active in commerce and trade registrations reported a very rapid increase in the number of companies active in assembly in the recent period. The assembly of EV parts is also an easier entry point than the manufacturing of EV components. According to participants, local manufacturing of parts is still challenging due to the lack of sufficient incentives for manufacturing and to the numerous administrative requirements. Yet, future projects could look at supporting manufacturing of the easiest components such as body parts, or supporting casting skills.

Some participants disagreed with the more modest growth expected on the end-of-life management of EV batteries. They state that battery refurbishing or repurposing might be handled by the same technicians active in the aftermarket support activities of maintenance and repairs, expected to strongly grow. Particular attention, e.g. for capacity-building activities, should therefore be included already now.

Projections over the next 5 years exhibit the same trend with strong to very strong growth on the same segments, with higher confidence levels in general. Overall, the surveyed e-mobility companies demonstrate a stronger optimism regarding sectoral growth, frequently forecasting "strong" or "very strong" growth over the next 2 and 5 years. This is particularly the case for the top three segments of the value chain: sales, services and assembly. Other ecosystem actors exhibit a more conservative outlook, more frequently anticipating "small" growth, with a marginal increase in confidence for the five-year horizon.

Skills needed

In the next 2 years, a strong demand for skills is expected in 4 segments: aftermarket support, assembly, sales, and services. Medium to smaller demand is expected for company management, end-of-life management, vehicle and battery production, and in input resources, both marked by lower growth expectations.

Comparing the growth and skills forecasts show that most value chain segments follow a similar pattern in terms of growth and skills demand: for instance, skills are very needed in areas expected to strongly grow, e.g. assembly, sales, as qualified personnel will be needed to implement these activities (see Figure 11).

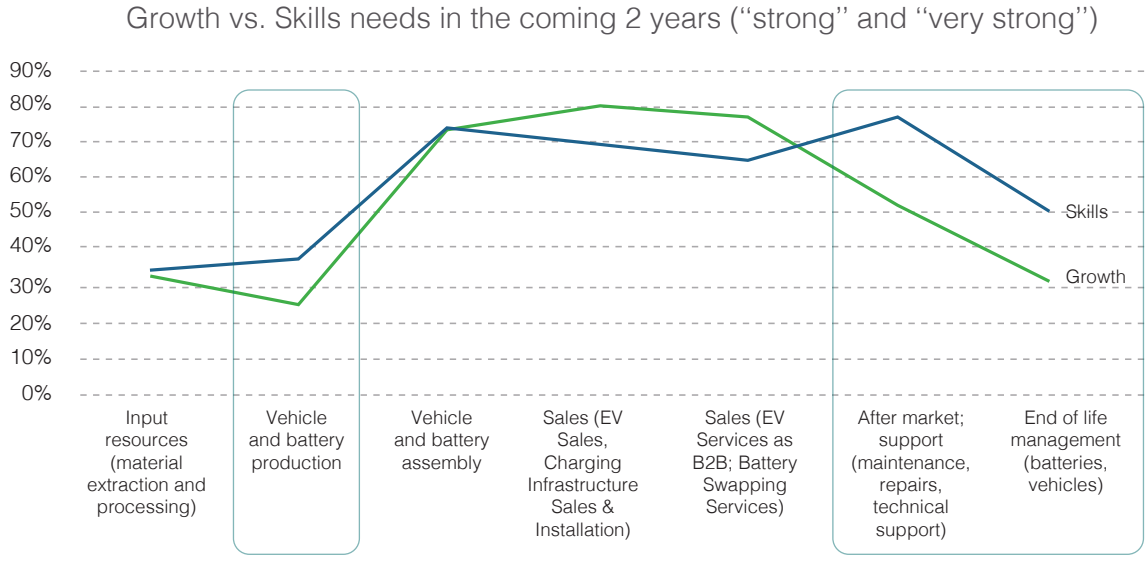


Fig 11: Comparison of growth and skills needs in the coming 2 years, according to the survey respondents

However, in the three segments of aftermarket support (maintenance and repairs), end-of-life management, and vehicle and battery production, the demand for skills is higher than the forecasted growth. A hypothesis is that these three segments are marked by particularly strong skills and knowledge gaps, due to their technical nature (maintenance and repairs, production) or innovative nature (end-of-life management of batteries and EVs). Hence, even if the ecosystem is slightly less optimistic on their growth potential, it identifies strong needs for qualified personnel to fill the gap in these areas as well.

Overall, as these areas are tightly interconnected and required for a robust uptake of e-mobility at various stages – e.g. in the short term for aftermarket support, in the longer term for vehicle and battery production – investing in all is needed to form a holistic strategy spurring long-term growth and localisation of value creation.

Job positions needed

An acute demand for EV technicians is expected over the next two years across all levels of vehicle, battery and infrastructure, followed by operators and engineers to a lesser extent. This perception of a very high need for skilled technicians in e-mobility is homogenous across the ecosystem: 81% of the companies indicate that they will have the biggest needs for technicians in this period, while 72% of the other ecosystem players identify a very high demand for technicians. Operators and engineers are also needed but less critically (respectively, 38% and 56%, and 44% and 40%), and management level to a much lesser event. This is aligned with findings in their EAC countries, e.g. in Rwanda where a "demand for specialized technicians with expertise in electric vehicle repair, maintenance, and diagnostics" is identified (Republic of Rwanda, 2024) or Kenya, in which a curriculum for EV Assistant Technician was developed (Pamoja Transformation, 2025).

Identification of needed job by the workshop participants

Vehicle: in the vehicle segment, participants noted an increasing demand for electrical and mechanical technicians, primarily TVET graduates or trained electricians, who will be responsible for the assembly, maintenance, and repair of EVs. They also emphasized the importance of EV drivers to operate electric fleets in both public and commercial transport, as well as the need for trainers to enhance the skills of technicians and drivers alike

Battery: in the battery subsector, discussions emphasised the upcoming need for skilled technicians to handle battery assembly, testing, and maintenance, along with engineers focused on battery design and modelling, albeit at a slightly more distant time horizon. Trainers will also be essential to facilitate knowledge transfer and skill development

Infrastructure: the participants highlighted the need for technicians to handle the installation of plug-in charging and battery swapping systems, for operators to manage daily operations and interact with customers at the stations, and engineers for designing, optimizing infrastructure layout and integrating safety measures. Trainers again play a key role in workforce development. Trainers were also seen as vital for building the capacity of both technical and operational staff. Other essential roles include: sales and marketing professionals to stimulate EV demand and R&D personnel to drive innovation; and local adaptation of e-mobility technologies.

While mechanics - understood by participants as often working in garages or workshops with a focus on repair and maintenance, and typically trained through apprenticeships, informal training, or short-term programs - dominate the informal vehicle service sector, the rise of e-mobility will increase demand for formally trained technicians. Technicians are considered having formal training or education, mostly through TVET and work in a more structured environment. Bridging the gap through upskilling programs, and ensuring proper certification, will be critical for an inclusive and robust transition.

Educational background needed

Knowledge is needed in four key areas:

- **Electrical and electronics**
- **Computer systems, IT, telematics, and software (hereafter "IT")**
- **Mechanical systems**
- **Logistics and supply chain management.**

Companies place a particularly strong emphasis on electrical and electronics skills over the next two years (88% of the surveyed companies identifying as "very strong"), clearly before IT (50%), mechanical engineering (28%) and logistics and supply chain (25%). Other players of the ecosystem identify a more balanced distribution of needs between these four areas. They further stress the need to support education in automotive engineering with EV specialization, ergonomics, quality control & safety; environmental engineering and recycling.

General disciplines such as accounting and finance, mathematics and physics, chemistry, human resources, are perceived to be less critically needed in the coming two years. However, this slightly changes in the expectations for the next five years, where stronger needs for chemistry, mathematics and physics are expressed. One hypothesis may be linked to a progressive increase of value creation on the battery segment, e.g. via local battery sizing, design and assembly.

The focus on electrical skills is consistent with skill needs identified in other countries, e.g. with highest priority on skills development of Electrical Service Technicians in the Philippines, while Mechanical Service Technician skills could be provided by existing technicians knowledgeable with ICEVs, yet with retraining of those to address any concerns with electrical safety, e.g. fear of electrocution (Angosta Lopez, 2023; UNEP, ILO, UNDP, UNIDO, UNITAR, 2024). The need for IT skills is also a typical area identified, needed from the design of BMS, R&D to fleet management (ibid).

Two specificities can be found in the context of Tanzania: the high position of manufacturing skills - possibly as the need to increase local assembly and develop further local manufacturing of parts is present, in a current context of imports dominating the sector and local assembly only emerging -, and of logistics and supply chain management. The latter can be linked to the reported difficulties to navigate supply chains for EVs, charging infrastructure and spare parts, secure quality products, and reduce delays, all considered to be particularly strong challenges.

Future training considered by education institutions

In response to the development of the e-mobility market, some educational institutions have integrated some topics related to e-mobility in existing modules, e.g. UDSM, NIT, and ATC. Some institutions desire to expand their training offer on e-mobility in the future, via short or professional courses, or via long courses on e-mobility at various levels of qualification including ordinary diplomas, bachelor and masters, e.g. DIT, ATC, NIT.

For the coming five years, the workshop participants considered short courses, professional programmes, and the integration of e-mobility topics within existing modules as the easiest entry points.

- **Professional and short courses**: these could be situated at education institutions offering courses at diploma, degree levels and short professional courses (DIT, UDSM, NIT, ATC, etc.) and at VETA centers. Most education institutions present at the validation workshop consider these professional and short courses to be the most suited frameworks for the upcoming five years. Courses should consider typical challenges and recommendations identified by NACTVET, such as the need to strengthen coordinating mechanisms of TVET programmes offered by the various providers to ensure continuity between vocational and technical curricula, the need to align the training with labour-market demands by involving employers, academia, and policy makers, and the need to include marginalized groups and women (NACTVET, 2022).
- **For higher learning, integrating e-mobility topics modules within current education programs** is seen as a more practical and scalable pathway to build up a skilled workforce and support the rapid expansion of the e-mobility sector, compared to standalone courses, which would be a

longer-term perspective.

In the more distant future of five to ten years, standalone long courses on e-mobility are envisaged as the market develops. According to participants, this long period stems from four pre-requisites:

- Need for market demand, justifying the development of an ad-hoc curriculum
- Need for a national policy framework supporting and regulating e-mobility, as a prerequisite for some institutions to get approval from their management
- Periodicity and time needed for curriculum approval or review by NACTVET for the technical education training levels of the national qualification framework and by TCU for higher university levels.
- Securing funding to develop curricula and modernisation of facilities and equipment.

Further aspects will be key to support knowledge localisation within Tanzanian education institutions:

- **Strengthened cooperation with e-mobility companies or garages**, via student internship and joint work on hands-on activities, e.g. vehicle or battery assembly. This could also extend to cooperation and knowledge sharing with entities involved in industrial support in Tanzania, such as the Small Industries Development Organization (SIDO) or Tanzania Research and Development Organization (TIRDO)
- **Development of research networks with universities in East Africa**, countries showing similar EV types of advanced policy frameworks e.g. India, ASEAN, or Europe.

Recommendations for E-Mobility Training

Finding #3: A wide array of training and capacity-building activities is required to tackle short, medium and long-term needs for the e-mobility transition.

Short to medium-term training needs

Training activities should address the most pressing challenges identified in the study, namely the lack of basic training on e-mobility suited to the needs of e-mobility companies and available to students and garage workers, as well the lack of awareness on e-mobility fundamentals among students, limiting the recruitment pool, as well as with teaching staff, government staff, and any interested institution.

Training on the fundamentals of e-mobility

- **Rationale**: training on the fundamentals of e-mobility, opportunities and pre-requisitives of a robust and sound roll-out, through key technological, market, policy and environmental dimensions. This aims to strengthen knowledge and raise awareness among a wide spectrum of beneficiaries. This type of introductory training is also found in other locations, e.g. in Ghana with KNUST Level 1 training, 'Electric Vehicle Awareness Training' (see 'The National, Regional and Global Context' Sections). It is essential in a context where e-mobility:
  (1) is not a policy priority yet, contrary to other technologies such as CNG
  (2) suffers from low awareness among students and government according to key stakeholders, limiting the pool of potential recruits
  (3) yet exhibit key opportunities that should be reaped, e.g. economic gains, potential for industrial development, and reduction of carbon emissions
  (4) but also bears safety and environmental risks linked to the import of sub-standards products, which need to be addressed for a safe roll-out of e-mobility.

- **Topics**: high-priority topics across all type of EVs (see Figure 12):
  - Fundamentals of e-mobility, trends and key concepts
  - Charging infrastructure technologies, strategies, localisation, standards
  - Policies and planning for an efficient transition to electric mobility
  - Battery technologies, design, assembly and safety, second life and circularity
  - Specific focus on electric two- and three-wheelers: charging infrastructure; battery technologies; diagnostics, troubleshooting and maintenance.

- **Participants**: broad range based on demand, including:
  - Students to create interest and widen recruitment pools from various fields - not only electrical, mechanical or automotive engineering but also urban planning, transportation or civil engineering, development studies, environmental sciences and climate change
  - Teaching staff, e.g. for continuous learning
  - Any stakeholder interested in understanding the basics of e-mobility, including Government staff, e.g. from ministries, agencies active in industrial development, trade facilitating, EV sale officers, safety officers, etc.

- **Approach**: flexibility should be the guiding principle, with modules developed based on demand and specific areas of interest (e.g. fundamentals of electric buses to authorities or operators involved in the BRT or minibus operations, in view of a potential shift), and various training formats (training of trainers, online, in-person, study visits, etc.). Gender aspects should be a key consideration when planning training sessions, or a standalone training module.

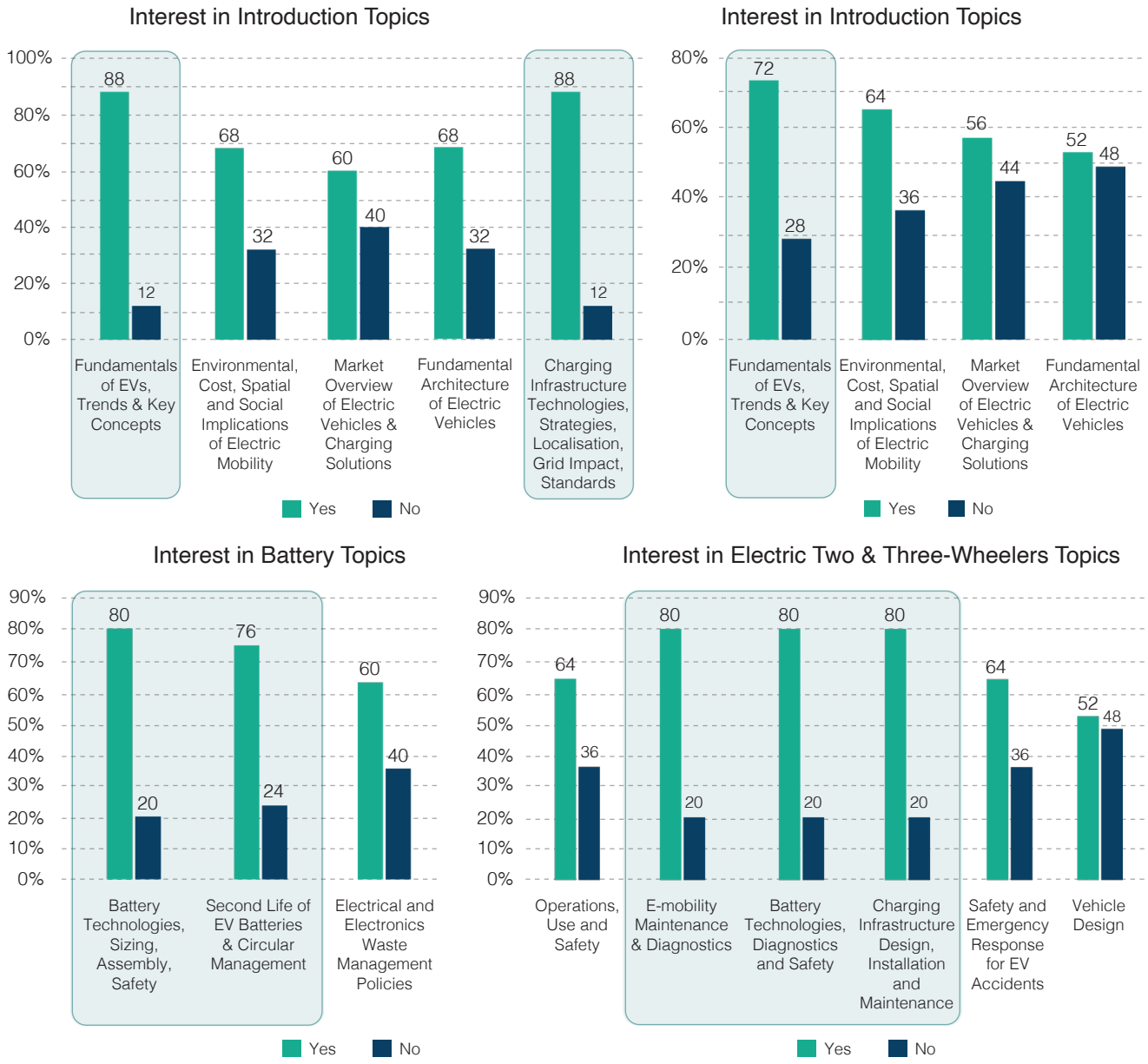


Fig 12. Interest in training topics among the survey respondents

Practical TVET training

- **Rationale**: practical TVET training to build hands-on skills to address critical areas such as EV and battery diagnostics, troubleshooting, and charging systems, to train EV technicians

- **Topics**: high-priority topics as identified by ecosystem stakeholders, in particular companies (see Figure 13):
  - › Basic EV troubleshooting, repair and maintenance, diagnostics
  - › Occupational Safety & Health Training (OSHT), in particular with relationship to safety and batteries
  - › Fundamentals of EVs and charging infrastructure
  - › Batteries: battery technologies; testing, troubleshooting, repair and maintenance; end-of-life management of lithium-ion batteries (dismantling, sorting, processing and re-assembly), assembly of battery packs

- **Participants**: garage workers, and students at education institutions offering ordinary diplomas (e.g. DIT, UDSM, NIT) or at VETA centres, with a focus on gender inclusion.

- **Approach**: short or professional course, no requiring prior curriculum approval

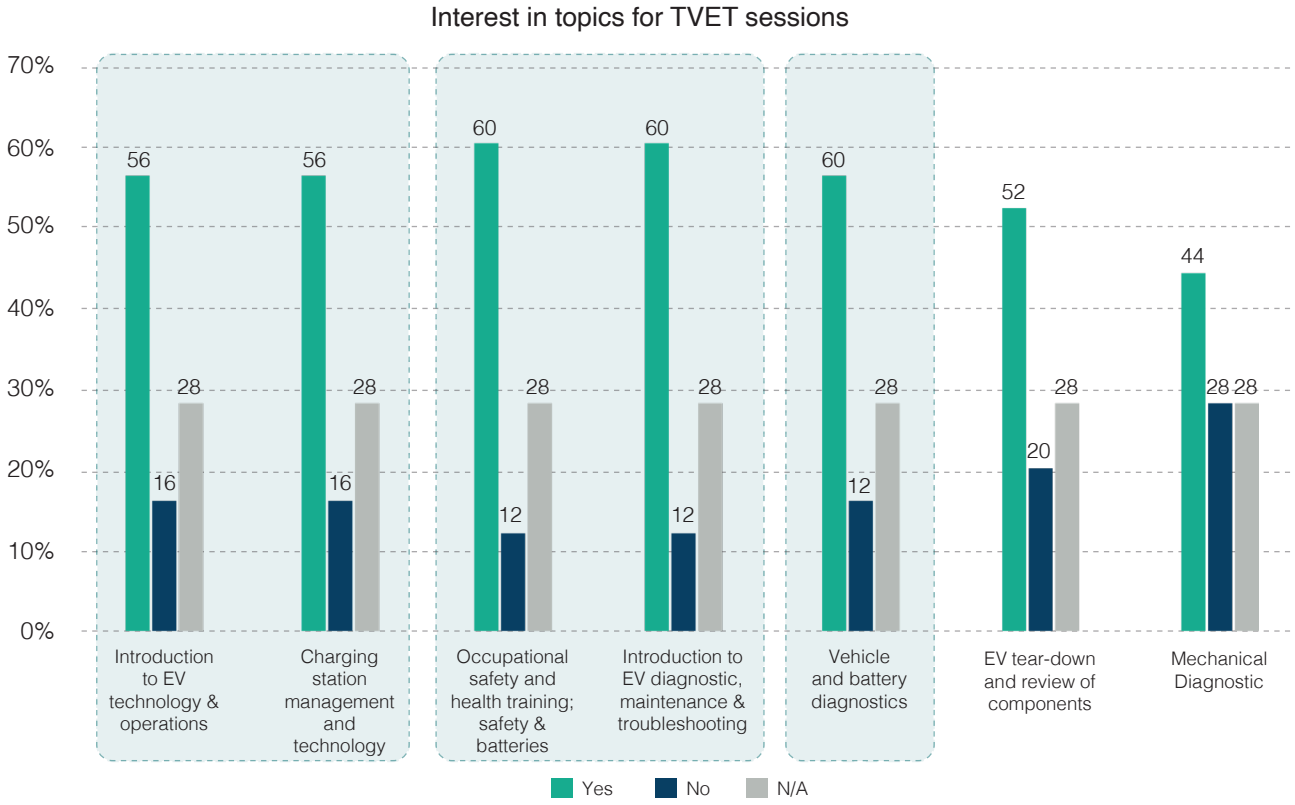


Fig 13. Interest in TVET hand-on training focus areas

Complementary key activities

- **Collaboration** between companies, garages, and education institutions, via student internships, apprenticeship, or career fairs.
- **Driving and safety training for EV drivers**.
- **Develop non-technical skills**, for instance on:
  - › **Business development and management**: a need identified by some of the e-mobility companies surveyed, and by at least two education institutions, as students currently face challenges to transform small pilots developed at education campuses into viable businesses.
  - › **Basic competences**, often identified as needed in other e-mobility markets (e.g. analytical, critical thinking, and active learning in UNEP, ILO, UNDP, UNIDO, UNITAR, 2024), or part of TESDA's Pure Battery Propelled Electric Vehicle Servicing Level II Qualification in the Philippines (e.g. workplace communication, team work, workplace problem-solving skills, workplane innovations, etc.).

Medium to long-term training needs

In the medium to longer term, key objectives should include the consolidation and expansion of e-mobility technical and non-technical skills, in particular with a view to increase the value locally created, e.g. through activities supporting local vehicle manufacturing and battery design assembly. Capacity building activities should support this shift.

In particular, international study and research stays may stimulate localisation of value creation, available for students and staff in electrical, mechanical or automobile engineering, to study, use equipment and develop their own research projects thereby fostering a skilled workforce to sustain Tanzania's burgeoning e-mobility industry. For instance, exchanges to other universities, assemblers or training organisations in EAC countries or further countries either with an advanced e-mobility industry or exhibiting similar EV types as in Tanzania.

Recommendations for Policy Support

Finding #4: Policy support and further sectoral exchange is required to develop a framework for skills development

Experience in countries with substantial e-mobility market development show the crucial importance of standardisation and certification of qualification, to ensure that skills are recognised within the EV ecosystem, and enable transfer and upskilling of ICEV workers to EVs, as well as ensure a safe roll-out of vehicle and charging infrastructure technologies (UNEP, ILO, UNDP, UNIDO, UNITAR, 2024). Tanzania's policy framework provides a strong foundation for advancing e-mobility skills development, building on key instruments such as the Education and Training Policy (2014, revised 2023), the National Science, Technology and Innovation Policy, and the Tanzania Development Vision 2050, which emphasize STEM education, technical and vocational skills, innovation, and a technology-driven economy. Within this enabling environment, there are significant opportunities to develop e-mobility skills by leveraging the experience of NACTET, with the support of industry engagement from the Tanzania E-Mobility Association (TAEMA), to further develop need-based curricula and support workforce readiness across the EV value chain.

Based on the findings of this initial assessment, policy recommendations can be identified for further discussion within the Tanzania e-mobility sector:

- **Development of a comprehensive e-mobility policy roadmap that integrates the dimension of human resource development**, covering skills and capacity-building of the needed personnel to support the development of the EV industry, identifying government institutions and agencies tasked with this development.
- **Definition of occupational profiles**, to ensure clarity over the terminology used. Peer learning exchange could be proposed to key Tanzanian institutions including NACTVET, to learn about the definition and standardisation of occupational profiles in the e-mobility sector, for instance with Rwanda TVET Board (RTB) which has undertaken these tasks (Republic of Rwanda, 2024), or within the EAC.
- **Development of competency standards for technicians**, particularly of electrical service technicians. As recommended above, peer learning exchanges could help identify recommendations on the process, for instance with Kenyan authorities on their experience and learnings while developing their E-Mobility Curriculum for Electric Vehicle Assistant Technician II – National Skill Certificate (NSC) II, KNQF Level 3, and in the Philippines with TESDA on their Pure Battery Propelled Electric Vehicle Servicing Level II Qualification. This could be used as an opportunity to develop corresponding short or long courses, e.g. as done by TESDA with its "Electrical Installation and Maintenance NC II course"
- **Sectoral discussion on specific and suitable requirements with regards to charging infrastructure** (Electric Vehicle Supply Equipment, EVSE), i.e. requirements for the installation, inspection and the role of various stakeholders. A potential inspiration or reference point could be the Tanzanian regulatory framework applying to CNG and mandating a series of obligations related to personnel and skills, e.g. inspection, workshops approval, and certifiers (Petroleum, Compressed Natural Gas, Supply and Marketing Services Rules, 2019). Similarly, Energy and Water Utilities Regulatory Authority (EWURA)'s Common Qualification System (CQS), as a professional database and data repository on activities of suppliers and service providers carrying out petroleum and natural gas activities in Tanzania, could provide a reference point.

- **Develop courses at TVET and higher education institutions, as well as integrate e-mobility related topics within existing teaching modules**. A broad range of participants and training topics should be considered to address the spectrum of training needs - from EV fundamentals, to diagnostics and troubleshooting, to broader training on e-mobility fundamentals, policies and safety pre-requisites. Beyond training to students and professionals active in e-mobility (technicians, company staff, garages or workshop workers, fundis), training should be offered to government staff to ensure dissemination on e-mobility, which remains a complex and rapidly changing field for public policy.
- **Create a task-force or sub-group for sectoral discussions on human capacity for e-mobility**. It is recommended to involve all government institutions involved in electric mobility and education policy, including the Ministry of Transport, the Ministry of Education, NACTVET, TCU, supported by organisations including TAEMA, COSTECH and the Tanzania Renewable Energy Association (TAREA). Such taskforce could be provide a structure to (1) regularly update and report on progress and respective capacity building activities (e-mobility companies, education institutions, garages and workshops), which may benefit from the development of a shared database (example: Common Qualification System, CQS); (2) exchange on the development of short or long courses at education institutions, providing spaces for continuous exchanges between institutions active on e-mobility based in different locations, e.g. Dar es Salaam and Arusha. (3) exchange on curriculum development, definition of occupational profiles, and development of competency standards, thereby deepening the skills assessment for each segment of the value chain initiated in this study. Contacts with relevant foreign authorities having developed their own certification frameworks or e-mobility curriculum (e.g. Kenya, Ghana, Philippines, Thailand, etc.) should be encouraged and supported.

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