

E-Mobility as a Driver for Change: Towards a gender transformative and just transition to electric mobility



Photo: La Rolita/Xiomi Garzon

**International Baseline Report on
Gender and E-mobility**

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Federal Ministry
for Economic Cooperation
and Development

Background

This report is the first deliverable under the project “**E-Mobility as a Driver for Change - Towards a gender transformative and just transition to electric mobility**” which is being implemented by the United Nations Environment Programme (UNEP) with funding from the German Federal Ministry for Economic Cooperation and Development (BMZ). The project aims to ensure that the introduction of, and shift to, electric mobility (E-Mobility) in low- and middle-income countries (LMICs) will include and promote the position and interests of women, to create a more gender transformative and just transport sector. Engaging more women in the E-Mobility ecosystem can in turn help to speed up the transition to zero emission mobility systems.

This report has the objective to increase the knowledge and evidence base, internationally and locally, on how women can play a more important role in accelerating the take up of E-Mobility based on improved data availability. There is a unique opportunity to revise the current planning and decision-making paradigm in transport as the transition to E-Mobility accelerates and disrupts the established system based on Internal Combustion Engine vehicles (ICEVs). It will also bring in new players and innovative opportunities leading to a more inclusive transport sector.

Based on the collection and analysis of gender-disaggregated data, an evidence-based framework for the integration of gender into E-Mobility projects will be developed. The framework is aimed at informing international and national policy makers, and the industry on how gender can be included in E-Mobility policies. To ensure effectiveness, the framework will be piloted through project activities in various countries. Following validation, it will be disseminated widely to encourage adoption, replicated in other projects and ultimately help to achieve both GHG and air pollution emission reduction and progress in gender equality.

This project is being implemented within the framework of **UNEP’s Global Electric Mobility Programme**. The Global Electric Mobility Programme supports member states, especially LMICs with the introduction of E-Mobility to reduce air pollution and mitigate climate change. The Programme is currently working with partners to actively support the shift to electric mobility in more than 60 LMICs, implementing grants close to US\$ 130 million. The program is active on global, regional and country levels, combining technical assistance, outreach, awareness campaigns and investment.

The findings of this report and follow up activities will strengthen gender considerations across UNEP’s Global Electric Mobility Programme. The Programme incorporates activities on facilitating a gender responsive E-Mobility transition with the development of national gender responsive E-Mobility strategies, the collection of gender disaggregated data in country projects, the inclusion of women’s representatives in the intersectoral E-Mobility steering committee and quotas for women’s participation in workshops and training. While these are important first steps, to have real impact on women’s inclusion, gender considerations need to be placed at the center of all areas of the shift towards decarbonizing mobility, guiding testing, validating, systematizing and mainstreaming a gender transformative approach to E-Mobility and facilitating replication of project experiences in other countries and cities.

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Glossary of acronyms

ADB	- Asian Development Bank
BEV	- Battery Electric Vehicles
BaaS	- Battery as a Service
CAF	- Development Bank of Latin America and the Caribbean
E-Mobility	- Electric Mobility
EVs	- Electric Vehicles
FCEV	- Fuel Cell Electric Vehicles
ICE	- Internal Combustion Engine
ICCT	- International Council on Clean Transportation
IDB	- Inter American Development Bank
IEA	- International Energy Agency
ITF	- International Transport Workers Federation
LMIC	- Low- and Middle-Income Countries
MaaS	- Mobility as a Service
MRV	- Monitoring Reporting and Verification
OECD	- Organization for Economic Co-operation and Development
PHEV	- Plug in Hybrid Electric Vehicles
PWD	- People with disabilities
SDG	- Sustainable Development Goals
SIGI	- Social Institutions and Gender Index
STEM	- Science, Technology, Engineering and Mathematics
TUMI	- Transformative Urban Mobility Initiative
UNEP	- United Nations Environment Programme
UNFCCC	- United Nations Framework Convention for Climate Change
WHO	- World Health Organization
ZEV	- Zero Emission Vehicles

Executive Summary

Overview

This report is the first deliverable under the project “**E-Mobility as a Driver for Change - Towards a gender transformative and just transition to electric mobility**” which is being implemented by the United Nations Environment Programme (UNEP) with funding from the German Federal Ministry for Economic Cooperation and Development (BMZ). The project aims to ensure that the introduction of, and shift to, electric mobility (E-Mobility) in low- and middle-income countries (LMICs) will include and promote the position and interests of women and create a more gender transformative and just transport sector.

This **international baseline study** sets out the current state-of-the-art on the introduction of E-Mobility and identifies **potential entry points for women** to benefit and become more involved in this transition. The report focuses on gender inequalities in the road transport sector and looks at how these are currently transferred into E-Mobility. It addresses challenges for women as users, workers, planners, practitioners, entrepreneurs and decision-makers. The report has been designed to be a reference document, providing state-of-the-art information on gender, transport and E-Mobility that can be used by national and local policy and decision makers, as well as the industry and development institutions, to include gender in their policies, projects and actions to ensure this transition is not only transformative but also just.

Section one **identifies current challenges for women** and their mobility in relation to E-Mobility and defines how this intersects with gender. It then maps international policy frameworks that support and encourage national efforts to introduce and support E-Mobility and gender equality and address climate change. Section two looks at the interplay of **gender roles and transport**, section three gives an overview of the **global electric vehicle (EV) market** and how E-Mobility is being introduced into LMICs. It also touches on major trends in job and skill sets required for this transition and identifies those that present opportunities and/or challenges for women. We also delve into the wider ecosystem of EV design, manufacturing, assembly, and after sales; and consider key aspects of charging infrastructures and battery development that are part of the transition to all forms of electric mobility and make suggestions where women can step into these emerging sub-sectors. Section four sets out some of the **data challenges** and the findings from practitioners who answered our online survey and interviews and finally, in section five, we share our conclusions and put forward **recommendations and suggestions for high potential entry points** where women can benefit and add value to this transition and identify risks to equity and justice. Furthermore, we identify current E-Mobility initiatives with a gender component, with a view to develop gender transformative projects across the whole E-Mobility ecosystem.

While the report presents the global picture of **electric mobility focusing on LMICs**, it also draws on the more detailed situation in **six countries: Colombia, Ecuador, Indonesia, Kenya, Uganda and Vietnam**. Deep dives for each of these countries have been prepared by local teams. Country level information is included in this report as well as short case studies from the six project countries. These country reports will be published subsequently.

The information and sources from the international and country literature reviews have been collected into an online database that can be sorted per thematic area (such as policy, industry) as well as geographical region.

Executive Summary

Gender is now a widely used term and it refers to socially constructed characteristics and roles of women, men, girls and boys. As a social construct, gender varies from society to society and changes over time. It is not biologically determined, and gender identity does not always match expectations associated with assigned biological sex. Gender is frequently used as a proxy for women. While this is the case for this report, we recognize that by doing this, we do not include the wider dimensions of gender(s) such as the LGBTQ+ communities and other gender identities beyond the male-female binary (e.g. non-binary, gender queer etc.).

Internationally there has been good progress over the past 20 years to acknowledge the importance of gender equality and many imbalances in international policy have been formally recognized and efforts made to address them. **International agreements** such as the [Paris Agreement on Climate Change](#), [2030 Agenda for Sustainable Development](#) (SDG) and the [New Urban Agenda \(NUA\)](#) help to stimulate national policies linking gender equality with sustainability. However, progress is slow, and data remains patchy, especially in respect to gender and transport. Providing equal legal rights is a cornerstone of achieving gender equality but this is not yet the case in many LMICs (especially in the Middle East, North Africa and South Asia).

Besides gender inequality, **climate change is a major global issue** linked to transport. Currently, over 90 per cent of transportation uses fossil fuel for its energy, and the sector accounts for almost two thirds of the oil used worldwide¹. Diesel and gasoline dominate as transport fuels. They both produce high levels of greenhouse gas (GHG) emissions and local pollution, so the sector must shift away from these fuels if it is to decarbonize and reduce negative health impacts. Electric mobility (E-Mobility) is one of the most promising alternatives that can **deliver both climate benefits and local pollution improvements**. There are an increasing number of international commitments to introduce E-Mobility, and transport features in many National Determined Contributions (NDCs) and national energy plans in LMICs, with some having specific targets for Electric Vehicles (EVs). A few triangulate these policies with gender aspects, but most references are vague, yet the UNFCCC has made significant progress to include gender into its framework and working parties and encourages the parties (countries) to do so. If gender is not specifically included in national reporting on international commitments it is likely to be overlooked, under-resourced and under-reported.

Women are **not as active in the global labor force** as men. This is largely due to the disproportionate amount of unpaid work they do as part of their family and caring responsibilities. They spend significantly more time on this than men do, which constrains them from working in paid employment and limits them from starting their own businesses. The ILO estimates that the burden of the economy of care, defined as unpaid domestic work looking after family members, can be valued at 9 per cent of global Gross Domestic Product (GDP). They are also absent and underrepresented in the transport workforce.

According to UN Women's report '*Progress on the Sustainable Development Goals: The gender snapshot 2023*'², there are persistent **gender gaps in power and leadership** and women struggle to get into political and commercial leadership positions in all sectors. Improving education for women and girls has seen the most progress in the past decade and there are many more women, especially in LMICs who are attaining university degrees. However, there are still **major gaps in women studying**

¹ <https://understand-energy.stanford.edu/energy-services/energy-transportation> - :~:text=Transportation modes for passengers and,of the oil used worldwide.

² <https://www.unwomen.org/en/digital-library/publications/2023/09/progress-on-the-sustainable-development-goals-the-gender-snapshot-2023>

the Science, Technology, Engineering and Mathematics (STEM) subjects that are needed for them to enter the technical areas of E-Mobility.

The low representation of women in STEM subjects is common in every region of the world. Global trends in the participation of women and girls in STEM found that even though in some countries graduation rates are higher among women than men, those that do graduate in STEM subjects are less likely to enter STEM careers; and exit their careers earlier than male peers. Women are also underrepresented in Information and Communication Technologies (ICT) jobs, another critical skill in the pathway to E-Mobility.

Access to modern energy services is a necessary component of economic growth, among other things and for the introduction of E-Mobility. Women are already strongly affected by their access to energy for domestic purposes, and this will also affect the possibility of them adopting E-Mobility. Electricity insecurity will certainly impact the ability to charge EVs. This is a risk to the take up of E-Mobility especially for women who need reliable transport and those using EVs for commercial reasons. Solar energy is an option for E-Mobility charging in many LMICs, but this is not yet widely used. Increasing access to off-grid and solar energy may help women in more ways than transport by providing energy for other uses including education (with on-line learning), as well as access to water and clean cooking.

Transport is an essential service that enables the mobility of people and goods and provides access to opportunities that support daily life as well as societal and economic functions. It is, therefore, both a public good, and an enabler for economic and social development. Traditionally and historically, transport is recognized as a male dominated sector; therefore, achieving **equality in the transport sector presents a major challenge**. Today, women are underrepresented in all aspects³ and the transport decision-making paradigm in place for planning, investments and operations is largely in the hands of men⁴.

The intersection of gender and the transition to cleaner, greener mobility is an important one. There is an **unconscious bias** in planning and investment in transport towards the needs of men, and this must be addressed if the shift to electric mobility is to be just. As women represent half the global population, this is a reasonable expectation. The best way to do this is for **more women to actively participate** in the introduction of E-Mobility at all levels. For instance, if they are in decision making roles, they can influence investments and promote the position and interests of women, to create a more gender transformative and just transport sector. This is true everywhere, but in particular in LMICs, where the men dominate all levels of transport organization, investments and operations.

The interplay of **gender and transport** is highly contextual as gender-related needs and roles differ across cultures and geographies. Women and men use transport in different ways, and this is well documented. There is widespread evidence on the typical behaviors and needs that are shared by most women. These dimensions of transport are highly interrelated and define many choices women make about their travel, namely:

- Mobility options, availability and cost (mode, distance to access etc.);
- Safety and security (both perceived personal security for themselves and others, and real levels of safety and security); and

³ <https://www.weforum.org/agenda/2023/01/women-in-mobility-sector-gender-equality/>

⁴ Gender imbalance in the transport sector – a toolkit for change <https://www.polisnetwork.eu/news/gender-balance-in-the-transport-sector-a-toolkit-for-change/>

- Life stage and occupations (schoolgirl, student, mother, elder, homemaker, full/part time, formal or informal worker).

Applying a gender lens⁵ is complex, so we have used four categories to structure our analysis and identify the most promising entry points in E-Mobility. These are: **women as transport users, as workers, as entrepreneurs and as decision makers.**

Women as users need safe, sustainable transport options (as men do), but they face greater mobility challenges than men. They tend to access transport systems according to the availability of transport (private) or public (mode, frequency, and timetables), affordability (cost per trip without extra costs for interchanging), accessibility (physical and cognitive) and acceptability (frequency of services, comfort, passenger information and their perceptions of safety and personal security) of current transport options. In this context the availability, affordability and acceptability of the transport options define their mobility, and this does not rely on the energy used. In other words, E-Mobility will not necessarily influence their travel choices without other systemic changes – as the difference between being able to go somewhere, or not, is more important than the fuel used. This is especially the case in LMICs where convenient and safe public transport options are often lacking.

Our research confirms that buses, shared taxis and two and three wheelers (2/3Ws) are the modes most used by women. Therefore, if vehicle or services design of these modes are being improved with the introduction of E-Mobility, women may benefit even more than men given their higher usage of these modes. There are also options for women as users of E-Mobility especially in rural areas. Here the vehicles need to be adapted for rough terrain and higher loads. For instance, cargo bikes have been electrified and re-designed for rural use and can be used for example to carry water as well as people. E-tricycles also have a promising future as multipurpose vehicles including for health services.

Our findings also show that women face the same, or similar socio-economic, cultural, and institutional barriers to access E-Mobility as they do to conventional (fossil fueled) transportation, with some additional constraints. These include the high price of EVs and a lack of knowledge about E-Mobility, but it is expected that these barriers are likely to diminish over the next decade or so.

Women as workers in the E-Mobility sector present a promising opportunity to transform the workforce. Transport not only provides access to jobs but generates many jobs itself. But data and information on actual numbers, disaggregated information by subsector and occupation profile are difficult to come by. In 2019, according to the ILO, women represented less than 20 per cent of the global transport workforce⁶. These figures are very general and camouflage the realities of each subsector within transport and hide many inequalities in jobs. Nonetheless, this evidence shows that women are underrepresented as workers across the whole sector, and this is more pronounced in technical areas. Furthermore, most of transport operations (e.g. public transport (formal and informal), taxis (car and motorcycle), deliveries and logistics) are firmly in the hands of men, especially in LMICs.

The **electric vehicle market has experienced exponential growth.** The three largest markets in terms of manufacture and assembly and as users are China, who is the largest market and maker of EVs worldwide, the United States and Europe. Today approximately 14 per cent of all new cars sold are electric, with most of the take up of in a few high-income countries, but EV sales in other categories

⁵ Applying a gender lens means looking at ways in which content and approaches are informed by, shaped by, or biased toward men's or women's perspectives i.e. gendered. As men and women are conditioned to see things differently, applying a gender lens to research and analysis means examining the implications of our socially constructed roles and biases.

⁶ <https://blogs.worldbank.org/en/latinamerica/women-transportation-advance-leads-change-quito>

are growing strongly in LMICs. **Globally 2/3Ws are the most electrified market segment** today and they are widely used in LMICs. This new market segment provides many openings for women to participate in the transition to E-Mobility.

There are numerous initiatives globally already in place to increase the number of women working in the transport sector. But more is needed to move from pilot projects to scale up. For instance, there are an increasing number of female E-bus drivers (La Rolita, in Bogotá, Colombia is a good example of this) and there are several examples of projects to support women as E-motorcycle (E-2W) or E-three wheelers (E-3W) drivers. Several examples found in Latin America, Africa and Asia are highlighted in this report. But operations are only one aspect, and women can work in many other areas of the E-Mobility ecosystem.

The introduction of E-Mobility also presents many interesting opportunities for women's empowerment **through entrepreneurship**. Women's entrepreneurship is stifled by their limited **access to finance**. This affects them being able to start a business or to purchase an EV. Our investigation showed that access to finance was a major barrier for women to engage as entrepreneurs with E-Mobility. Currently, most female-led enterprises are small, and women own a third of the registered small-to-medium sized businesses (SME) in the world. Furthermore, many women led businesses, especially in LMICs are informal and therefore don't feature in these statistics. Women are also actively participating in the 'gig' economy and are increasingly working in on-demand services. The service offers of ride hailing taxis and urban deliveries by car or 2/3Ws are growing and electrification is an extra dimension. These jobs can be attractive options for women as they choose the hours they want to work. However, many of those working via these platforms do not benefit from social protection and fair pay.

Women are also significantly under-represented in **decision making roles** generally, and specifically, in transport. Women's equal participation and leadership in political and public life is seen as being essential to achieving the Sustainable Development Goals. Based in 2024 information from 190 countries⁷, UN Women found that there are only 18 countries with a woman Head of State, and 15 countries with a female Head of Government. Furthermore, only 8 per cent of women cabinet ministers were responsible for transport. All our six countries have different approaches to gender mainstreaming at national level. Many have gender embedded in national policy documents with language that obligates government bodies on the national and provincial levels to mainstream gender in the planning, implementation, monitoring, and evaluation of all transport policies and programs, but this is not always transposed into the reality, especially when it comes to decision makers in the transport sector. Nonetheless, leadership takes many forms, and we were able to identify several examples of women in senior positions that had been able to overcome the many challenges and are shaping the future of transport in the E-Mobility sector.

There are **several barriers** that impede the mass up-take of EVs, and some are shared equally between women and men, while others are more specific to women. High purchase prices of EVs are of particular concern to women, who have less access to capital than men. Consumers everywhere worry about the distance they can drive⁸ with an EV, the availability of recharging infrastructure and the time it takes for a full charge (especially at public charging points). In some of the countries we investigated, we found a lower general awareness and understanding about E-Mobility in women than men, this included understanding about range and access to charging infrastructure. Furthermore, it appears

⁷ <https://www.unwomen.org/en/what-we-do/leadership-and-political-participation/facts-and-figures>

⁸ The distance i.e. range depends on battery size and capacity but also to the topography, the driver's style and the weather conditions which affect battery charge and life.

that women have additional concerns about the functionality of the charging infrastructure – *‘attaching the charging cable properly, accessing the digital platform for payment for the charge, how much will the charge cost in the public space compared to access at home, how long will it take to charge, waiting in public space and feeling vulnerable* etc. Awareness building with women is needed and this could be increased if the location of charging points shared EVs were located near places of interest that women use.

Furthermore, there are cross cutting issues such as the **digital literacy and knowledge gap**. Digital literacy and access to data via smartphones is an area that will also determine access to E-Mobility for both men and women. As men are more likely to be trained in ICT technologies, they have a higher level of digital know-how and understanding compared to women. The number of smartphone mobile network subscriptions worldwide reached almost seven billion in 2023⁹, and over half (54 per cent) of the global population now owns at least one smartphone¹⁰. But connectivity varies widely between regions and even within countries. GSMA, the international body that collects information about the mobile phone ecosystem, states that Sub-Saharan Africa has the largest gaps in coverage and usage.

The shift to E-Mobility will also bring undeniably **positive health** effects such as less noise and local air pollution. Lower noise and pollution levels in urban areas will improve the quality of life for those who live near major roads, as well as for those who walk as their main mode of transport. The tangible health benefits of cleaner air will benefit everyone, but especially young children and the elderly who suffer most from respiratory diseases. Furthermore, there is now research showing that women’s reproductive health is negatively affected by traffic pollution. Lower noise levels especially in urban areas will also improve the quality of life especially for those who live near major roads.

Key findings and recommendations

E-Mobility is well positioned to contribute to making **transport more equitable** and help address the numerous challenges and barriers women face today. New supply chains and the creation of a new eco-system serving E-Mobility present numerous entry points for including gender perspectives and these need to be led by different players. **Governments** should proactively create an enabling environment for the transition to be just and help support opportunities for women to enter the E-Mobility. This can take the form of policies and government led initiatives, but also help build awareness with capacity building programs with and for public and private sector players on gender aspects, requirements for education centers to develop vocational courses for women in E-Mobility and boosting existing courses in STEM subjects at universities. In addition, resources and financial support for the collection, monitoring and evaluation of gender disaggregated data and the monitoring of the implementation and impact of policies related to gender equality in the E-Mobility sector should be provided. Many international donors and development agencies are interested in E-mobility, but governments need to show that they can sustain and scale-up gender and E-Mobility projects. They can also work in partnership with financial institutions to give women better access to capital and low-cost finance so they can proactively engage as entrepreneurs at all levels of the transition.

Furthermore, to address the gap in research and development capacity in E-Mobility in LMICs – **the academic community** needs to actively support female researchers in all subjects related to E-Mobility and climate change. The **industry and private sector** players are responsible for ensuring that women have **equal levels of safety and security** in all E-Mobility products and services, and testing procedures

⁹ <https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/>

¹⁰ <https://www.gsma.com/newsroom/press-release/smartphone-owners-are-now-the-global-majority-new-gsma-report-reveals/>

and standards should reflect this. There needs to be conscious efforts made to ensure that the workforce is gender balanced, and women are able to fully participate. **Grass roots** and non-government organizations can also play **an important role** in building awareness and capacity at community level and support lighthouse and pilot projects targeted at getting women into E-Mobility. Professional networks foster knowledge exchange and experience and act as support mechanisms to help women thrive in the E-Mobility eco-system.

The following are key recommendations regarding the inclusion of gender in E-Mobility:

- Position electric mobility within **an integrated national strategy** for sustainable mobility to help ensure a just transition.
- **Strengthen the awareness of the gender, transport and climate change nexus** and develop skills for conducting gender analysis and gender mainstreaming when developing E-Mobility policies and projects.
- **Establish mechanisms for institutional coordination** across a wide range of institutions, which may not necessarily have any history of collaborating, including ministries and organizations that are responsible for gender and social aspects. Ensure that women are represented equally in decision making arenas, and especially at senior levels of any new bodies created for the introduction of E-Mobility.
- Invest in robust and comprehensive **disaggregated data collection** to fully understand and appreciate the gender dimensions of E-Mobility and improve the evidence base used for decision-making.
- Provide and support **capacity building, training, and sharing of know-how** to engage and inform officials and other stakeholders from the public and private sectors on the added value diversity and equality will bring to this transition. Information and data is needed to design inclusive policies, plans and schemes for E-Mobility, but also to build capacity with women so they are well positioned to benefit from the transport transformations that E-Mobility will bring. Greater efforts to build a robust and well qualified pipeline of suitable female candidates for new roles is therefore needed.
- Shape a **new E-Mobility workforce** highlighting women's skills to access green jobs in traditionally male dominated occupations across the full value chain – from vehicle design to end of life.
- Improve **formal vocational and technical training** so women can join the E-Mobility ecosystem and workforce and to address fear of change and knowledge gaps.
- Invest in **local research and development capacity** for E-Mobility and gender given the newness and multidimensionality of the topic.
- Enable and support **civil society and NGOs** to build awareness at community levels and address existing misunderstandings about E-Mobility.

The shift to E-Mobility is inevitable and provides an opportunity to address many of the constraints women current face in the transport sector. However, alone and without strong commitment and deliberate action by all stakeholders, it will not solve the failures of our current transport system. There are numerous high potential entry points that will help ensure that the transition, and resulting transport improvements, are both equitable and just. As passengers, drivers, workers and entrepreneurs, our study suggests that the **2 and 3-wheeler categories of EVs** have the highest potential to change women's lives, both as a transport mode and opportunities for employment. For instance, if more women can own and drive E-2/3Ws, this will bring multiple benefits beyond those associated with a shift to E-Mobility. In LMIC women often prefer to be driven by other women due

to personal security concerns. Thus, these EV entrepreneurs will be able to earn a living themselves by providing safe and secure first and last mile local connections to public transport and other local services especially attractive for women, but their services will additionally improve the mobility of the women who will use them. This in turn gives them more access to opportunities and jobs. Furthermore, there will be other E-Mobility co-benefits from cleaner local air, and less noise.

Women are themselves well placed to provide safe and secure mobility services for other women, but this is a new area of activity for many of them and they will need support, networks and know-how. The shift to cleaner, greener, more sustainable transport and the introduction of E-Mobility presents an opportunity to redress this.

While there needs to be a more enabling environment, **women must also step up to the challenge and claim this space**. It will not just be automatically given to them, but representation matters and getting more women involved in all levels of transport, and particularly in the transition to new technologies, will provide an opportunity to make the sector more inclusive. While women face similar challenges inherited from the current transport paradigm, it is likely to be easier for them to enter markets that are not yet controlled by incumbents and traditional practices. They can also add value to design, planning, operations and ownership of assets across the whole emerging EV ecosystem.

In conclusion, while **E-Mobility can certainly bring significant decarbonization benefits globally**, it also has the potential to contribute to several other important development agendas—notably **women's empowerment**, inclusive mobility, local air quality, energy security, and industrial development. If a strong and proactive policy framework is in place combine, the transition to E-Mobility could become a strong backbone of smart, sustainable and just mobility systems.

Section One: Global overview of transport, gender and E-Mobility

1.1 International context of transport

Transport is an essential service that enables the mobility of people and goods and provides access to opportunities that support daily life and societal and economic functions. Mobility can be provided through different modes of transport, public (collective) or private (individual) modes, and active modes such as walking, cycling. Usually more than one mode is used for any journey and these modes may use different sources of energy. In today's world, mobility should be equitable, efficient, safe and climate responsive to ensure that the needs of the current generation will not be met at the expense of future generations (i.e. that it will be sustainable)¹¹.

Currently, over 90 per cent of transportation uses fossil fuel for its energy, and the sector accounts for almost two thirds of the oil used worldwide¹². Diesel and gasoline are the dominant transport fuels, but they also produce high levels of greenhouse gas (GHG) emissions, local pollution and deplete natural reserves. According to Stanford University's Energy Learning Hub¹³ cars, light duty vehicles, and motorcycles account for approximately 60 percent of energy use¹⁴ in transportation, and 98 per cent of those vehicles run on gasoline. Research¹⁵ shows that fossil fuel powered vehicles are extremely inefficient and only about 12 - 30 per cent of the energy used in conventional (ICE) vehicle is used to move it (depending on the drive cycle)¹⁶, the rest is lost to engine and driveline inefficiencies. Therefore, shifting transport to other fuels can also increase the energy efficiency as well as decarbonize the sector.

Electric vehicles (EV) have emerged as a solution to replace fossil fuel use in transportation. EV sales are expected to be 17 million in 2024, and now account for more than one in five cars sold worldwide. Electric buses (E-Buses) and Electric Two and Three Wheelers (E-2/3Ws) are also growing in popularity all over the world, especially in low- and middle-income countries (LMICs).

Traditionally and historically, transport (along with construction) is recognized as a male dominated sector. The intersection of gender with the transition to electric mobility (E-Mobility) is therefore an important one. Women are already underrepresented in the transport sector¹⁷ and the current transport paradigm for planning, investments and operations is largely male dominated¹⁸. Therefore,

¹¹ https://sustainabledevelopment.un.org/content/documents/2643Global_Mobility_Report_2017.pdf

¹² [https://understand-energy.stanford.edu/energy-services/energy-transportation-#:~:text=Transportation modes for passengers and, of the oil used worldwide.](https://understand-energy.stanford.edu/energy-services/energy-transportation-#:~:text=Transportation%20modes%20for%20passengers%20and,%20of%20the%20oil%20used%20worldwide.)

¹³ Energy for transportation, Understanding Energy Learning Hub, Stanford University.

<https://understand-energy.stanford.edu/energy-services/energy-transportation>

¹⁴ GHG emissions are calculated based on the vehicle energy use (and efficiency)

¹⁵ Understanding Energy Learning Hub, Stanford University & US Department of Energy.

<https://www.fueleconomy.gov/feg/atv.shtml/index.html>

¹⁶ The European Environment Agency (EEA) <https://www.eea.europa.eu/data-and-maps/data/external/where-the-energy-goes-gasoline-vehicles> & US Dept. of Energy <https://www.fueleconomy.gov/feg/atv.shtml>

¹⁷ <https://www.weforum.org/agenda/2023/01/women-in-mobility-sector-gender-equality/>

¹⁸ Gender imbalance in the transport sector – a toolkit for change <https://www.polisnetwork.eu/news/gender-balance-in-the-transport-sector-a-toolkit-for-change/> & https://www.sum4all.org/data/files/gender_imbalance_in_the_transport_sector_a_toolkit_for_change.pdf.

transport projects aiming to shift to E-Mobility should intentionally include and promote the position and interests of women, to create a more gender transformative and just transport sector.

Despite the importance of understanding the gender impact of E-Mobility the topic has not been studied extensively. There is a limited integration of the gender-transport-climate nexus in policy and business decisions and a lack of general awareness and knowledge on how different transport policies or services impact men and women differently. Therefore, as we transition to E-Mobility, it's crucial to assess how this shift impacts different segments of society, including gender.

1.2. Baseline methodology

This international baseline study sets out the current state of the art on the introduction of E-Mobility especially in LMICs and identifies potential entry points for women to become more involved in this transition. The report focuses on the road transport sector and looks at the persistent gender inequalities and how these are transferred into women's realities. These include challenges for women as transport users, workers, planners, entrepreneurs, practitioners and decision-makers.

This report provides inputs to policymakers and companies to develop gender inclusive E-Mobility policies and programs. It also aims to help development partners that want to identify gender sensitive entry points and implementation strategies in their E-Mobility portfolio.

A general lack of gender-disaggregated data was identified as a considerable challenge to building evidence on gender actions within E-Mobility projects. Therefore, a comprehensive international literature review was undertaken. It identified key studies, papers and reports using the following keywords: Electric Mobility, E-Mobility, Gender, Women, Transport, Transportation, Inclusion/Inclusive, Gender equality/Equity & transport, Climate change & transport, Policy and Electric Mobility, Charging Infrastructure, Electric Vehicles (all categories) globally, Green Jobs and gender. Open-source publications, gray¹⁹ literature, internet sources and media reports were included, as this is a dynamic and fast-moving topic, and solely relying on peer reviewed academic journals was likely to exclude the latest developments. The information and sources from the literature review have been collected into a database that can be sorted per thematic area (such as policy, industry) as well as geographical region. Country level information is included where available and case studies from the six project countries already mentioned. References have been collected under different categories and include travel preferences and mobility behaviors; international policy frameworks, institutions (responsible for the introduction of E-Mobility and /or gender), national policies; and information on E-Mobility globally (all vehicle categories) including manufacture (with different categories), ownership, use, charging infrastructure and battery developments (disaggregated by gender where possible. This database can be a useful resource and complements this report. Examples and case studies that can be scaled and replicated have also been collected and a larger selection than is presented in this report is included in the on-line database.

For the data analysis, the conceptual framework of 'women as transport users, workers, entrepreneurs and decision makers and the gendered impact of infrastructure' was applied to identify barriers and opportunities as well as specific aspects of interest for women to engage in the E-Mobility transition.

¹⁹ Gray literature includes materials and research produced by organizations outside of the traditional commercial or academic publishing and distribution channels. Common gray literature publication types include reports, working papers, government documents, white papers and evaluations

Section one defines the current thinking on gender and reviews international and national policy frameworks that support and encourage national efforts on climate change and how this is being used to support E-Mobility and gender equality. In **Section two**, we investigate the four dimensions of women as transport users, workers, decision makers and entrepreneurs and highlight key challenges. We look at the current state-of-the-art on women's involvement with the labor markets, education and how gendered roles in caring impact this. We also touch on major trends in job and skill sets required for this transition that present both opportunities and challenges for women. **Section three** looks at the global EV market and the wider ecosystem of EV design, manufacturing, assembly, and after sales and considers key aspects of charging infrastructures and battery development that are necessary for all forms of electric mobility. **Section Four** presents the findings of our survey with practitioners and **Section Five**, our conclusions and recommendations. Along the way we identify current E-Mobility initiatives with a gender component, with a view to developing gender transformative projects across the whole E-Mobility ecosystem. While the report presents the global picture of E-Mobility focusing on LMICs, it also draws on the more detailed situation in six countries: Colombia, Ecuador, Indonesia, Kenya, Uganda and Vietnam. Deep dives for each of these countries are currently being prepared by local teams.

1.3. Gender terminology

“Gender equity should not be seen narrowly as a women’s issue..., it is an issue that requires men and women to work together in search of solutions that are both practical and based on principle. Increasingly, those solutions will be neither acceptable nor sustainable if the equal rights, dignity and worth of men and women are not respected.”

Koïchiro Matsuura, Director-General of UNESCO

Gender is now a widely used term and it refers to the characteristics of women, men, girls and boys that are socially constructed. This includes norms, behaviors and roles associated with being a woman, man, girl or boy, as well as relationships with each other²⁰. Gender is often used as a proxy for women. This is the case for this report, although we recognize that by doing this, we do not include the wider dimension of gender(s) such as the LGBTQ+ communities²¹ and other gender identities beyond the male-female binary (e.g. non-binary, gender queer etc.). We acknowledge that this emphasis on binary gender identities can overlook marginalized non-binary or gender non-conforming individuals within the population. We hope to investigate this wider gender topic in future reports given the current lack of available data and cultural sensitivity in certain countries.

1.3.1 Key terms

Gender refers to the socially constructed roles and characteristics of being a man, woman, or other gender identity. As a social construct, gender varies from society to society and can change over time. Gender is not biologically determined, and gender identity does not always match expectations associated with assigned biological sex.

²⁰ Source: [UN Women Training Center glossary on definitions](https://trainingcentre.unwomen.org/mod/glossary/view.php?id=36&mode=letter&hook=G&sortkey&sortorder&fullsearch=0&page=-1)
&<https://trainingcentre.unwomen.org/mod/glossary/view.php?id=36&mode=letter&hook=G&sortkey&sortorder&fullsearch=0&page=-1> &
<https://www.who.int/health-topics/gender>

²¹ LGBTQ+ means lesbian, gay, bisexual, transgender/transsexual and queer people <https://www.coe.int/en/web/gender-matters/lgbt->

Gender audits are institutional gender analysis and assessment tools that help to scan the extent to which gender equality has been integrated into institutions, policies, or programs.

Gender analysis critically examines the relationships between females and males and their access to and control of resources and the constraints they face, relative to each other. It examines how differences in gender roles, activities, needs, opportunities, and rights affect women, men, girls and boys. Gender analysis may be conducted based on qualitative information and methods and/or based on quantitative information provided by gender statistics.

The term **gender bias** describes a type of unconscious bias, where someone may stereotype or hold preconceived notions about other individuals based on personal or learned experiences. It stems from *“prejudiced actions or thoughts based on the gender-based perception that women are not equal to men in rights and dignity”*²² and bias is considered to be the root of much gender inequality.

Gender blindness is the failure to recognize the roles and responsibilities of men/boys and women/girls given to them in specific social, cultural, economic, and political contexts and backgrounds. Projects, programs, policies and attitudes which are gender blind do not consider the different roles and diverse needs of men and women, and they tend to maintain the status quo and do nothing to help transform the unequal structures of gender relations.

Gender equality refers to women and men having equal conditions for realizing their full human rights and for contributing to, and benefiting from, economic, social, cultural and political development. It requires that women and men are considered equal at home, in the workplace, in their community and in society.

Gender equity means recognizing that we do not all start from the same place and that we must acknowledge and adjust imbalances. Equity²³ recognizes that each person has different circumstances and resources need to be allocated based on need to reach an equal outcome. Equity requires us to identify and overcome intentional and unintentional barriers arising from bias or systemic structures.

Gender mainstreaming refers to strategies for promoting gender equality and integrating a gender perspective into all policies, programs, and activities at all levels of the decision-making process. Mainstreaming means considering women’s as well as men’s concerns and experiences as part of the design, implementation, monitoring and evaluation of policies and programs in political, economic and societal spheres so that women and men benefit equally, and inequality is not perpetrated. The goal is to achieve gender equality²⁴.

Gender sensitive²⁵ is the ability to acknowledge and highlight existing gender differences, issues and inequalities, and consider them in the design and implementation of strategies and actions. Gender sensitive policies or programs will look to differentiate between the capacities, needs and priorities of women and men and ensure that the views and ideas of both women and men are considered as well as the implications of decisions and their impact on women relative to men.

²² https://eige.europa.eu/publications-resources/thesaurus/terms/1320?language_content_entity=en

²³ <https://www.internationalwomensday.com/Missions/18707/Equality-versus-Equity-What-s-the-difference-as-we-EmbraceEquity-for-IWD-2023-and-beyond>

²⁴ https://wedo.org/wp-content/uploads/2017/11/2018-Edition-of-Pocket-Guide-to-Gender_1.pdf

²⁵ <https://www.un-redd.org/glossary/gender-sensitive> & https://commission.europa.eu/strategy-and-policy/policies/justice-and-fundamental-rights/gender-equality_en

Gender responsive²⁶ explicitly acknowledges and considers women's and men's specific needs and integrates them in project and policy design by understanding and addressing the causes of gender inequality. This is different from gender-sensitive, which recognizes the different needs of women, men, boys and girls but does not necessarily address these differences other than to try and integrate an understanding of these differences within project, program or policy design.

A **gender-transformative**²⁷ approach looks to redress gender inequalities, remove structural barriers, unequal roles and rights and empower disadvantaged populations. In practice, this means working for change in laws and policies; systems and services; distribution of resources; norms, beliefs, and stereotypes; and behavior and practices. Structural barriers that need to be overcome include unequal gender roles in the reproductive and economic domains, unequal power relations, and the exclusion of women from basic rights, entitlements, and opportunities.

Gender gaps occur in many areas especially in relation to the labor market and pay. These stem from gender stereotyping and occupational segregation in the job market combined with the unequal participation of women across different sectors of the economy. More women than men work in low-paid jobs and sectors, and in lower positions²⁸.

Stereotypical expectations based on fixed norms for women and men, girls and boys are called **gender stereotypes**. These stereotypes strongly influence what women can and cannot do, including their agency to move outside the home. Gender stereotypes can limit women's ability and aspirations to choose a field of study or training or pursue a professional career. By constraining what or where they study (in some cases women are simply not able to study at university), stereotypes also influence what jobs they are able to have, thus contributing to the gender pay gap. This is currently seen in many transport related qualifications such as mechanical, electrical and civil engineering and digital technologies.

A **'Just Transition'**²⁹ means greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities, and leaving no one behind. The concept originated from the global labor movement, to deal with the social impact of the climate crisis and ensure that a policy framework take account of the workers on whom the sector depends.³⁰

1.3.2 Women and vulnerability

Gender considerations are often not included in transport decision making because there is a lack of awareness and understanding of what differences taking a gender perspective brings and because women often don't have a seat at the table. It is wrongly assumed that a gender-neutral approach³¹

²⁶ <https://documents1.worldbank.org/curated/en/099512412082314620/pdf/IDU0a9d235b00e11b040f00ad80077fcc4d1ef74.pdf>

²⁷ UNICEF. 2019. Realizing Potential: Evaluation of UNICEF's Gender Action Plans. Final Report. New York, NY <https://www.unicef.org/documents/realizing-potential-evaluation-unicefs-gender-action-plans-december-2019>

²⁸ <https://open-research-europe.ec.europa.eu/articles/3-47#FN25>

²⁹ International Labor Organization: Green Jobs - <https://www.ilo.org/resource/green-jobs-green-economy-just-transition-and-related-concept-definitions>

³⁰ <https://slocat.net/a-just-transition-for-transport-workers-the-foundation-for-sustainable-and-decarbonised-transport-pathways/>

³¹ Gender neutral means ensuring that the policy or project has neither positive nor negative impact in terms of gender relations or equality between women and men. See https://eige.europa.eu/publications-resources/thesaurus/terms/1321?language_content_entity=en

is sufficient. Statistically there are slightly more men than women in the world³² population. However, the global figures require greater scrutiny, as the top two most populous countries China and India have large male populations. If the populations of China and India are excluded from the totals, there are more females than males in most countries and regions in the world (January 2024)³³. Furthermore, it is expected that females will outnumber males in 2049 (and onwards to 2100). Therefore, taking a gendered approach to mobility makes it inclusive today but also for the future and is also a commercial opportunity for businesses.

The term 'vulnerable group' is often the language used to describe women when it comes to policy development. But using this terminology carries negative connotations³⁴, implying that women must be protected rather than empowered, furthering patriarchal power. The use of the term – equalizing women with vulnerable groups - increases the invisibility of women and ignores the roots and causes of their vulnerability(ies).

Women are not a minority, as half of the world's population is not born with fewer capabilities or inherent vulnerabilities. The systematic lack of respect for women's human rights, and its intersection with other factors, such as violence, discrimination, or marginalization push women into the complex situation of different types of vulnerability which can also be seen in transport. These constraints vary according to age, socio-economic status, racial/ethnic background, religion, social norms, health and disability.

**If women and girls represent half of the world's population,
they also represent half of its potential.**

Quote from an interviewee

Women, like men, are not a homogenous group. However, there are some common and shared values, and this is often grounded in personal safety and security. They tend to be risk averse and there is documented evidence that a lack of certain safety and security features in the design of the transport system, combined with the perception of insecurity constrain their decisions to choose to travel or to use a particular mode of transportation. This may result in them not attending education facilities or taking up better job offers due to her (or her family's) transport concerns. These fears and concerns may not always be obvious to men, and include physical accessibility, unsafe waiting areas, poor lighting, isolated bus stops or stations and overcrowded services which often lead to various forms of harassment

Women in LMICs often have less control of economic resources and access to finance. Combined with poverty and a lack of financial independence makes many women insecure, and unable to fully participate in political, social, and economic development. But many women in LMICs are very creative and innovative, often having to juggle family commitments with productive occupations - this is a resource that can usefully be applied to the transition to E-Mobility if they have the right opportunities.

³² <https://statisticstimes.com/demographics/countries-by-male-female-population.php>

³³ Idem

³⁴ <https://translatorswithoutborders.org/blog/stop-labeling-women-as-vulnerable/>
<https://translatorswithoutborders.org/blog/stop-labeling-women-as-vulnerable/>

women than men work in informal sector and are self-employed⁴³ which have fewer safeguards⁴⁴. This lifetime gender-based wage gap leads to substantial pension gaps, and consequently, a higher risk of income insecurity and poverty in old age for women. This is particularly the case in LMICs, as women are less likely to be in formal employment and are more likely to drop out of the labor market after childbirth than men.

Transport provides jobs but also provides access to job opportunities and a lack of access to safe, affordable transportation has an impact on job options. This affects women more than men and their decisions on paid employment are often based on the location of jobs (they tend to choose those that are near where they live so they can return home quickly if needed), as well as the hours and conditions. Whether and how they share the family and caring responsibilities with their partners also affects if they can take up full time, part time or only informal, occasional work. According to the World Bank⁴⁵ poor transport access to jobs reduces women's participation in the workforce by some 16.5 per cent and they also estimate that women are more likely to be actively seeking work and that this is more pronounced in developing countries.

1.4. The relevance of international policy frameworks

There has been good progress over the past 20 years to acknowledge the importance of gender equality and several imbalances in international policy have been more formally recognized. Providing equal legal rights is a cornerstone of achieving gender equality. Nevertheless, the Atlas of Sustainable Development Goals (2023) report that women currently only have three-quarters of the rights the average male enjoys⁴⁶. North America, Europe and Central Asia come closest to providing equal rights, but this is not yet the case in many LMICs (especially in the Middle East, North Africa and South Asia).

Gender Equality was made part of international human rights law by the Universal Declaration of Human Rights, which was adopted by the UN General Assembly on 10 December 1948. This milestone document in the history of human rights recognized that "All human beings are born free and equal in dignity and rights" and that "everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, color, sex, language, religion, birth or other status."

Discrimination and the restriction of basic rights of women in society is an international challenge. New analysis (2023) from the OECD Social Institutions and Gender Index (SIGI)⁴⁷, that measures discrimination against women in 179 countries and reviews laws, social norms and practices that restrict women's and girls' rights and access to empowerment opportunities and resources, shows that there is little real progress. The index captures the underlying drivers of gender inequality and acts as the official data source for measuring progress on SDG 5 (women's empowerment and equality). It reveals that the biases against women's economic empowerment have worsened between 2014 and 2022, and 40 per cent of women globally live in countries where discrimination is

⁴³ <https://www.ilo.org/publications/women-and-men-informal-economy-statistical-update>

⁴⁴ A study by WIEGO in 39 anglophone and francophone African countries found that no country provide cash benefits for maternity protection to informal workers.

https://www.wiego.org/sites/default/files/publications/file/rd-24-assesment-impact-covid-19-africa-2022_0.pdf

⁴⁵ <https://blogs.worldbank.org/en/investinpeople/she-drives-change-breaking-barriers-women-transport-#:~:text=The International Labour Organization says,to feel unsafe in buses.>

⁴⁶ <https://datatopics.worldbank.org/sdgatlas/goal-5-gender-equality/?lang=en>

⁴⁷ OECD (2023), SIGI 2023 Global Report: Gender Equality in Times of Crisis, Social Institutions and Gender Index, OECD Publishing, Paris, <https://doi.org/10.1787/4607b7c7-en>.

high or very high. Their regional report for Southeast Asia - A time to care⁴⁸ (2024) found that 70 per cent of women in the region live in countries with high and very high levels of gender discrimination. Women undertake up to 3.5 hours more unpaid work (for family and caring duties) than men each day in this region. This is similar in both Africa and Latin America, where they also systematically work more hours on caring.

International agreements such as the [Paris Agreement on Climate Change](#), [2030 Agenda for Sustainable Development](#) (SDG) and the [New Urban Agenda \(NUA\)](#)⁴⁹ help to stimulate national policies promoting gender equality and sustainability. However, progress is slow and according to UN Women's report *'Progress on the Sustainable Development Goals: The gender snapshot 2023'*⁵⁰, the gender gap in power and leadership positions remains. Women struggle to get into leadership (especially political and commercial sectors) as they still carry the burden of care⁵¹. The report also states: *'No country is within reach of eradicating intimate partner violence, and women's share of workplace management positions will remain below parity even by 2050'*. On the other hand, equality in education has seen the most progress.

1.4.1. Sustainable Development Goals

The 2030 Agenda has gender equality and equity as one of its main ambitions. The Leave No-one Behind (LNOB) principle is at the heart of the 2030 Agenda and promotes equality, non-discrimination, and equity for all. Indeed, achieving gender equality and women's empowerment is seen as being integral to each of the 17 SDG goals especially those targeting reducing poverty and improving health and education for all. Equality is especially highlighted in SDG 5 (aiming to end discrimination between women and men, achieve gender equality and empower all women and girls) and SDG 10 (reduce inequality within and among countries). They place special emphasis on those left furthest behind and the most excluded, such as women and girls, children, youth, older persons, persons with disabilities, and other groups facing social exclusion within specific contexts.

While there is no dedicated SDG for transport, inclusive transport is a key enabler for achieving many of the SDGs notably SDG 11 on sustainable cities and communities, SDG 13 on immediate climate action⁵² and SDG 7 on affordable clean energy which in turn is intrinsically linked to E-Mobility.

Several of the United Nations SDGs have been pushed off track by the socioeconomic fallout of the COVID 19 pandemic. COVID impacted many sectors but especially transport – reducing mass transit patronage to near zero for several months and changing people's behaviors and mobility habits. It also increased interest in active transport modes such as walking and cycling and individual on-demand modes (MaaS), which can benefit the transition to E-Mobility. Electric assisted pedal bikes, scooters

⁴⁸ https://www.oecd.org/en/publications/sigi-2024-regional-report-for-southeast-asia_7fc15e1c-en.html

⁴⁹ Gender responsive urban mobility is referenced in para 114 of the New Urban Agenda, the outcome document of the Habitat III conference in 2016: *"We will promote access for all to safe, age- and gender responsive, affordable, accessible and sustainable urban mobility and land and sea transport systems, enabling meaningful participation in social and economic activities in cities and human settlements, by integrating transport and mobility plans into overall urban and territorial plans and promoting a wide range of transport and mobility options."* <https://habitat3.org/the-new-urban-agenda/>

⁵⁰ UN Women Gender Snapshot 2023: <https://www.unwomen.org/en/digital-library/publications/2023/09/progress-on-the-sustainable-development-goals-the-gender-snapshot-2023>

⁵¹ Burden of care is a concept emerging in the literature that describes the physical, emotional, social, and financial problems that can be experienced by family caregivers

⁵² ARAP Inclusive Transport Infra report <https://content.unops.org/publications/Guidelines-for-developing-inclusive-transport-infrastructure.pdf>

and motorbikes have seen huge increases in demand and use in both the Global North and South, stimulated by social distancing measures imposed during the pandemic by governments. These trends are still on-going.

1.4.2. Climate Change Policies

The gender-climate nexus is gaining prominence in policy, programming, and in climate finance strategies. While there are no specific references⁵³ to transport in the Paris Climate Agreement (2015), there are some to gender and is a growing awareness among Parties to the United Nations Framework Convention on Climate Change (UNFCCC) that gender-responsive climate policy is *'not just more equitable but it is also more effective in yielding lasting impact for climate and development agendas, and thereby is a necessity to meet the goals of the Paris Agreement'*. During COP28 the Gender-Responsive Just Transitions and Climate Action Partnership was formed, committing signatories to *'just and inclusive transitions that advance gender equality and the goals of the enhanced Lima Work Program on Gender (LWPG) and its Gender Action Plan (GAP)'*. The LWPG is the main instrument aimed at achieving gender responsive climate policy and action. Specifically, LWPG seeks to *"promote the deployment of gender-responsive technological solutions to address climate change, including strengthening, protecting and preserving local, indigenous and traditional knowledge and practices in different sectors and for improving climate resilience, and by fostering women's and girls' full participation and leadership in science, technology, research and development"*⁵⁴.

UNFCCC explicitly notes that *'gender-responsive implementation of climate policy can enable Parties to raise ambition, as well as enhance gender equality, and just transition of the workforce and the creation of decent work and quality jobs'*⁵⁵. However, challenges remain including the low proportion of female researchers at the Intergovernmental Panel on Climate Change (IPCC), the main body that provides scientific assessments of climate change, which currently stands at 30 per cent, and only 122 out of 1,000 "most influential" climate scientists are women.⁵⁶

At the national level, according to the most recent synthesis report on 166 Nationally Determined Contributions (NDCs),⁵⁷ parties are increasingly recognizing gender integration as a way to enhance the effectiveness of their climate action⁵⁸ and more and more countries are including transport targets in their NDCs.

The targets for transport in NDCs are tracked by several organizations. In the first-generation NDCs, the most popular transport related mitigation actions were vehicle technology improvements, public transport, infrastructure improvements, and alternative fuels, followed by electric mobility. According to SLOCAT's⁵⁹ report "Climate Strategies for Transport: An Analysis of Nationally Determined Contributions and Long-Term Strategies"⁶⁰ (2022), 41 per cent of second-generation NDCs have stated

⁵³ Although transport is seen as a key area for climate actions.

⁵⁴ Activity D.3 Lima Work Plan on Gender

⁵⁵ https://unfccc.int/sites/default/files/resource/gender_0.pdf

⁵⁶ <https://www.ipcc.ch/site/assets/uploads/2019/01/110520190810-Doc.-10-Rev.1TG-Gender.pdf>

⁵⁷ An NDC is a self-defined national climate pledge pledged to the UNFCCC under the Paris Agreement, detailing what the country will do to help meet the global goal of 1.5°C or lower.

⁵⁸ <https://unfccc.int/documents/619180>

⁵⁹ Sustainable Low Carbon Transport Partnership - SLOCAT

⁶⁰ SLOCAT (2022), Climate Strategies for Transport: An Analysis of Nationally Determined Contributions and Long-Term Strategies <https://slocat.net/wp-content/uploads/2022/01/Climate-Strategies-for-Transport-An-Analysis-of-NDCs-and-LTS-SLOCAT-December-2021.pdf> & <https://changing-transport.org/publications/transport-in-ndcs-and-lts-2/>

transport GHG mitigation targets and/or non-GHG targets for transport. E-Mobility is the most common type of transport mitigation measure, included in 74 second-generation NDCs (52% of total submitted). Asia is particularly active and as of 2022, at least 14 countries in the region had made economy-wide pledges towards net zero emissions, in addition to having transport-specific targets, mostly on E-Mobility.

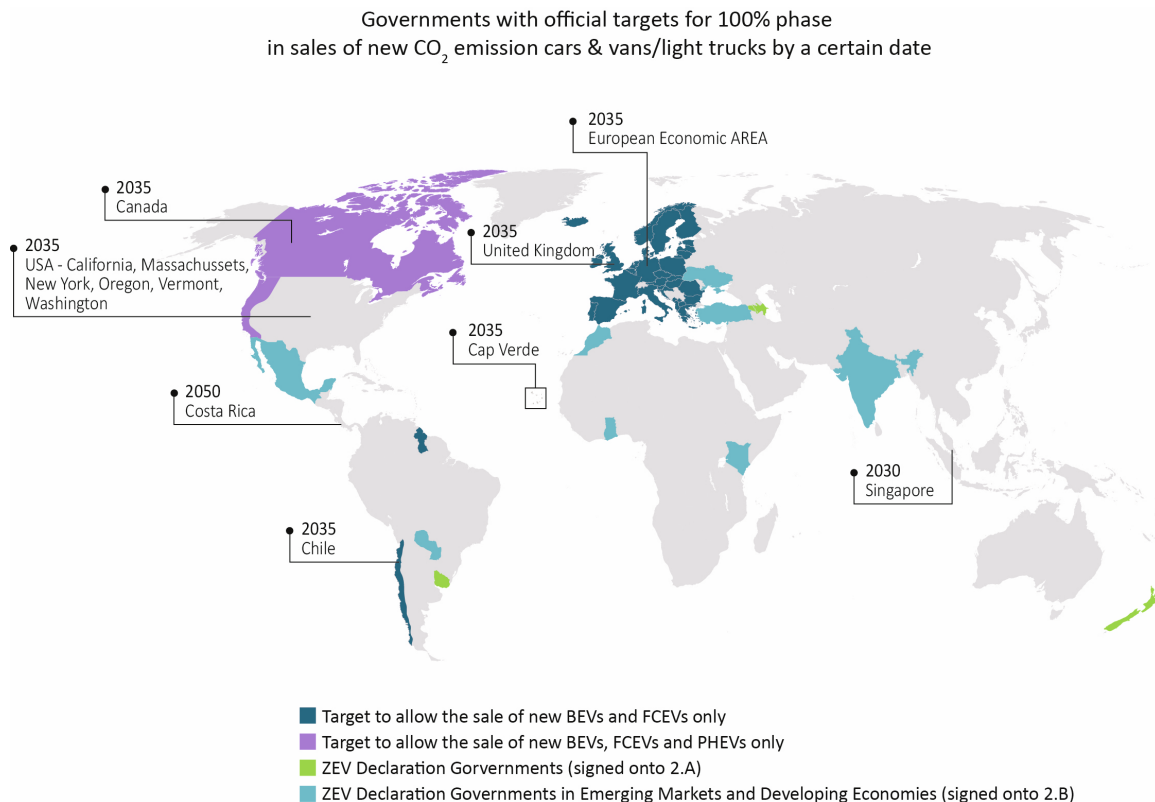


Figure 1: Governments with official targets for 100% sales of new zero emission cars and vans by a defined date (information correct up to February 2024)⁶¹.

Source: The International Council on Clean Transportation⁶²

The world map in Figure 1 shows countries, states and provinces that have set targets to only allow the sale and registration of new battery electric vehicles (BEV), hydrogen powered Fuel Cell Electric Vehicles (FCEV), and plug-in hybrid electric vehicles (PHEV) by a certain date. British Columbia (Canada), the states indicated in the USA, and the European Economic Area have regulations to enforce their targets by specific dates⁶³. Targets have been set for other vehicle categories including zero emission buses and other medium and heavy-duty vehicles that can be found on the ICCT website⁶⁴. An international declaration for the phase-out of ICE two and three wheelers is notably absent, despite their important role as a means of both passenger and goods transport in LMICs.

⁶¹ The map does not include hybrids in Japan. Zero Emission Vehicle (ZEV) Declaration signatories to 2.A committed to phase-in targets by 2035 for leading markets and 2040 globally (binding and non-binding). Zero Emission Vehicle (ZEV) Declaration signatories to 2.B committed to work intensely towards accelerated proliferation and adoption of zero emission vehicles. Full overview of national targets and updates on global progress on zero emission transport policies can be found on <https://www.driveelectriccampaign.org/wp-content/uploads/2024/05/PUBLIC-2023-DEC-Driving-Progress.pdf>

⁶² <https://theicct.org/region/global/>

⁶³ Some countries such as Norway have set 2025 as the date for while others have no-binding targets.

⁶⁴ <https://theicct.org/region/global/>

The following table gives some insights into the climate and energy policies that relate to E-Mobility related climate commitments from the six focus countries.

Country	Overview of national climate and energy policies in respect to E-Mobility ⁶⁵
<p>Colombia</p>	<p>Under its updated NDC, Colombia aims to have 600,000 EVs on the road by 2030⁶⁶, as well as retrofitting freight vehicles with cleaner technologies. Law 1964, adopted in 2018, sets the legal basis for the 2030 EV target, along with intermediate targets for proportional increases of EVs in the national fleet and public transport networks, tax incentives for purchasing EVs, and minimum requirements for charging infrastructure in major cities.</p> <p>The national E-Mobility strategy (ENME) approved in 2019 sets out four specific goals aiming to speed up the transition:</p> <ul style="list-style-type: none"> - Establish the regulatory and policy framework to ensure the promotion of E-Mobility nationally. - Review and generate economic and market mechanisms necessary for the promotion of E-Mobility. - Establish the technical guidelines to be developed for the promotion of electric technologies in the different vehicle segments. - Define the actions that will allow the development of EV charging infrastructure. <p>Some of the measures include implementing communication strategies, capacity development, defining an electricity tariff scheme for transportation, and establishing price parity to generate demand in the market.</p>
<p>Ecuador</p>	<p>Ecuador has not updated its NDC since 2019 but plans to do so in 2024. The current NDC includes actions to reduce emissions in freight and passenger transportation in Quito, Guayaquil and Cuenca. Notably, the government has recognized the importance and connection between gender and climate change and included gender considerations in official documents (the Third National Communication, the Concept Note on the Gender Action Plan and Climate Change for Nationally Determined Contributions, National Policy for Sustainable Urban Mobility, Action Plan on Gender and Climate Change in Ecuador). The Ministry of the Environment, Water and Ecological Transition formed the Commission on Gender and Climate Change (CGCC) to promote the inclusion of gender perspective in policies, measures and initiatives related to climate and to monitor actions that mainstream the gender approach in its programs, plans and projects, including the implementation of NDCs. The E-Mobility National Strategy (ENME) has set an initial target of 10,000 EVs by 2025 and has an ambitious target of 750,000 units by 2040. This is supported by the provision of incentives such as reduced taxes, tariffs, and preferential electricity rates for EVs. The strategy addresses the high cost of EVs and promotes innovative business models, and financial instruments for fleet renewal with preferential loan rates for EVs to help accelerate their acceptance.</p>

⁶⁵ Based on information from our country reports

⁶⁶ Gobierno de Colombia 2020. NDC de Colombia Actualización 2020. Bogotá.

Indonesia	The government has an ambitious objective outlined in its Enhanced Nationally Determined Contributions (ENDC) to achieve a reduction of 32 per cent ⁶⁷ in GHG emissions by 2030 through domestic efforts, with an additional 43 per cent reduction (facilitated by international support). The ENDC mentions transportation and E-Mobility as one of the mitigation measures in the energy sector with targets to deploy 15 million EVs by 2030. The Presidential Decree No 55 (2019) on the ‘Acceleration of the Battery Electric Vehicle Program for Road Transportation’ is part of the main regulatory framework for the introduction of E-Mobility.
Kenya	Kenya has a target of 18 per cent reduction of transport emission from Business As Usual (BAU) and explicitly mentions its endeavors to implement low carbon and efficient transportation systems in its most recent updated NDC (2020) ⁶⁸ and includes mention of “low carbon and efficient transportation systems,” but there is no specific mention of E-Mobility or gender. The 2023 SDG report has a small reference to stepping up E-Mobility efforts, and nothing on the intersection of women and green jobs in Kenya ⁶⁹ . Kenya’s national E-Mobility policy draft released in 2024 sets out guidelines to enhance confidence in building the local market and includes targets for charging infrastructure, discussion on incentives for consumers, manufacturers, and green jobs creation through local manufacturing ⁷⁰ .
Uganda	Under Additional Mitigation Measures in the transport section, Uganda’s 2022 NDC plans to cut emissions by 24.7 per cent by 2030 ⁷¹ and calls for a switch to cleaner fuels, with a specific mention of electric boda bodas ⁷² , E-buses, and electric rail transport. However, there is no explicit mention of the linkage to gender, and little detail on how E-Mobility will be introduced. It states that Uganda looks to promote cleaner fuels, and more fuel-efficient vehicle technologies; update transport codes and regulations and implement measures to ensure compliance.
Vietnam	Vietnam updated its NDC in 2020 and 2022 ⁷³ . In the latest NDC (2022) it aims to reduce emissions by 15.8 per cent compared to the BAU scenario, and by an additional 27.7 per cent with international support. This would achieve a total of 43.5 per cent by 2030. Specifically, 15-20 per cent reduction is expected from the introduction of EVs. The 2020 NDC stated a 30 per cent target for all new electric car sales, and the 2022 NDC added targets 22 per cent for electric motorbike sales. E-buses will be introduced in 2025 and are expected to be 30 per cent of the fleet by 2030. The Ministry of Transport is developing an MRV ⁷⁴ system for transport and its action program aims to develop regulatory frameworks to support EV deployment at city and national level and introduce fuel economy measures with incentives for manufacturers, businesses and people to switch to EVs.

Table 1: Overview of climate and energy policies in respect to E-Mobility in our 6 project countries.

⁶⁷ 31.89% rounded up to 32%

⁶⁸ <https://unfccc.int/sites/default/files/NDC/2022-06/Kenya.pdf>

⁶⁹ [https://transport.go.ke/sites/default/files/Draft National e-Mobility Policy For Circulation 27.03.2024.pdf](https://transport.go.ke/sites/default/files/Draft%20National%20e-Mobility%20Policy%20For%20Circulation%2027.03.2024.pdf)

⁷⁰ [draft national - e-mobility](#)

⁷¹ [https://www.unep.org/ndc/action-area/uganda - :~:text=Uganda submitted its updated NDC,%25 to 24.7%25 by 2030.](https://www.unep.org/ndc/action-area/uganda-%20to-24.7%25-by-2030)

⁷² Local motorbike taxis

⁷³ https://changing-transport.org/wp-content/uploads/2023_policy_brief_vietnam-1.pdf

⁷⁴ MRV - Monitoring, Reporting and Verification

The NDC tracker ⁷⁵ Changing Transport mentions a that there were only small number of cases where a specific reference to gender is included in transport and climate mitigation actions in early submissions. Although more of the updated NDCs (submitted in 2022) mention gender equality considerations compared to the first round of submissions, most do not go into detail on what sectors are being covered or how this will be achieved.

1.4.3 Gender-responsive policies

Governments can play a decisive role in accelerating progress towards gender parity through legislation, public finance, programmatic change and public-private partnerships. Regional, national or local governments can ensure that all transport policies, programs, initiatives, and infrastructure investments are nondiscriminatory, gender-transformative and work to develop high level legislation on gender equality suitable to the local context. Such legislation is needed to remove direct and indirect gender discrimination embedded in current laws and professional practices, especially in transport.

Gender responsive regional and national E-Mobility policies and strategies can help to close gender gaps in the transport sector; create awareness and understanding of the role of women in the workforce; send a strong signal to developers and investors; and encourage information exchange, education and communication about gender informed approaches. However, most policies are currently ‘gender blind’, meaning that it is assumed that the benefits will automatically flow equally to men and women. Gender-blind interventions usually lead to unequal benefit-sharing between men and women and sometimes unintended negative long-term consequences. Better designed gender-responsive interventions are needed to ensure equal representation and access to transport services for all genders. Women and men should also have equal opportunities for providing input into the design and planning process of transport and energy policies, programs and projects, and implementation must be driven by transparent and open dialogue between industry, financiers, academia, civil society and governments.⁷⁶

There are now some examples from LMICs. Kenya was the first country in Africa to adopt a National Policy on Gender and Development and a Gender Policy for the energy sector to raise the level of gender awareness, change attitudes and inculcate an engendered work culture among staff in the energy sector in 2019.⁷⁷ Ghana’s National Green Jobs Strategy for the period 2021–2025 envisions a just and socially inclusive transition to a green economy. The strategy identifies women as a priority group, particularly for skills development. It sets quotas for women’s participation in green skills training and supports women’s participation in green entrepreneurship development through business development services and finance. Collection and analysis of sex-disaggregated data on green skills-training programs is envisioned throughout the strategy. ⁷⁸ Ghana⁷⁹ has specific gender and transport related mentions in its E-Mobility Policy and Market Readiness Framework where it states that the 19 policy actions will foster social inclusion focusing on youth and women, but the details of this in the final report are quite vague. This policy developed in 2022 with support from UNEP also specifically mentions improving public transport and the electrification of E-3Ws, acknowledging that this will require reform and reorganization of the public transport sector.

⁷⁵ <https://www.climatewatchdata.org/ndc>

⁷⁶ Blueprint Guide for Creating Gender-responsive E-Mobility Policies: <https://www.nrel.gov/docs/fy19osti/73927.pdf>

⁷⁷ <https://psyg.go.ke/wp-content/uploads/2019/12/NATIONAL-POLICY-ON-GENDER-AND-DEVELOPMENT.pdf>

⁷⁸ Ministry of Employment and Labour Relations of Ghana. 2021. National Green Jobs Strategy. Ghana.ILO. 22 March. https://www.ilo.org/africa/WCMS_776631/lang-en/index.htm.

⁷⁹ <https://unepccc.org/wp-content/uploads/2022/06/national-electric-mobility-policy-framework-ghana-final.pdf>

In addition, regional bodies can localize international policy frameworks and provide direction to their member states. For example, the African Union (AU) strategy for Gender Equality and Women's Empowerment (GEWE) 2018-2028⁸⁰ sets forth a plan to realize Aspiration 6 of the African Union's Agenda 2063: *'An Africa where development is people driven, relying upon the potential offered by people, especially its women and youth and caring for children'*, and the principles enshrined in Article 4 (I) of the AU's Constitutive Act: *'promotion of gender equality'* as well key continental and global commitments. It emphasizes the importance of women's economic empowerment in sustainable development. This strategy is remarkable in that its outcomes aim to eliminate the major constraints hindering gender equality and women's empowerment in Africa. The Women, Gender and Development Directorate (WGDD) was established to coordinate AU efforts to achieve the strategy targets and ensure that African states implement it. The Economic Community of West African State (ECOWAS) together with Power Africa and National Renewable Energy Laboratory (NREL) developed in 2019 a Policy for Gender Mainstreaming in Energy Access⁸¹ to provide policy makers with instrument and human right-based indicators and rigorous arguments to align energy interventions with principles of gender equality. This is complemented by the NREL Guide to help support the policy making process in countries interested in pursuing a more gender inclusive energy sector⁸² and several aspects can be applied to the transport sector.

An example of local government entity acting on gender and transport is the city of Bogotá. In 2017, the city's adopted a Women and Gender Policy⁸³ for its integrated public transport system. The policy addresses challenges related to violence against women using public transportation, improve accessibility and safety criteria, and promote the inclusion of women in the transport labor force. It also provided the framework for the comprehensive strategy for the training and education of women in non-conventional trades for urban transportation in Bogotá, which seeks to train and develop women's skills and thereby effectively advance their inclusion, economic autonomy, and employability. The Eco-Driving Program for women was created jointly between the District's Mobility and Women's Affairs Secretariats, Transmilenio, and the National Learning and Employment Service as part of this strategy⁸⁴.

1.5. Electricity supply for E-Mobility

Sufficient and stable electricity supply is an important consideration for the introduction of E-Mobility in both urban and rural areas of LMICs. In addition, in order to capture the full climate benefits of shifting to E-Mobility, the electricity supply needs to be low carbon. Access to clean energy is a core component of sustainable development and SDG 7 aims for universal access to affordable energy by 2030.

For many LMICs, the availability and supply of electricity can be more problematic than its carbon intensity. The ECOWAS regional strategy for Energy Access⁸⁵, states that the lack of access to clean

⁸⁰ https://au.int/sites/default/files/documents/36195-doc-au_strategy_for_gender_equality_womens_empowerment_2018-2028_report.pdf

⁸¹ <https://www.nrel.gov/energy-solutions/partner-usaid.html>

⁸² <https://www.nrel.gov/docs/fy19osti/73927.pdf>

⁸³ <https://www.sdp.gov.co/gestion-socioeconomica/politicas-sectoriales/politicas-publicas-sectoriales/politica-publica-de-mujeres-y-equidad-de-genero>

⁸⁴ https://transformative-mobility.org/wp-content/uploads/2023/04/Mujeres-Conductoras_EN.pdf

⁸⁵ https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/ECOWAS_Policy_for_Gender_Mainstreaming_in_Energy_Access.pdf

and modern forms of high-quality energy, i.e. electricity and modern fuels, is affecting ECOWAS countries' development with currently only 56 out of 100 households (2024) having access to electricity in the region⁸⁶. Notably, in 2017, ECOWAS Member States adopted the ECOWAS Directive for Gender Assessments in Energy Projects, with the double aim to identify and mitigate potential adverse and discriminatory impacts on women from energy projects, and to promote and increase the participation and capacity of women in energy project development. It requires Member States to adopt appropriate domestic legal frameworks and requiring a gender assessment and management plan for approval of projects that are likely to have significant gender-related impact. These provisions directly apply to energy project developers, regardless of whether it has been transposed into national law of a Member State⁸⁷. The implementation of this Directive is informed by the 2017 ECOWAS Policy for Gender Mainstreaming in Energy Access which outlines national obligations and introduces gender dimensions and considerations in energy interventions.

Asia Pacific is the most electrified region⁸⁸ with an overall electrification rate of 95 per cent (2020). The Latin America and the Caribbean region is less well connected and the United Nations Economic Commission for Latin America and the Caribbean (CEPAL)⁸⁹, estimates that 16.1 million people do not have access to electricity in the region. CEPAL's research also shows that women face barriers to access employment and training in the energy sector, which is related to their limited representation in areas such as engineering, technology, research and development in renewable energies. Closing these gender gaps requires enhancing their participation in the fields of STEM, planning and design of energy policies, and the commission sees women's contribution as essential to promote sustainable development processes at the national and regional levels. For instance, in Chile's energy sector, 23 per cent of jobs are held by women, but this figure drops to 10 per cent for operations. There are few women on company boards as was noted at the First Latin American Conference on Women and Energy: Capacities for Change, Empowerment, Gender and Energy (2023).

There are several networks and communities of practice to promote women in the renewable energy sector such as Women in Renewables Alliance (WiRA)⁹⁰ described as a thought and action platform dedicated to addressing the persistent gender gap in the clean energy industry. These are helping to break down barriers to entry and promote cross fertilization of ideas and successes to increase the gender balance in transport and energy. A similar network for women in e-mobility should be created.

In all regions, rural areas are less connected to the national grid and low-income households in urban areas are also often not connected, even if access to the grid is available. Due to the over-representation of women in lower-income households, women are therefore more affected⁹¹. As women are strongly affected by low energy access, this lack of access will affect the possibility for them to adopt E-Mobility. Lack of grid connection impacts the ability to charge EVs unless the supply is independent and off-grid. Insufficient and/or erratic supply presents risks to the take up of E-Mobility and especially for those using EVs for commercial reasons and for women who need reliable transport. Solar energy can be used for E-Mobility (especially E2/3W) in many LMICs but this is not yet widespread. Off-grid options stimulated with the introduction of E-Mobility may help women in more

⁸⁶ https://www.ecowas.int/wp-content/uploads/2024/02/Ecowas-report_ENG-2024-1.pdf

⁸⁷ http://www.ecowrex.org/system/files/ecowas_directive_on_gender_assessments_in_energy_projects_0.pdf

⁸⁸ Asian Development Bank <https://www.adb.org/news/features/qa-meeting-asia-and-pacifics-growing-electricity-needs#:~:text=There%20has%20been%20rapid%20progress,million%20have%20no%20electricity%20whatsoever.>

⁸⁹ A <https://www.cepal.org/en/pressreleases/energy-transition-unique-opportunity-close-gender-gaps-energy-access-and-harness>

⁹⁰ <https://www.womeninrenewables.org/>

⁹¹ <https://www.oxfam.org/en/why-majority-worlds-poor-are-women>

ways⁹² than only transport, both by providing jobs but also giving them access to energy for other uses such as water pumps, home lighting and cooling etc.

1.6. Climate finance to support gender actions

Climate finance can be used to stimulate and accelerate gender equality in E-Mobility. The 2X Challenge⁹³ was launched at the G7 Summit 2018 as a commitment to inspire Development and International Finance Institutions (DFIs/IFIs) and the private sector to invest in women. The 2X Climate Finance Task Force⁹⁴ is a group of DFIs, led by the Commonwealth Development Corporation (CDC), European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB), whose objective is to leverage the power of gender-smart investments to catalyze climate action. It has set out actions that can be used to combine climate actions and gender with transport.

A gender-smart climate finance investment is defined as being Paris aligned and meeting the 2X criteria. The 2X criteria encourage investments in the following five areas and investments are 2X aligned if they meet at least one aspect of the five criteria:

1. Women as entrepreneurs (looking to expand opportunities for women entrepreneurs by providing finance, and to promote female entrepreneurs as role models);
2. Women as leaders (diversity at senior levels and promote the benefits of corporate diversity);
3. Women as employees (by improving women's access to quality work opportunities and support female career advancement and development);
4. Women as consumers (to provide women with products and services that address the critical barriers to their economic participation and success); and
5. Women as financial intermediaries (by expanding access to finance and providing support to businesses that are owned, led or founded by women or that provide decent work for women).

The **Green Climate Fund (GCF)** has adopted a clear mandate towards a gender-sensitive approach in all its processes and operations and has recognized the importance of gender considerations in its impact and access to climate funding. It looks to maximize the impact of its funding for adaptation and mitigation and sees gender as an integrated measure for social dividends of the overall portfolio. The Governing Instrument explicitly lists women among GCF stakeholders and calls for gender balance among the members of the Board (para. 11) and the staff of the Secretariat (para. 21). It is providing funding for the Project FP195 on E-Mobility and Low Carbon Transportation in 3 Latin American countries (Panama, Paraguay, and Uruguay), implemented by the Development Bank of Latin America and the Caribbean (CAF)⁹⁵. This ambitious program is designed to overcome barriers to the mass deployment of EVs, especially E-buses. It is guided by national gender action plans that have been developed based on findings from multi-stakeholder and gender inclusive consultations and national sustainable and inclusive E-Mobility strategies and implementation plans. Actions and measures are

⁹² Such as for domestic needs (cooking, lighting, heating and cooling)

⁹³ <https://www.2xchallenge.org/>

⁹⁴ https://static1.squarespace.com/static/638cb83455f20147b91df430/t/64049fbce80cab0e8e2977a4/1678024638544/2X_SectorNote_SustainableTransport_v8.pdf

⁹⁵ <https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp195.pdf>

designed to improve gender equality and reduce sexual harassment in public transport. Activities include enhancing national policies and strategies on gender-aware electric mobility and enhancing vehicle and charging standards considering the gender dimension. Specifically, the gender action plans must include actions and targets (i) on improved access for women to public transportation; (ii) improved sex-disaggregated data collection on urban transport; (iii) Improved women's access to jobs; (iv) interventions including awareness raising and infrastructure to reduce sexual harassment in public transport.

Another example is the Asian Development Banks (ADB's) GCF funded E-Mobility Program⁹⁶, approved in March 2024, in Armenia, Georgia, Indonesia, Kazakhstan, Kyrgyz Republic, Nepal, and Uzbekistan. The program aims to overcome the barriers to mass deployment of EVs with targeted policy advice and capacity building actions to ensure a favorable E-Mobility environment for the deployment of large-scale fleets. The Gender Action Plan cites several actions including 100% of policies and roadmaps supported by the program are to be reviewed with a gender lens; the collection of sex disaggregated data collection on urban transport and monitoring the experience of women in the new vehicles (buses and taxis); and a gender sensitive evaluation or survey of users to better understand the different needs and perspectives of women and men in terms of access to services and infrastructure.

The Global Environment Facility (GEF)⁹⁷ is another major multilateral fund providing support for climate change action (amongst other areas). The GEF also supports gender equality and women's empowerment, across all its programs stating that women are essential to global efforts to safeguard the environment. Its GEF Gender Partnership, established in 2016, is instrumental in setting the foundations for advancing gender equality through and across the projects and programs it funds. The GEF-7 Global Electric Mobility Program is an initiative implemented by UNEP that provides support to LMICs in their shift to electric mobility. Mainstreaming gender equality into electric mobility country projects and designing gender-responsive policies and strategies is one of its core features⁹⁸. The program also provides funding for data collection efforts such as the IEA Global EV Outlook.

These programs suggest that the landscape is promising for gender inclusion as a component of climate finance.

⁹⁶ <https://www.greenclimate.fund/document/gender-action-plan-fp225-e-mobility-program>

⁹⁷ <https://www.thegef.org/what-we-do/topics/gender>

⁹⁸ https://www.thegef.org/sites/default/files/documents/10270_CEO_Endorsement_Request_1.pdf

Section Two: Women's roles and agency – an overview

Gender inequality manifests in various forms, from limited access to education, healthcare and economic opportunities to political and commercial under representation, and gender stereotyping and discrimination in society. These disparities not only impede women's social progress but also constrain overall economic growth and social stability. The systematic lack of respect for women's human rights, and its intersection with other factors, such as violence and discrimination disadvantage women's access to transport in multiple ways⁹⁹. On a positive note, global shifts in perception and the acceleration of the feminist movement are impacting social norms through advocacy and awareness raising. The challenge lies in moving from being gender-sensitive — recognizing and understanding the different roles, needs, opportunities and barriers that women and men face — to taking gender-transformative action.

2.1. Women and care

The gendered nature of different roles is based on societal expectations and cultures. The burden of the economy of care¹⁰⁰, defined as unpaid work looking after family members, falls largely on women's shoulders, especially in LMICs. The ILO estimates that women's unpaid work can be valued at 9 per cent of global Gross Domestic Product (GDP)¹⁰¹. This 'burden of care and housework' limits women's social and personal development and/or career progression and affects women all over the world in varying degrees.

The OECD report 'Unpaid Care Work: The missing link' (2014)¹⁰² analyzes both gender gaps and labor outcomes, and it states that gender inequalities in unpaid care work are closely linked to gender gaps in labor force participation. In the ILO report 'A Quantum Leap for Gender Equality: For a Better Future of Work for All' (2019)¹⁰³, they estimate that key labor market indicators on gender have not narrowed substantially in the past 20 years. Both organizations found that unpaid care work is the main reason why women are not joining the labor force to the same extent as men. The higher the inequality in distribution of care responsibilities between women and men, the higher the gender gaps in labor force participation. According to work by Oxfam, 42 per cent of women cannot get jobs because they are responsible for all the caregiving, compared to just six percent of men¹⁰⁴. The European Institute for Gender Equality (EIGE) found that care is also the primary reason for only working part-time¹⁰⁵. In

⁹⁹ Intersectionality describes the ways in which systems of inequality based on gender, race, ethnicity, sexual orientation, gender identity, disability, class and other forms of discrimination "intersect" to create unique dynamics and effects.

¹⁰⁰ The care economy includes paid and unpaid work caring for others. Care responsibilities can be broadly categorized into two groups: those carried out within the home and those performed outside of it.

¹⁰¹ <https://www.apec.org/publications/2022/03/unpaid-care-and-domestic-work-counting-the-costs>

¹⁰² https://read.oecd-ilibrary.org/view/?ref=1227_1227993-tc9lf4qiaj&title=Unpaid-Care-Work-The-Missing-Link-in-the-Analysis-of-Gender-Gaps-in-Labour-Outcomes

¹⁰³ A Quantum Leap for Gender Equality: For a Better Future of Work for All (2019)

<https://www.ilo.org/publications/major-publications/quantum-leap-gender-equality-better-future-work-all>

¹⁰⁴ <https://www.oxfam.org/en/not-all-gaps-are-created-equal-true-value-care-work#:~:text=In%20low%2Dincome%20countries%2C%20women,just%20six%20percent%20of%20men.>

¹⁰⁵ <https://eige.europa.eu/publications-resources/toolkits-guides/gender-equality-index-2019-report/enduring-burden-care-perpetuates-inequalities-women?languagecontententity=en>

Europe, as much as 10 per cent of women, compared to 0.5 per cent of men, either do not work outside the home at all or work part-time because of care responsibilities.

Discriminatory laws and social norms that confine women to care and reproductive roles and position men as the breadwinner and decision maker in the family persist in many LMICs. Indonesia, for example, ranks 45 in the OECD Development Centre's Social Institutions and Gender Index (SIGI) ¹⁰⁶. The SIGI Index is a cross-country measure of discrimination against women in social institutions that intersect across all stages of girls' and women's lives, restricting their access to justice, rights and empowerment opportunities and undermining their agency and decision-making authority over their life choices and acting as drivers of gender inequalities. The world average is 29. The regional average for Southeast Asia is 39, Vietnam was given a SIGI score of 24 in 2024, denoting low levels of discrimination compared to Indonesia which was ranked 45 (well above the regional average). The African average is also 39, and Kenya is ranked 32 while Uganda fairs slightly better at 27. The average for the Americas is 21 and Colombia ranks 23 and Ecuador has the highest ranking of all the 6 countries at 17¹⁰⁷.

Women dedicate on average 3.2 times more time than men to unpaid care work: 4 hours and 25 minutes per day, against 1 hour and 23 minutes for men¹⁰⁸. As can be seen in the Figure 2 women in LMIC spend more time on unpaid care work, thus they find it particularly difficult to become financially independent through paid work outside of the home.

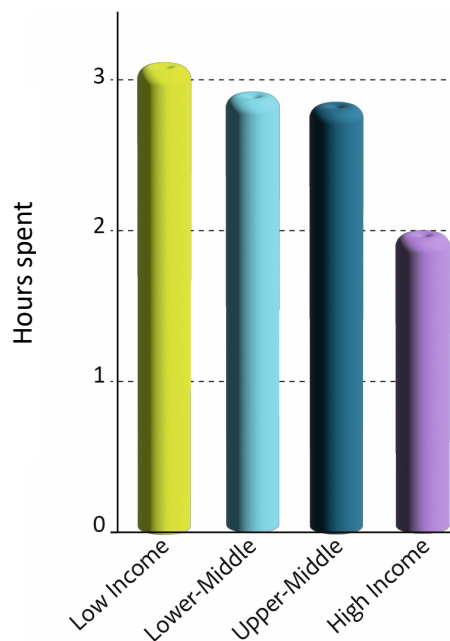


Figure 2: Gender inequality in unpaid care by income – hours spent by women compared to men¹⁰⁹

Women also do most of the paid care work globally – and high numbers of women can be found in jobs like nursing, and early childhood education. According to WHO, women comprise over 67 per cent of the global workforce within the health sector, making them indispensable contributors to the

¹⁰⁶ SIGI scores range from 0 to 100, with 0 indicating no discrimination and 100 indicating absolute discrimination.

¹⁰⁷ https://data-explorer.oecd.org/vis?tm=DF_SIGI_2023

¹⁰⁸ <https://www.ilo.org/publications/major-publications/care-work-and-care-jobs-future-decent-work>

¹⁰⁹ Based on ILO & Oxfam reports

delivery of health care services¹¹⁰. Even though this work is vitally important, these jobs are among the lowest paying and transport systems are often not designed to cater for their schedules¹¹¹.

2.2. Education is key to empowerment

Education is considered key to achieving gender parity and access to education is closely connected to safe and secure transport. Finishing high school allows girls to be able to earn a living. Yet globally one in five girls get married before the age of 18 and adolescent pregnancy stops them from being able to attend school. Consequently, they do not gain the basic qualifications that lead to better employment options and financial independence later in life. Girls in Latin America, and Sub-Saharan Africa are particularly affected¹¹².

Tertiary education attainment varies by country. Globally, the share of females enrolled in upper secondary technical and vocational programs is 43 percent, but this differs by region and subject. It is 32 per cent in Central and Southern Asia but reaches 50 per cent in Latin America and the Caribbean¹¹³.

Gender Equality and STEM Education in Colombia and Ecuador¹¹⁴

In Colombia, the gender equity policy: 'Towards the sustainable development of the country' approved in April 2022, is also known as CONPES 4¹¹⁵ highlights and proposes several strategies to address digital and STEM gender gaps in its roadmap to 2030. Based on the diagnosis prepared for the policy, they studied gender and STEM gaps and the policy proposes strategies and a course of actions, strengthening teaching skills in STEM to include girls from the earliest stages of education (pre-school, elementary, and high school. The laws No. 2314 and No. 2337 (2023) on the participation of girls, adolescents and women in STEM education enhances the inclusion of women in entrepreneurship, increasing their participation in business development programs. Law 2337 says that the government will create a new policy: 'Public Policy of Women in Science and Technology', although to our knowledge this policy is yet to be released. It looks to reduce the gender gap in Colombia by guaranteeing the minimum participation of women, including transgender women, in projects, programs, instruments, funds, and resources aimed at promoting business development, entrepreneurship, innovation, and training of people organized by national entities and the National System of Competitiveness and Innovation. It also aims to promote the inclusion of women in STEM training programs organized by national entities, administrative sectors, and higher education institutions within the framework of their autonomy. The Ministry of Equality and Equity was established in Colombia in 2023 to protect the rights of alienated groups with gender approaches and works to empower women and girls. According to the National System of Higher Education Information, slightly over 50 per cent of the enrolled undergraduate and graduate students in 2022 were women. However, career choices remain biased and stereotypical; and girls tend to choose careers related to female traditional roles (health and education), while more boys choose engineering programs. Furthermore, after graduating, women are less likely to be employed than men, this gap increases with lower levels of education.

In the past 15 years the difference in schooling between girls and boys in Ecuador has diminished and is now almost non-existent, but there are higher dropout rates from girls than boys due to economic and family reasons. Most women and men over 24 years old have, on average, attained tenth year of basic general education. It is making efforts to increase female participation in STEM subjects and is part of the European funded project 'Building the future of Latin America: engaging women in STEM (W-STEM)', a multi-country knowledge exchange and capacity building project. The project is funded through the EU Erasmus+ program, coordinated by the

¹¹⁰ World Health Organization Spotlight on Statistics https://www.who.int/hrh/statistics/spotlight_2.pdf

¹¹¹ This includes times of service but also tariffs that cover a full year (without taking school holidays into account)

¹¹² <https://resourcecentre.savethechildren.net/pdf/globalgirlhoodreport2020africaversion2.pdf/>

¹¹³ <https://unesdoc.unesco.org/ark:/48223/pf0000372963/PDF/372963eng.pdf.multi>

¹¹⁴ UNEP Ecuador and Colombia country reports

¹¹⁵ <https://2022.dnp.gov.co/Paginas/CONPES-aprueba-politica-de-Estado-por-la-equidad-de-las-mujeres.aspx>

Salamanca University (Spain). Fifteen European and Latin American institutions are participating: Chile, Colombia, Costa Rica, Ecuador, Spain, Ireland, Italy, Finland, Mexico, and the United Kingdom. Ecuador is represented by the Universidad Tecnica Particular de Loja and the Universidad Tecnica del Norte. One of the main contributions of the project is to define strategies to boost the participation of female students in STEM areas, proposing action plans and specific activities to strengthen access, attraction, and retention of women in STEM. It focusses on various measures at faculty level to create spaces where students and teachers participate in activities within the university and local secondary education communities to strengthen interest in technical careers and boost girls' interest in technical careers. The University also supports different academic clubs such as WISE (Women in Science and Engineering) Program, Latin America in Ecuador, Ecuadorian Network of Scientific Women and WIE (Women in Engineering) Section Ecuador and it also focusses on practical work experiences. Activities concentrate on attracting women of different ages to STEM careers and ensuring the dissemination of information on projects being carried out within the University, where women are significant players, generating a space to motivate, innovate and promote female STEM skills. The percentage of women in STEM is 29.23 per cent in Ecuador, slightly above global averages.

Box 1: Gender equality and STEM education levels in Colombia and Ecuador

One of the major challenges in mainstreaming E-Mobility is the availability of skills – those with strong STEM education and qualification will be well positioned for this transition. E-Mobility offers a wide range of labor market opportunities for higher-skilled workers as well as for those capable of adapting to changed skills needs. The underrepresentation of women in STEM subjects is common in every region of the world. A 2020 report by the World Bank on Global Trends in the Participation of Women and Girls in STEM found that ‘women are less likely to choose studies in STEM fields, particularly engineering, ICT and physics’ despite overall university graduation rates being higher for women compared to men. Furthermore, women that do graduate in STEM subjects are less likely to enter STEM careers; and they exit their careers earlier than male peers. Based on the [Global Gender Gap Report](#) (2023)¹¹⁶ covering 146 nations, women comprised 29.2 per cent of the STEM workforce compared to 49.3 per cent (or almost half of the total employment) in non-STEM occupations¹¹⁷.

Therefore, it comes as no surprise that women are also underrepresented in tech companies, making up less than 20 per cent of people employed in the sector. Moreover, they find it more difficult to climb to senior positions. The McKinsey report on *Women in Tech* found that on a global level, only 52 women are promoted to managers for every 100 men. These figures are slightly higher in the United States, where women are awarded about half of the science and engineering degrees from universities and hold around 35 per cent of jobs in tech (2023)¹¹⁸ but this is seen as the exception rather than the rule. There is also some evidence of occupational segregation within tech companies. For instance, the percentages of women working within tech companies is improving, while the percentages of women working in tech roles (such as developers and data engineers) remains low.

In India, a regional leader in STEM, the workforce of women in STEM is around 27 per cent, slightly lower than the global average of 30 per cent. In addition, India is seeing women leave the workforce¹¹⁹ and many women do not join the workforce once they graduate. Compared to India, Vietnam has only 11 per cent of women studying STEM subjects¹²⁰ and figures are even lower in Indonesia. This has

¹¹⁶ <https://www.weforum.org/publications/global-gender-gap-report-2023/in-full/gender-gaps-in-the-workforce>.

¹¹⁷ See: Article <https://www.orfonline.org/expert-speak/women-and-stem-the-inexplicable-gap-between-education-and-workforce-participation> & The Equality Equation - advancing the participation of women and girls in STEM <https://openknowledge.worldbank.org/server/api/core/bitstreams/d85229dc-c43c-527e-b014-bd6a37d666a8/content>

¹¹⁸ Women in Tech Network – a McKinsey report (2023) <https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/women-in-tech-the-best-bet-to-solve-europes-talent-shortage>

¹¹⁹ <https://www.npr.org/sections/goatsandsoda/2023/01/04/1146953384/why-women-in-india-are-dropping-out-the-workforce-even-as-the-economy-grows>

¹²⁰ Information Technology Human Resources Market 2020 Report of Vietnam Works In TECH

been noticed and recent announcements by the Women's Empowerment and Child Protection Ministry emphasized Indonesia's commitment to empowering women and girls in the STEM fields highlighting the need for STEM education and digital literacy for women¹²¹.

While women may be increasingly choosing to study STEM subjects, they still face significant challenges to obtain good jobs after graduation. As STEM subjects will play a major role in the skills required to transition to E-Mobility it will be important to overcome the stereotyping and glass ceilings that currently restrict women's interest in joining and staying in these types of jobs.

2.3. Transport and gender

In a predominantly male-dominated transport sector women encounter systemic obstacles hindering their entry and advancement – face heightened vulnerability to violence and harassment as users and are consistently marginalized in decision-making processes. Transport projects are often gender-blind, wrongly assuming the improvements will equally benefit men and women. However, in many LMICs' women must still conform to the social norms that restrict their movements and travel choices about where they can go outside of the house, and how to get there and there are significant differences in their travel patterns, modes of transport access, and utilization of transport infrastructure and services. Men also dominate the sector's leadership and workforce, signaling a need to advance women into new roles through e-mobility projects.

In general, women tend to be more risk averse than men, which also affects their transport choices. They suffer from high risk of harassment when travelling in public space and on public transport, and this is well documented in literature for almost all countries¹²². Women everywhere adapt their transport behavior to avoid this as much as possible and this is unlikely to change with the transition to E-Mobility.

The interplay of gender and transport is also highly contextual as gender-related needs and roles differ across cultures and geographies. Nonetheless there is enough documented evidence to be able to agree on typical behaviors and needs. The following three dimensions of transport are highly interrelated and define many choices women make about their travel:

- Mobility options (mode, cost, distance to access etc.);
- Safety and security (both perceived levels of security by themselves and others, and real levels of safety and personal security); and
- Life stage¹²³ and occupations (schoolgirl, student, mother, elder, homemaker, full/part time, formal or informal worker).

Women need safe, sustainable transport options (as men do) but they face greater mobility challenges than men. They access transport systems according to the availability of transport (private) or public (mode, frequency, and timetables), affordability (cost per trip without extra costs for interchanging),

<https://vietnamnews.vn/society/1639597/breaking-down-stereotypes-on-women-in-stem-gives-female-engineers-more-confidence.html>

¹²¹ <https://en.antaraneews.com/news/313755/ministry-affirms-indonesias-commitment-to-empowering-women-in-stem>

¹²² See on-line database ([here](#))

¹²³ Life stages are the ages and stages we go through as we move from infancy to adulthood. The life experiences we personally experience in each stage build upon one another and influence our values and the choices we make in future life stages. Women's mobility behaviors are deeply impacted by their life stage, especially as when they have children.

accessibility (physical and cognitive¹²⁴) and acceptability (frequency of services, comfort, passenger information and their perceptions of safety and personal security) of current transport options.

Women face many challenges when traveling:

- Routes and schedules are designed with a commuter in mind and usually do not consider the different patterns and destinations women require;
- The cost of trip chaining (financial and time based); and
- Security perceptions and risks (sexual harassment and other forms of gender-based violence) experienced by women when travelling in public transport vehicles, using transport facilities and, in general, traversing public space when accessing mobility options or returning home. First and last mile journeys are of particular importance.

E-Mobility is well positioned to contribute to making transport more equitable and help address some of the challenges and barriers women face today. We have used 4 different categories to analyze gender entry points in E-Mobility: **women as transport users, as workers in the sector, as decision makers and entrepreneurs.**

2.3.1. Women as transport users

Historically, efforts to reduce the gender gap in transport have been primarily focused on the user perspective, tackling issues like safety and sexual harassment. Many studies and reports show that women and men have different mobility behaviors¹²⁵ yet most transport systems do not reflect this. The design of transport infrastructures, and the way the system functions, especially in urban and interurban areas, typically responds to the needs of an able-bodied commuter, usually male, rather than to the realities faced by women, children, the elderly, and people with disabilities.

Mobility patterns are largely shaped by gendered roles and social norms, and for women this means they need to integrate their caregiving and domestic responsibilities with their professional activities. This is particularly the case for women in many LMICs, where they are expected to look after the family as their primary role. Strong social norms influence women's freedom of movement outside the house, and their ability to access transport, and these differ between and even within countries.

Furthermore, women are less likely to own their own car or any vehicle for that matter, so they rely on walking, public transport and shared mobility options to get around. There are fewer women than men who possess a driving license and they have less access to finance needed to purchase a vehicle should they wish to do so. Men tend to buy vehicles in line with how they perceive their status, i.e. they are more image conscious and will choose the vehicle as a representation of power and status. Women typically do not share the same motivations when buying a vehicle. They tend to be more

¹²⁴ An understanding of how the transport system works. Examples this include an understanding of planning the route to work out where you need to go which may not be the obvious direct route that would be walked but is the best routes for public transport or cycling, how to change modes if needed, how to interpret maps and wayfinding indications of where bus stops or stations are located, parking and charging availability.

¹²⁵ Examples include the World Bank report "Why Does She Move? Looking at female urban transport ridership in Latin American cities" <https://www.worldbank.org/en/results/2020/11/12/why-does-she-move-a-study-of-womens-mobility-in-latin-american-cities>, and Ella se mueve segura— A study on women's personal security and public transport in three Latin American cities (2018); <https://www.fiafoundation.org/media/461162/ella-se-mueve-segura-she-moves-safely.pdf> & <https://www.fiafoundation.org/media/461162/ella-se-mueve-segura-she-moves-safely.pdf> & [scioteca.caf.com](https://www.fiafoundation.org/media/461162/ella-se-mueve-segura-she-moves-safely.pdf)

utility minded with safety, functionality, comfort, and fuel economy ranking highly. They are also more price conscious and tend to purchase cheaper options¹²⁶.

At the global level, women are more likely to rely on public transport than men and they make multiple trips to different destinations in a single journey. This is because women combine tasks, mixing job and care responsibilities (family errands, care for the elderly) into one trip. World Bank data shows that on average 65 per cent of the trips made by women are shorter than 5 kilometers¹²⁷. Our literature review confirms that the modes most used by women are buses, shared taxis¹²⁸ and 2/3Ws (as passengers). Furthermore, due to the high number of trips they make, women often pay more than men for their transport.

Gendered travel in Indonesia¹²⁹

In Jakarta, high numbers of people commute from the surrounding cities and surveys show that 70 per cent of commuters are male. A household survey designed to collect qualitative information representative of individual labor market outcomes for women (aged 15 -65 years) who lived within a 5 km radius of a BRT station in metropolitan Jakarta showed that transport-related factors played a significant role in the specific jobs that they chose. Most women respondents who stated that they were not looking for a job cited childcare or family responsibilities as the main reason. Based on the sample, 31 per cent of the women who have ever turned down a job, did so because of transport constraints and 64 per cent of all female respondents said that a job's location was the decisive factor when choosing whether or not to accept an offer of employment¹³⁰. Apart from their different travel behaviors compared to men, it found Indonesian women often travel with children or with groceries and are more concerned about traffic related air pollution and their road safety¹³¹.

Box 2: Gendered travel in Indonesia.

Typically, women travel accompanied by others (e.g. children or elderly family members) and may carry bags of shopping, or have baby strollers when they travel, so ticket prices, space and comfort are important considerations. When a multimodal integrated fare is not in place, they must buy a new ticket every time for both them and their children (especially as they get older and no longer travel for free), or they just decide to walk more. The safety, affordability, and convenience of first and last mile connections for accessing public transport are rated highly important by women¹³². If these connections can be made with EVs (especially E-2/3Ws) it will increase their mobility.

E-Mobility as a feeder service for passengers

The female general manager of the Capital Region Transport (CRUT) in Bhubaneswar, India, has introduced an electric rickshaw feeder service 'Mo E-Ride'. These give first and last mile connections to the main bus system Mo Bus, which is not (yet) electric. As she manages the bus system, she has also been able to implement gender sensitive measures. These include the deployment of 40 per cent women bus conductors (an increase from zero women conductors), equipping segregated bathroom facilities at bus depots for women workers, and improving the lighting at bus shelters as a safety measure for passengers. In addition, CRUT is one of the few transport

¹²⁶ <https://www.wired.com/story/women-buy-more-cars-so-why-are-the-designs-so-macho/> & <https://medium.com/@kathikruse/attracting-female-car-buyers-a-marketing-guide-for-car-dealerships->

¹²⁷ <https://blogs.worldbank.org/en/transport/big-data-proves-mobility-not-gender-neutral>

¹²⁸ Including minibus taxis

¹²⁹ Indonesia Country Report

¹³⁰ Witoelar et al. (2017). How Jakarta's Traffic Affects Labor Market Outcomes for Women and People with Disabilities

¹³¹ Idem

¹³² Borker G., (2024) Understanding the constraints to women's use of urban public transport in developing countries. World Development. Elsevier

agencies that try to respond to the needs of people who identify as transgender and increase their access to public transport. Their needs are strongly coupled with concerns about their personal safety in public space.

These measures and others have succeeded in increasing the ridership of services by 200 per cent over four and a half years, with 57 per cent of passengers shifting from private modes¹³³.

Box 3: E-Mobility as a feeder service for passengers

In much of the developing world, people depend on informal or popular transport. This can take the form of shared taxis, minibus and motorcycle taxis. In particular, women rely on these modes for their mobility needs as they are less likely to own their own vehicle. They operate under various local names such as jitney, matatu, tro-tro or trufi. In both urban and rural areas, motorcycle taxis especially have revolutionized mobility, but with high road safety costs¹³⁴ which made them banned in some places. In Asia motorcycles, 3Ws (tuk tuks) are widely used, while in Latin America, informal transport is predominantly characterized by minibuses and shared taxis. In African cities motorcycle taxis (given various local nicknames such as boda boda or okada), combined with minibus taxi services, are the backbone of local mobility. In Kenya twice as many motorcycles, as cars, are added to the vehicle fleet every year, most of them used as motorcycle taxis¹³⁵. On average, these vehicles travel twice the daily distances compared to cars. Therefore, shifting minibus and motorcycle taxis to electric is a priority but needs careful management and attention to existing organizational structures.

According to the World Bank¹³⁶, limited access to safe and reliable transport in developing countries is estimated to reduce women's participation in the labor market by 16.5%. While women currently use more sustainable modes of transport their mobility patterns are often not a matter of preference but necessity. Therefore, without interventions to make transportation more amenable, especially for women, as women increasingly join the paid workforce their car use could converge with men's over time, bringing additional pressure on traffic congestion and GHG emissions from individual car use. There is already some evidence that women are beginning to drive more. While the number of male driving license holders has always been greater than that of female driving license holders, the gap between is closing and in some countries, it has reversed, in both the USA and Germany¹³⁷ although this data has not been found for LMICs. In addition, while women's lower carbon footprint may be desirable environmentally, their current travel patterns, which are localized, are also barriers to their economic independence and their full participation in economic life. Affordable EVs and a transformation of public transport service operation induced by EVs could provide a solution to improve women's mobility while not significantly increasing their carbon footprint.¹³⁸

¹³³ TUMI Electric Women In Transport 2022 <https://women.transformative-mobility.org/> & IDTP <https://itdp.org/wp-content/uploads/2023/09/MOBILIZE-BhubaneswarSTA2023-final.pdf>

¹³⁴ https://deepblue.lib.umich.edu/bitstream/handle/2027.42/171067/RegionalCityTransportation_Final.pdf

¹³⁵ <https://changing-transport.org/kenyas-e-vehicles-regulatory-environment/>

¹³⁶ <https://thedocs.worldbank.org/en/doc/229591571411011551-0090022019/original/GenderGlobalRoadmapofAction.pdf>

¹³⁷ <https://news.umich.edu/women--outnumber-men-but-still-drive-less/> & <https://www.forbes.com/sites/sarwantsingh/2014/05/23/women-in-cars-overtaking-men-on-the-fast-lane/?sh=4a926ca868d2>; Frost & Sullivan <https://store.frost.com/women-in-cars-overtaking-men-on-the-fast-lane.html>

¹³⁸ Nato Kurshitashvili, Anne Laure Humbert and Laila Ait Bihi Ouali. World Bank. 2024. 'Toward Developing a Mobility and Gender Index' see: <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099012224120015202/p1801641e6a4d40c1aaa71eecdafa3960a>

2.3.2. Women as transport workers

Transport generates many jobs itself, but planning, operations, vehicle manufacturing and assembly industries are very male dominated. Data showing the percentage of women in vehicle manufacturing and assembly is difficult to obtain as much of this remains in the private sector. The ILO transport data is difficult to disaggregate as it combines several sub sectors including logistics, but their figures for 2019 indicate that women represented less than 20 per cent of the global transport workforce.

	Number of countries	Average female participation in the transport workforce (per cent)
EEA and Turkey	33	18.9
Africa	1	8.1
Asia	2	8.4
Latin America	6	10.8
North America	2	23.2
Transition	2	16.3
Total	46	17.3

Table 2: Female participation in the transport workforce (2019)¹³⁹

In Table 2 the regional percentages from the ILO data are shown. However, only one country in Africa reported to the ILO, while Asian figures are based on data from two countries and Latin America come from 6, indicating a possible under-representation of LMICs. The Asian Transport Outlook¹⁴⁰ is publishing new data on the transport workforce with disaggregated data and this may shed some new light on numbers for the region. Furthermore, most upstream jobs such as transport and urban planning, are also held by men meaning transport systems are often planned by and for men.

The ILO numbers also camouflage the stark realities within each transport sub sector¹⁴¹, but we can say with some confidence that women are underrepresented as workers across the whole sector, and this is most prominent in technical areas. Most of the organization and ownership of mobility operations in public transport (formal and informal), taxis (car and motorcycle), deliveries and logistics in LMICs are also firmly in the hands of men. More women are to be found in administration, offices, ticket selling, or cleaning, while men work more often as planning, drivers, mechanics, or supervisors in transport in LMICs.

Women also remain underrepresented in STEM related professions, which are considered highly valued fields for E-Mobility¹⁴². Saera, an EV manufacturer from India, notes that the EV industry requires an understanding of electrical components rather than mechanical and physical labor as

¹³⁹ <https://www.itf-oecd.org/sites/default/files/docs/gender-dimension-transport-workforce.pdf> Based on data from ILO (2019)

¹⁴⁰ <https://asiantransportoutlook.com>

¹⁴¹ <https://www.polisnetwork.eu/news/gender-balance-in-the-transport-sector-a-toolkit-for-change/>

¹⁴² https://www.oecd-ilibrary.org/environment/supporting-women-s-empowerment-through-green-policies-and-finance_16771957-en

needed in traditional automotives, and this suits the skill sets available from women employees. This has resulted in many EV companies in India, hiring more women than men¹⁴³.

Women working in E-Mobility in Kenya

The 2/3W vehicle segment has the largest share of the vehicles registered (48 per cent) in Kenya. According to a study by the Motorcycle Association of Kenya, there are nearly 5 million people who are directly or indirectly involved in commercial motorcycle operations in Kenya. Their survey¹⁴⁴ showed that 9 out of 10 motorcycle drivers use their bikes for commercial services and 75 per cent of drivers were under 35 years old. They estimate that 1 motorcycle supports approximately a household of about 6 people. The motorcycle sector overall remains male dominated and only a few drivers and technicians (6 per cent) are female.

There is a growing interest in E-2Ws and the government has reduced the import duty on EVs by 10 per cent to promote adoption. Private sector companies have been hiring women at a reasonable rate, but parity is not yet achieved. Most female technicians are to be found in private start-ups rather than in the traditional organizations. Four E-Mobility companies in Kenya, including two of the largest, all report having between 33-38 per cent women staff, higher than in traditional automotive sector companies¹⁴⁵. The start-up Ecobodaa is one of the growing number of companies in Nairobi operating a fleet of electric motorcycles on lease-to-own schemes for boda boda drivers. Of the 11 full time employees, 36 per cent are women, and 50 per cent of them are in upper management¹⁴⁶.

The report 'Challenges Facing Female Engineers, Technicians and Riders in the E-Mobility Space in Kenya (2022)'¹⁴⁷ found that the women technicians felt they lacked training opportunities. The current model for training E-2W maintenance engineers and technicians is to hold training sessions online, but the cost implication of these virtual training sessions is high by Kenyan standards. In addition, technical jobs (maintenance technicians and engineers) are still regarded as jobs for men.

Ebee, a Kenyan E-Bike company, is committed to gender diversity and the company aims to have a 50/50 gender balanced workforce. Its hiring process encourages diverse talents that will contribute to developing the E-Mobility sector. It places a high emphasis on passion and willingness to learn on the job rather than existing skill levels in recruitment. This approach has proven successful, with women riders showcasing exceptional dedication and performance. It also has flexible working hours for its women riders, which also contributes to increased efficiency in delivering orders. Internally, three department heads are women and four are men, and there is a conscious effort to ensure that second-in-command roles are gender balanced. This approach not only promotes a diverse leadership structure but also fosters a collaborative working environment. In the future, eBee has the ambitious goal of having one million e-bikes on the roads by 2030, creating 200,000 direct jobs for women and youth across Africa.

Box 4: Women working in E-Mobility in Kenya

Many E-Mobility companies have difficulty in attracting talent so they can simply not afford to miss out on 50% of the population talent pool. Specific efforts need to be made to reach greater diversity in the transport workforce. There are currently global shortages of some skills vital to keep transport running. An example is the International Road Unions' (IRU) recent report on unfilled truck driver

¹⁴³ https://assets.publishing.service.gov.uk/media/64904fca5f7bb7000c7fad03/WOW_Helpdesk_Query_80_Women_s_Economic_Empowerment_and_Electric_Vehicles_in_Kenya.odt

¹⁴⁴ Challenges Facing Female Engineers, Technicians and Riders in the Electric Mobility Space in Kenya https://p4gpartnerships.org/sites/default/files/2023-02/Report_Challenges_Facing_Female_Riders_and_Engineers.pdf

¹⁴⁵ Kenya country report

¹⁴⁶ Interview with Ecobodaa, April 23rd, 2024. Kenya country report

¹⁴⁷ <https://p4gpartnerships.org/challenges-facing-female-engineers-technicians-and-riders-electric-mobility-space-kenya>

positions¹⁴⁸. They state that globally over 3 million positions are open and driver shortages are set to double in the next five years. This is largely due to an aging workforce, with many nearing retirement. Only 12 per cent of drivers are under 25 years old and only 6 per cent are women. There are higher levels of women drivers in urban passenger transport compared to freight – and in specific sub-sectors such as school bus and accessible door-to-door community transport services.

Bus drivers are in great demand everywhere. Based on experiences with ICE vehicles, there is evidence that women make excellent bus drivers – they have fewer major crashes, are more careful drivers (fewer small incidents inside the bus due to erratic driving behaviors) and are good with people with disabilities (PWD), children and elderly¹⁴⁹. Examples include evidence from La Rolita, in Bogotá, where female bus drivers received 91 per cent satisfaction ratings in its first year, compared to 30 per cent from passengers using other bus services in the city. Furthermore, La Rolita drivers recorded the second lowest number of injuries from accidents compared to all other bus operators (predominantly with male drivers). A study published in 2020 by Belgium’s road traffic institute Vias also found that generally women bus drivers ‘take fewer risks behind the wheel than men’ and ‘are less involved in serious accidents’¹⁵⁰. This has been found elsewhere, with one of Sydney’s (Australia) largest bus operators being granted an exemption from anti-discrimination laws so it can exclusively recruit women as bus drivers. The reason given is that ‘women are better drivers and their driving habits cause fewer accidents (both within the vehicles from passengers falling and from road crashes)’¹⁵¹. Similarly, Go Ahead, one of the UK’s foremost bus operators aims to recruit 1,500 new women bus drivers by the end of 2025 and aims to achieve parity by 2035¹⁵².

However, a major barrier to obtaining these jobs is the price of obtaining professional public service (PSV) or heavy-duty vehicles (HDV) licenses (for bus, train and/or truck driving). This ‘price’ is both financial and time as it is very difficult for mothers to attend training sessions as the times often conflict with family responsibilities (or the cost of childcare is prohibitive).

Recruiting women into the sector is not simple. Job stereotyping remains strong, particularly for engineering and technical roles, and recruitment processes are often biased against women, although there are efforts looking to change this¹⁵³. Current thinking indicates that a step-by-step approach may be more fruitful than quotas and targets, especially for LMICs where the talent pool of suitable women able to apply for any jobs advertised also needs to be built up. Our Indonesian team interviewed the main authority for organizing transport in the capital Jakarta who shared their views about setting targets.

“We want to put targets on the number of women workers in the e-bus workforce, however, if we set targets, we must achieve them, and currently, there are not enough resources (applicants) to fulfill any targets we could set. So, our focus now is more on recruiting as many women as possible regardless of a target.”

Syafrin Liputo, Head of Jakarta Transportation Agency

These observations could be applied to many transport players who may be looking to improve the gender balance of their transport workforce. But it shows that governments and other stakeholders

¹⁴⁸ <https://www.iru.org/news-resources/newsroom/global-truck-driver-shortage-double-2028-says-new-iru-report>.

¹⁴⁹ <https://reasonstobecheerful.world/women-bus-drivers-overcoming-stereotypes-in-bogota/>

¹⁵⁰ <file:///Users/heatherallen/Downloads/vrouwen-in-het-verkeer2018.pdf>

¹⁵¹ <https://injuryprevention.bmj.com/content/14/4/219>

¹⁵² <https://www.go-ahead.com/our-people/Go-Ahead-Women>

¹⁵³ Gender Imbalance in the transport sector page 27 & 29.

are aware of the urgency and need for gender balance in the workforce, although they may not yet be willing to set ambitious targets. Failure to meet targets may come with reputational risks.

Trade unions provide a voice for all workers. They can provide a strong voice to ensure that women¹⁵⁴ can benefit from a safe and secure working environment, proper facilities (access to bathrooms and safe rest areas, secure contracts with benefits such as maternity (and paternity) leave etc.). However, even where there are high numbers of women in the union, women members are often not very active¹⁵⁵. Greater engagement by women through the voice of trade unions could help improve the working environment and make transport jobs a more attractive option for them.

“No woman in the bus industry should face unequal pay, be told to wear a uniform designed for a man when she is pregnant, risk her health because of inadequate toilet facilities, or her dignity and safety through sexual harassment, violence or discrimination, ensuring respect, safety and high standards for workers and the travelling public.”

*Diana Holland, Chair of the ITF¹⁵⁶ women’s committee, and Assistant General Secretary
Transport - Equalities, Great Britain*

There is work to be done to improve the image and attractiveness of the sector to women and diversifying the workforce requires new forms of recruitment. The informality of transport operators in LMICs presents several challenges as there are high levels of discrimination against women. Nevertheless, there are many hundreds, if not thousands, of women globally working in and around informal transport, most are found in the wide range of service occupations at major transport hubs, often in precarious, vulnerable and low paid jobs. Occupations include conductors, ticket sellers or inspectors, parking attendants or cleaning, vending or street side selling. For instance, in Colombia, many informal women workers can be found in and around the main Bogotá bus terminal. In Uganda, a typical bus and minibus (‘taxi’) terminal has several hundreds of women working informally as conductors, hawkers, vendors, security guards, despatchers, ticket inspectors, booking clerks etc.¹⁵⁷

Stereotyping and perceptions that transport is no place for women make it difficult for them to access jobs within the sector and to achieve the transition from informal to formal work. Some women do manage to become minibus or motorcycle taxi drivers, but they also face a higher level of police harassment including verbal abuse, confiscation of licenses, and fines (usually from which the traffic police arresting officers gain a commission).

Nevertheless, women do succeed. An example is Jackline¹⁵⁸, who has been a Boda Boda driver for more than ten years in Kibera, the largest informal settlement in Nairobi with some 500,00 people. She is a member of the Kenya Riders and Owners (KRO) Boda Boda SACCO, set up in 2022 to support boda boda drivers¹⁵⁹. The association offers several services to its 800 plus members to overcome some of the key challenges facing the motorcycle taxi drivers in Kenya. Founder and Chair Elly Kegode proactively encourages inclusivity within the industry and offers free training and support to female

¹⁵⁴ <https://www.itfglobal.org/en/sector/women>

¹⁵⁵ https://itfviolencefreeworkplaces4women.files.wordpress.com/2016/06/women_bus_workers_2013_eng.pdf

¹⁵⁶ ITF – International Transport Workers Federation

¹⁵⁷ Dave Spooner & Jess Whelligan The power of informal workers – an ITF education booklet (2017)
<https://www.itfglobal.org/sites/default/files/resources-files/informal-transport-workers.pdf>

¹⁵⁸ <https://www.transaid.org/wp-content/uploads/2024/03/Jackline-Oundo-case-study.pdf>

¹⁵⁹ Motorcycle taxi (Boda Boda) drivers in Kenya are called riders

drivers, but also devotes time to campaigning and mobilizing riders, to end gender-based violence in the sector.

Engaging women as employees presents a critical opportunity for companies to enhance productivity and build a more diverse and skilled workforce. There is increasing evidence that increasing the number of women employed in the transport sector enhances service delivery, increases perceptions of safety for users, and attracts talent, resulting in greater productivity and financial performance. Investors and lenders are also increasingly interested in ESG, impact investment and gender-lens investment, which provides opportunities for EV companies to access climate finance through making their operations and products more gender-inclusive. Considering that the full transition to e-mobility could become an employment booster, aligning company and government policies could lead to a significant generation of new jobs with high female participation.¹⁶⁰

2.3.3. Green jobs, gender and E-Mobility

The creation of green jobs is one of the green economy strategies intended to improve social well-being and equity, and at the same time significantly reducing environmental impacts¹⁶¹. The ILO defines green jobs as jobs that transform economies, enterprises, workplaces and labor markets “*into a sustainable, low-carbon economy providing decent work*”. Decent work is defined as being productive work for women and men in conditions of freedom, equity, security, and human dignity and it is recognized by the international Trade Union as being a core pillar to eradicating poverty and increasing prosperity. Equal rights, dignity and recognizing the worth of both women and men are cornerstones of green job strategies. Countries who adhere to the ILO Green Jobs Agenda need to live up to obligations under their commitments to social justice and decent work, and to the UN’s international human rights framework.

Existing barriers to women’s economic empowerment are likely to persist in the transition to a green economy. Women earn less than men and are under-represented in certain occupations and sectors relevant to the green economy and transition to net zero. For example, in the renewable energy sector, where the number of jobs could increase from 10.3 million in 2017 to nearly 29 million in 2050, women only represent 32% of employees (IRENA 2019)¹⁶².

According to the IRENA World Energy Transitions Outlook¹⁶³ pathways to achieve the 1.5°C climate goal could create close to 85 million additional energy transition-related jobs by 2030, providing opportunities for people with a range of skills and educational levels. In a similar way, transitioning the transport work force to green jobs will shift jobs currently occupied by one profile of qualified worker to another, but it will also create new job profiles. As we transition to a low carbon transport system, some jobs will continue, additional jobs will be created in new or expanding areas such as battery swapping or recycling, other existing jobs will be adapted to make them greener and, unfortunately, there will be some losses of jobs. There is emerging analysis¹⁶⁴ predicting severe

¹⁶⁰https://assets.publishing.service.gov.uk/media/64914b31b32b9e000ca96a34/WOW_Helpdesk_Query_80_Women_s_economic_empowerment_and_electric_vehicles_in_Kenya.pdf

¹⁶¹ An ecological gap is inadequate ecological conditions, or protection fails to address the specific ecological conditions needed for long-term survival or ecosystem functioning.

¹⁶²https://assets.publishing.service.gov.uk/media/65b2416af2718c000dfb1d37/WOW_Helpdesk_Query_81_Update_to_Targeted_Guidance_3_WEE_Primer.pdf

¹⁶³ <https://www.irena.org/Digital-Report/World-Energy-Transitions-Outlook-2023>

¹⁶⁴https://www.omfif.org/2024/05/the-big-squeeze-environmental-risks-for-labour-markets/?utm_source=omfif+update&utm_medium=email&utm_campaign=omfif+update

shortages of labor with nearly 13m additional workers required across the G20 countries to meet the demand for workers in green growth industries such as renewable energy, and electric vehicle manufacturing. Job postings for 'green' jobs are growing nearly twice as fast as the number of workers with the skills to fill them. Only one in eight people currently have skills relevant to abating the climate crisis, with women at a particular disadvantage. A Linked-In survey of job postings showed that between 2022 and 2023, jobs that required at least one green skill increased by 22 per cent.

Due to pre-existing gender inequalities, green investments do not guarantee equal access to green and decent jobs for women. There are risks that women may be excluded as there are still challenges at the hiring stage, with only [62 women for every 100 men considered 'green talent'](#)¹⁶⁵. The current talent pool for green jobs shows that 66 per cent of workers with at least one 'green skill' are male and only one in ten women have one green skill¹⁶⁶. If green jobs are concentrated in parts of the economy with historically limited female representation, women will still not be able to access them easily. Therefore, ensuring that women can be recruited for these positions will need specific programs and support from national and local governments.

The decarbonization of transport will create many green jobs. For example, shifting more trips onto active modes such as bicycles also creates local jobs selling and repairing bicycles. Copenhagen, a city known for high bike use and where nearly 40 per cent of the population cycle to work, has 309 registered workplaces that either sell or repair bicycles, accounting for 650 full-time jobs. In Germany there are five times more jobs in bicycle retail and repairing than in bicycle manufacturing (approximately 22,000), and women can be trained for these jobs¹⁶⁷. Electric assisted pedal bicycles create additional green jobs and mobility options that women can access with the right support systems d.

The replacement of ICE vehicles by EVs will bring about job gains in certain associated sectors (e.g. electricity generation, battery manufacturing, the production of electrical parts and machinery, charging station infrastructure) and job losses in the traditional fossil fuel automotive industry (e.g. fuel production and refinery, retail sale of fuel, repair of motor vehicles, ancillary industries). This is an opportunity to increase gender parity in the transport workforce, e.g. by fostering women's role on decision-making and management levels in public and private sectors or by actively incorporate women in hiring plans for electric buses, electric motorcycle rider trainings and issuing of commercial driving licenses for EVs, etc¹⁶⁸.

The introduction of E-buses in Colombia¹⁶⁹

The entry into operation of 172 electric buses in February 2022 in Bogotá, Colombia created 502 green jobs directly through the operation's concessionaire, contractors and suppliers. The buses were assembled locally, employing more than 1,400 individuals, including 165 females. At city level, the District Department of Women (DDW) in Bogotá (Colombia's capital city) actively promotes the education of women in STEM-related subjects and supports them taking jobs in transport. The DDW provide resources (financial, logistical, and connections with other key stakeholders) to enable women to access training on STEM-related topics. For example, their website offers courses for women, including digital skills. The secretariat also operates 18 Digital Inclusion Centers around the city where they teach women digital and ICT skills (including programming). The department has participated in projects where they provided resources to help train women as the first drivers and

¹⁶⁵ The 2022 Global Green Skills Report <https://news.linkedin.com/2022/february/our-2022-global-green-skills-report>

¹⁶⁶ Green Gender Gap Report 2023 - https://www3.weforum.org/docs/WEF_GGGR_2023.pdf

¹⁶⁷ <https://unece.org/DAM/thepep/en/publications/THE.PEP.Green.Jobs.e.pdf>. Green.Jobs.e.pdf

¹⁶⁸ ILO 2019: Jobs in Green And Healthy Transport – Making the Green Shift <https://www.ilo.org/publications/jobs-green-and-healthy-transport-making-green-shift>

¹⁶⁹ Colombia country report

technicians for La Rolita and assisted them in obtaining the required licenses (further information in the country report). They also introduced a program to train more women in eco-driving and assist them in the expensive procedure of acquiring Public Service Vehicle licenses (PSV)¹⁷⁰, which they need to be able to drive buses.

Box 5: Green jobs with the introduction of E-buses in Colombia

The distinction between employment in high and low productivity sectors also applies to green jobs. High productivity sectors are related to new technology, higher education, and better working conditions, while low productivity sectors are linked to workers with lower level of education, and ad hoc working (more precarity), less social security coverage and informal work contracts and arrangements. Promoting green jobs created in transport as part of a shift to E-Mobility to women can help address this imbalance and allow them to play a bigger role in managerial, technical and operational positions.

Example from India of women working in transport

Women constitute more than 50 per cent of all positions in operations in the regional rapid transit system between the Indian cities of Delhi and Meerut. The National Capital Region Transport Corporation aims to retain this approach across all the regional corridors. They developed a [gender action plan](#), a gender-friendly workplace policy and 1,400 women received training for employability and/or entrepreneurship opportunities. Other measures for the benefit of the users include clearly indicated dedicated seats reserved for women, additional seats reserved for pregnant women, caregivers, elderly, and differently abled on the rapid transit system.

Women-focused facilities are also being created to provide a safe environment. Some original equipment manufacturers and logistics companies have created women-only shop floors and warehouses to create a safe environment and to recruit and retain women workers. The Ola Future Factory¹⁷¹ In Tamil Nadu, India is one of the world’s largest factories for the manufacture of E-Scooters. It is run almost entirely by women and women represent 100 percent of the workforce on the shop floor. At full scale it aims to employ some 10,000 women. Ola has invested in the training and upskilling of the women and uses robots and automated lines for the manufacture of the scooters.

Box 6: Example from India of women working in transport

The new E-Mobility ecosystem brings new opportunities in planning, design, manufacturing, as well as the development of standards and processes that will enable interoperability of the system and vehicles across geographies. Many new job opportunities associated with E-Mobility will be created such as charging infrastructure management, battery swapping and recycling, battery reuse and digital payments. Since these are new jobs, they also bring significant opportunities for women to enter the transport workforce as transport transitions to E-Mobility.

2.3.4. Women in decision-making

Women are under-represented in decision-making positions worldwide. Recently (2024) UN Women¹⁷² compiled information on women’s leadership and political participation. They found 26 countries where women serve as Heads of State and/or Government. Women only represent 22.8 per

¹⁷⁰ These licenses are required to drive a bus.

¹⁷¹ <https://auto.hindustantimes.com/auto/news/ola-electric-facility-to-be-world-s-largest-all-women-factory-in-the-world-41631515606753.html> & <https://www.olaelectric.com/future-factory>

¹⁷² https://www.unwomen.org/en/what-we-do/leadership-and-political-participation/facts-and-figures#_edn1 (2024)

cent of Cabinet members heading Ministries. The five most commonly held portfolios by women Cabinet Ministers are Women and Gender Equality, followed by Family and Children Affairs, Social Inclusion and Development, Social Protection and Social Security, and Indigenous and Minority Affairs. Only 18 per cent of staff in infrastructure ministries are women, compared to 38 per cent in socio-cultural ministries and only 8 per cent of Ministers or Secretaries of State responsible for transport are women¹⁷³. In addition, despite strong evidence that women's leadership and participation improve climate action, the proportion of women delegates at COP meetings only rose from 30 to 38 per cent between 2009 and 2021 and the proportion of female Heads of Delegation only rose from 10 to 13 per cent¹⁷⁴.

There are a growing number of frameworks and targets for mainstreaming gender in national governments and bodies that are responsible for public service delivery, including transport, but they are slow to take force.

Examples of gender mainstreaming in government and women in leadership

The Ugandan constitution emphasizes the rights of women and mandated that women are to be accorded 'full and equal dignity of the person with men and that the state shall provide the facilities and opportunities necessary to enhance the welfare of women to enable them to realize their full potential and advancement'. The Constitution requires that the State protect women and their rights and recognizes gender inequality as a problem. About a third of the 2021 Parliament are women, nearly half of the country's 81 cabinet ministers including the top slots of prime minister and vice president are also occupied by women.

All the top decision-making positions in the Colombian Ministry of Transport are held by women and 47 per cent of other decision-making positions are also occupied by women, indicating progress at decision-making levels.

The Ministry of Transport and Infrastructure in Türkiye has a female internship program with 70 interns since 2021 as a part of its rail freight connectivity project. The program involves a 20-day paid internship in rail related roles across the ministry and on projects.

The [Asia Women Leaders Program](#) (AWLP)¹⁷⁵ aims to address significant gaps in women's leadership in the Asia and Pacific region. The program targets senior women government officials who are in positions to influence their country's public finance, policies and services and provides leadership capacity development strengthening their knowledge, skills, networks, and confidence. In the past three years, 73 senior women government officials from mostly ministries of finance, planning and infrastructure from 24 countries in the Asia and Pacific region participated in leadership training.

Box 7: Examples of gender mainstreaming and women in leadership

The gender gap is also stark in business ownership and leadership. Globally, women globally hold only 20 per cent of corporate board seats, 7 per cent of board chairs, 5 per cent of chief executive officer positions. This is even lower in the automobile industry with women representing less than 8 per cent of all executives in the leading 20 automotive companies, and half of them lacking any women on their executive teams.¹⁷⁶ A study conducted by Women in Manufacturing Kenya, puts the share of women in the automobile sector leadership at only 14 per cent.¹⁷⁷

There is evidence that gender diversity in business leadership has both financial and nonfinancial benefits. Businesses founded by women deliver more than two times the revenue per dollar invested

¹⁷³ <https://www.theprif.org/sites/default/files/documents/gender-equality-and-sustainable-infrastructure-7-march-2019.pdf> & <https://www.50x50movement.org/about-women-public-service-project/>

¹⁷⁴ <https://wedo.org/womens-participation-in-the-unfccc-2022-report/>

¹⁷⁵ <https://aric.adb.org/initiative/asia-women-leaders-program>

¹⁷⁶ [Women in the boardroom - A global perspective - 7th edition | Deloitte SEA](#)

¹⁷⁷ https://www.icrw.org/wp-content/uploads/2020/09/Women-in-Manufacturing-Africa_9.17_ICRW_KAM.pdf

than those founded by men.¹⁷⁸ Women-led businesses tend to employ more women and advancing women's employment could add US \$12 trillion to global GDP and boost economic output by as much as 35 percent in some countries.¹⁷⁹ We found a growing number of women in senior positions in both publicly and privately owned companies responsible for transport (and energy), although there remain strong regional and interregional differences.

High level women in powerful positions in the Asian E-Mobility sector

India has several women in high level powerful positions in transport. For example, the CEO of Indian state-owned Convergence Energy Services Ltd. is female and has been listed amongst the top 30 women entrepreneurs in India. She is actively working to deploy E-3Ws, cars and buses at scale and expanding EV charging infrastructure.

Mahindra Electric a major automotive manufacturer of EVs has a female CEO, a former director of the Automotive Research Association and who is now an advisor to several government bodies on EV- related policy development¹⁸⁰.

In **Vietnam**, VinFast¹⁸¹ is the leading domestic automobile company producing 100% electric vehicles. Its global CEO is a woman who oversees VinFast's automotive factory and its business activities in Vietnam, the US, Canada, France, Germany, and the Netherlands. She was recognized by the World Economic Forum (WEF) as one of the 199 Young Global Leaders (YGL) Class of 2013 for her significant contributions to business operations.

Box 8: High level women in powerful positions in the Asian transport sector

Despite these and other promising examples there remains strong gender differences in E-Mobility decision-making and a lack of gender diversity in many EV and transport operating companies. For example, the corporate leadership of Transjakarta, Jakarta's Bus Rapid Transport system and one of the longest in the world is not gender balanced. Only recently all board positions were held by men, but there is now one female board member¹⁸². As most of Transjakarta users are women and from vulnerable groups, the current imbalance indicates a lack of gender representation and inclusivity in decision-making processes within Transjakarta and this could perpetuate into the E-Mobility sector in Indonesia¹⁸³. Local OEMs and distributors of E-buses also reflect gender imbalances. Our Indonesian country team found that out of 5 OEMs, only 3 out of 40 people in decision-making positions are women. This disparity underscores a broader issue of gender inequality within the E-Mobility sector in Indonesia.

The lack of strong professional networks, leadership role models and mentorship opportunities prevent women rising to top leadership positions. The introduction and mainstreaming of E-Mobility also requires changes at institutional levels (nationally and locally). New agencies and bodies will be created to respond to the new and diverse needs of E-Mobility, and these will provide opportunities to mainstream gender and appoint female leaders to them.

¹⁷⁸ <https://www.ifc.org/content/dam/ifc/doclink/2023/lower-npls-for-women-owned-smes.pdf>

¹⁷⁹ <https://cherieblairfoundation.org/why-women-entrepreneurs/>

¹⁸⁰ <https://auto.economictimes.indiatimes.com/news/industry/women-taking-the-wheel-at-ev-companies/86930516>

¹⁸¹ https://vinfastauto.com/vn_en/vingroup-appoints-vice-chair-as-vinfast-global-ceo

¹⁸² As of 17/05/2024

¹⁸³ Indonesia Country Report

2.4. Women as entrepreneurs in transport

Women have the ability to be entrepreneurs but often lack access to finance to start businesses. The European Bank for Reconstruction and Development (EBRD) in their report ‘Access to finance – mind the gender gap’ (2020) ¹⁸⁴ states that little is known about the gender gap that limits women’s access to the opportunities and services provided by the financial sector, compared with that of men.

Micro-Finance for women transport entrepreneurs¹⁸⁵

More than three-quarters of women in Nepal work in the informal sector and cannot show lenders any credit history or proof of income. In addition, many women entrepreneurs are unable to take out a loan because they do not own any land to put down as collateral.

A new option is a system called [Aloi](https://aloi.global/)¹⁸⁶ where loans are provided in the form of digital tokens that can be accessed by SMS and used to pay for goods and services from verified vendors. Aloi was started in 2019, by a woman, who also was named a [Young Champion of the Earth](#), the United Nations’ most prestigious award for environmental action by young people. It is a software platform for digitally monitoring loan expenditure and repayment through verified merchants and deposit points.

Aloi have helped provide finance to 2,300 micro entrepreneurs in Nepal, many of them women. The loans are tailored to work with informal sector businesses and are particularly targeted at women. The technology also allows lending institutions to track where and how their funds are being spent. The data trails help borrowers to build a strong credit history that can be used to access financing to scale up their green businesses. Examples include learning how to drive a *safa tempo*¹⁸⁷, helping to buy expensive replacement batteries, and Aloi is also helping 100 more women learn how to ride an electric motorbike and buy their own electric scooter.

Box 9: Micro-Finance for women transport entrepreneurs

Micro (MSME) and Small /Medium sized Enterprises (SME) are at the heart of job creation. They play a large role in much of the developing world and account for at least 40 per cent of GDP of emerging economies¹⁸⁸. They also provide as much as 9 out of 10 jobs, so it is crucial that women can participate and build local businesses. Women-owned businesses make up 23 per cent of MSMEs and according to the according to IFC, female led MSMEs face an estimated US\$1.7 trillion financing gap¹⁸⁹.

Everywhere, women face significant barriers in securing funding, mentorship, networking opportunities, and other support services. As a result, they struggle to progress beyond the initial stages of business development. Women currently only receive 2 per cent of all venture capital (VC) investment (2022)¹⁹⁰ and the Boston Consulting Group found that companies founded or co-founded by women receive, on average, less than half the amount invested in companies founded by male entrepreneurs. Both conscious and unconscious gender bias of early-stage investors result in a significant gender financing and investment gaps, especially among start-up and early-stage entrepreneurs. According to the IFC, in emerging markets only 11 per cent of seed funding went to companies with women in their founding team and this gender finance gap further increases in later-

¹⁸⁴<https://ebrd.com/sites/ContentServer?c=Content&d=&rendermode=preview&cid=1395257008686&pagename=EBRD%2FContent%2FContentLayout>

¹⁸⁵<https://www.unep.org/news-and-stories/story/green-financing-allows-women-nepal-shape-their-own-futures>

¹⁸⁶<https://aloi.global/>

¹⁸⁷ Electric three-wheelers in Nepal are called *Safa Tempos*

¹⁸⁸<https://smefinanceforum.org/sites/default/files/SMEFF-Bangladesh%20Event-Non26-final.pdf>

¹⁸⁹<https://www.ifc.org/en/insights-reports/2022/closing-the-gender-finance-gap-through-blended-finance>

¹⁹⁰<https://www.bcg.com/publications/2019/boost-global-economy-5-trillion-dollar-support-women-entrepreneurs>

stage funding¹⁹¹. For example, of the total startup funding raised in Africa in 2022, only 4 per cent of it went to women-led startups; men-led ventures raised the remaining 96 per cent.¹⁹²This is largely due to limited access to formal financial institutions and investment networks.

E-Mobility is an emerging area, and very few programs have strong experts who can provide guidance on business growth, particularly with a gender lens. E-mobility is perceived as being risky by lenders compared to other, more traditional sectors such as energy and agriculture. Fund managers often opt for options that are considered more commercially viable¹⁹³. In general, business growth in LMICs is often hampered by weak market systems, including input supply chains, service providers and access to a range of local, regional and international buyers, in addition to cultural hesitance against women as entrepreneurs in male dominated sectors such as transport. Both conscious and unconscious gender biases of early-stage investors result in a significant gender financing and investment gap, especially among start-up and early-stage entrepreneurs. Furthermore, 4 out of 5 women in Africa lack access to an account with a formal financial institution compared to about 1 out of 4 men, this restricts them establishing and developing their own companies and in accessing finance.¹⁹⁴

The outlook for women entrepreneurs looks more promising The 2023 Global Entrepreneurship Monitor (GEM) Report highlights a rise in female entrepreneurship across industries, including clean technologies like EVs. It also identifies trailblazers in the sector to inspire other women. We found several E-Mobility start-ups managed and/or owned by women in Africa, while in Asia, India appears to be a regional leader and has several high-level women entrepreneurs working in E-Mobility. An example is Kinetic Green¹⁹⁵ a leading manufacturer, and supplier of 2/3Ws which has a female founder and CEO. Kinetic Green offers a wide range of electric vehicles, including E3Ws, for both cargo and passenger. It recently introduced an E-2W model, E-Luna, with a 110 km range on a single charge, fast charging capabilities, and swappable batteries. It has been designed for both urban and rural use.

A key barrier for women entrepreneurs in getting suitable loans is the need for collateral which is often required in the form of a land title, houses and other buildings, or equipment (including vehicles). These assets are usually held by men. The size of loans, terms for repayment and interest rates need to be adapted to meet the needs of female borrowers. Women entrepreneurs often prefer several smaller funding tranches aligned with their business growth rather than a large upfront loan since they often have a longer growth path (given competing responsibilities). The timing and length of entrepreneurship training also often conflicts with household responsibilities, resulting in missed opportunities. However, there are some innovative companies. An example is the asset financier M-KOPA¹⁹⁶ started in Kenya but now available in five African countries (Uganda, Nigeria, Ghana and South Africa) based on digital micro-payments. Their system is particularly well adapted to women's needs and has been shown to help women obtain loans to purchase E-2Ws with the objective to lease onwards to male drivers.¹⁹⁷

¹⁹¹ <https://www.ifc.org/en/what-we-do/sector-expertise/venture-capital/gender-initiatives/ifc-scalex#:~:text=The%20Challenge%3A%20In%20emerging%20markets,lower%20for%20later%20stage%20funding.>

¹⁹² Value for Women: What the Frontrunners are Doing: A Snapshot of Gender Inclusion among Committed Digital Innovation Ecosystem Players and Startups in Africa's Technology Sector Brief". Volume 1, Issue 8. London: Value for Women, 2024.

¹⁹³ <https://assets.wusc.ca/Final-AWCE-report.pdf>

¹⁹⁴ https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Financial_Inclusion_in_Africa.pdf

¹⁹⁵ https://kineticgreen.com/uploads/news/Kinetic_Green_Launches_E-Luna_Raipur_20-03-2024_Final.pdf

¹⁹⁶ <https://m-kopa.com/>

¹⁹⁷ https://assets.publishing.service.gov.uk/media/64904fca5f7bb7000c7fad03/WOW_Helpdesk_Query_80_Women_s_Economic_Empowerment_and_Electric_Vehicles_in_Kenya.odt

As reported by the World Bank, 104 countries out of 190 have at least one legal constraint that prevents women from running a business in the same way as men,¹⁹⁸ including laws that deny women the same rights as men to register a business, sign a contract, open a bank account, or own and inherit property – only three African countries have formal laws that prohibit gender discrimination.¹⁹⁹

Governments and investors could promote and provide visibility to female owned EV businesses, those with a high share of women in leadership, as well as those that are committed to a gender-diverse and equitable workforce. Investors, banks and venture capital organizations can choose those that report on their gender commitments as well as ensuring that they build this across the full value chain from procurement to design products and/or services that consider and respond to the distinct needs of women as a consumer segment within the E-Mobility ecosystem.

¹⁹⁸ <https://wbi.worldbank.org/en/wbi-data>

¹⁹⁹ World Bank Group African Region Gender Innovation Lab (2018) Profiting from Parity: Unlocking the potential of women's businesses in Africa

Section three: The global EV market

Global electric vehicle markets are seeing exponential growth and sales of new electric cars are expected to exceed 17 million in 2024²⁰⁰. The three largest markets are China (the largest market and maker of EVs worldwide²⁰¹) the United States and Europe. In 2022 there were only 26 million electric cars, but this has grown to over 40 million (2023)²⁰². However, this hides regional disparities as most of this growth is in high income countries. But EV sales are growing in LMICs as well, with E-2/3W growing the fastest. The recent International Energy Agency (IEA) Global EV Outlook estimates that all vehicle categories are expected to grow underpinned by competition, falling battery and car prices, and ongoing policy support in 2024.

International programs to accelerate the take up of E-Mobility

There are several international organizations providing substantial support to LMICs in the transition to e-mobility, including: UNEP's Global Electric Mobility Program²⁰³ that provides support to the transition to E-Mobility in 60 countries in Africa, Asia, Latin America and the Caribbean, Eastern Europe and Central Asia.

The ClimateWorks' Leapfrogging Partnership²⁰⁴ part of their Drive Electric Campaign also supports the take-up of EVs in Latin America, Africa, and Southeast Asia.

The World Bank²⁰⁵ has enabled 32 countries to develop essential infrastructure, expand electric vehicle fleets (particularly e-buses), and identify opportunities to accelerate electrification of passenger transport since 2016. It also provides knowledge and analytical studies to support countries in their transition toward electric mobility.

The TUMI Electric Bus Mission²⁰⁶ (funded by the German Ministry for Economic Cooperation and Development (BMZ), with international organizations such as C40 Cities, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), The International Council on Clean Transportation (ICCT), The Institute for Transportation and Development Policy (ITDP), ICLEI – Local Governments for Sustainability, The International Association of Public Transport (UITP) and World Resource Institute (WRI). It aims to ensure procurement readiness of 100,000 E-buses by 2025. they are working in 20 deep dive cities and aim to inspire a network of 100 cities.

ZEBRA (Zero Emission Bus Rapid-deployment Accelerator) led by the ICCT and C40 Cities network is working with 34 cities and states that they expect 25,000 E-buses to be on Latin American roads by 2030²⁰⁷.

Box 10: International programs to accelerate the take up of E-Mobility

²⁰⁰ IEA Global EV Outlook 2024 – Moving towards increased affordability - <https://iea.blob.core.windows.net/assets/aa21aa97-eea2-45b4-8686-ae19d8939161/GlobalEVOutlook2024.pdf>.

²⁰¹ The Stated Policies Scenario (STEPS) reflects existing policies and measures, as well as firm policy ambitions and objectives that have been legislated by governments around the world.

²⁰² <https://ourworldindata.org/electric-car-sales>

²⁰³ https://sustmob.org/EMOB/pdf/ElectricMobility_Brochure_Final.pdf

²⁰⁴ <https://www.driveelectriccampaign.org/leapfroggingpartnership/>

²⁰⁵ <https://www.worldbank.org/en/results/2024/03/21/from-gridlock-to-green-transport-supporting-electric-mobility-to-meet-the-demand-for-passenger-transport?cid>

²⁰⁶ <https://transformative-mobility.org/focus-area/tumi-e-bus-mission/>

²⁰⁷ <https://www.sustainable-bus.com/news/electric-buses-latin-america-2030-25000-forecast/>

3.1. Growing markets and regional differences

There are promising signs for EV markets in emerging economies for all vehicle categories. The projected strong growth is attributed to increasing environmental consciousness, advancements in technology, falling costs and supportive government policies and incentives.

Asia is a leader in E-Mobility compared to other regions. Latin America is developing fast and Africa's EV market²⁰⁸ is growing slowly but steadily. E-cars are probably the least dynamic category for LMICs, while 2/3Ws are the most. The IEA review of the EV market 'Moving towards increased affordability' (2024) notes that 'in 2023, between 55 per cent to 95 per cent of the electric car sales across major emerging and developing economies were large models that are unaffordable for the average consumer, hindering mass-market uptake'. On the other hand, around 1.3 million E2Ws²⁰⁹ were sold in India and Southeast Asia in 2023 alone. One in five 3Ws sold globally in 2023 was electric, and nearly 60% were sold in India, boosted by the Faster Adoption and Manufacturing of Electric Vehicles (FAME II) subsidy scheme.

Examples of EV ambition from our six countries

Colombia is a regional leader and is expected to experience significant growth in the EV market. It is already a major regional player in bus and automotive manufacturing so it is well placed to manufacture and assemble EVs. Some 6 000 electric cars were sold in Colombia in 2023., but Colombia is putting a strong focus on electrifying its mass transportation systems (buses), cargo vehicles and taxis with a target for 100% zero emission bus sales by 2035.

Ecuador exempts EVs from Value Added Tax (VAT), excise tax and tariffs. The goal is to reach 10,000 electric vehicles by 2025²¹⁰. To achieve this, it is planned to have 1,500 buses, 2,000 taxis, 1000 light-duty trucks, and 5,500 cars in circulation. But progress is slow and in 2022, the Instituto Nacional de Estadísticas y Censos (INEC) had only 829 electric vehicles registered in the three main cities (Quito, Guayaquil and Cuenca).

Kenya's Draft E-Mobility policy²¹¹ looks to establish an Electric Mobility Institutional Framework and the legal and regulatory framework to promote adoption of E-mobility. It also has the ambition to establish local manufacturing and assembly of EVs, develop local technical capacity and skills to support local EV manufacturing/assembly, operation and maintenance. A number of fiscal incentives are mentioned, and it will provide supportive measures for EV charging infrastructure, and low-interest loan programs to businesses and organizations investing in EVs. Furthermore, it states it will develop EV based public transport and it aims to enhance gender equality and social inclusion in the E-mobility ecosystem by developing targeted programs that incentivize women, youth and PLWDs to engage in economic activities enabled by E-mobility. Its National Energy Efficiency and Conservation Strategy (2020) envisions a 5 per cent target by 2025 for all registered vehicles in Kenya to be electric.

Uganda has introduced government incentives to ignite interest and investment in EVs. There is no VAT on EVs and import duty on E-2/3Ws has been waived.²¹² It has also introduced a special electricity tariff for charging

²⁰⁸ <https://www.statista.com/outlook/mmo/electric-vehicles/africa>

²⁰⁹ For the purpose of this report, electric two-wheelers and electric three-wheelers (commonly abbreviated as E2&3W, or electric 2&3W) are electric vehicles (EVs) with either two or three wheels, designed for personal mobility, transport of passengers or goods, and propelled by electric motor(s).

²¹⁰ <https://www.bnamerica.com/en/interviews/ecuador-plans-mass-electromobility-by-2040>

²¹¹ [https://transport.go.ke/sites/default/files/Draft National e-Mobility Policy For Circulation 27.03.2024.pdf](https://transport.go.ke/sites/default/files/Draft%20National%20e-Mobility%20Policy%20For%20Circulation%2027.03.2024.pdf)

²¹² <https://www.fairplanet.org/story/africa-electric-vehicle-charging-station-startup/>

stations. Furthermore, E-Mobility is being promoted by the Uganda Electric Mobility Association (NGO) part of the Africa E-Mobility Alliance (AfEMA) which connects stakeholders in electric mobility ecosystems across Africa.

Vietnam has introduced a net zero emissions target for the transport sector by 2050, aiming for 100 per cent EVs using green energy, with a ban on the production, assembly and import of fossil fuel powered vehicles in 2040. There are more than 1.7 million domestically produced and assembled EVs in Vietnam (electric cars and E-2Ws). In total there are about 2 million registered E-2W which accounts for 2.7 per cent of the total number of registered motorbikes in Vietnam²¹³. VinFast, a Vietnam-based multinational automotive company manufacturing EVs has installed some 150,000 charging points in parking lots, bus stations, shopping centers, and gas stations. Currently, E-buses account for about 2.8 per cent of the total fleet nationwide. They are operated by the Vietnamese company VinBus and total 239 in Hanoi on 9 routes, 167, in Ho Chi Minh City on 1 route, and a further 70 buses operate in smaller cities with more planned. Statistics from 2023 show that there were about 2,700 electric taxis operating nationwide²¹⁴.

In **Indonesia**, government vehicles have been required to be electric since 2022, and EV purchase subsidies have been in place since 2023. Indonesia aims to increase its domestic E-2W manufacturing capacity and has allocated USD 455 million in subsidies. Targets are to reach 800 000 new E-2W sales, along with the conversion of 200 000 conventional motorcycles²¹⁵.

Box 11: Examples of EV ambition from our six countries

While comprehensive data is lacking on fleet sizes, emissions, routes and ridership, informal or popular transport provides much of people's mobility in most LMICs. Informal services represent as much as 95 per cent of all motorized trips in African cities and up to 50 per cent of trips in Latin American cities. They are most people's main mode of transport, besides walking and are especially used by women who are less likely to have access to a vehicle²¹⁶. As many of these trips are made by minibus or 2/3W taxi, shifting these modes to E-Mobility presents a huge opportunity both for decarbonizing transport and for accelerating EV take-up for low-income groups.

3.2. Overview of electric vehicle types

3.2.1. Electric buses

Electric buses²¹⁷ have been growing in popularity since the early 2000s. Globally, almost 50 000 E-buses were sold in 2023²¹⁸ and many countries and cities have set ambitious targets for electric bus procurement to renew their fleets²¹⁹. China dominates the market, both in sales and manufacturing and accounts for over 80 per cent of global E-bus sales. It is also a major exporter to Latin American, North American and European countries. China has the largest E-bus fleet in the region with nearly half a million E-buses in circulation²²⁰. These fleets are present in major cities (first tier) as well as smaller ones²²¹.

²¹³ Vietnam has produced some 1.5 million E-2Ws and the difference comes from imported E-2Ws

²¹⁴ Vietnam country report

²¹⁵ Sources IEA Global EV outlook, UNEP country reports and Author

²¹⁶ <https://digitaltransport4africa.org/fr/from-minibuses-to-boda-bodas/>

²¹⁷ Most E-buses are large city buses

²¹⁸ IEA Global EV outlook 2024

²¹⁹ Based on NDCs

²²⁰ <https://www.ebusradar.org/es/#ciudades>

²²¹ First-tier cities are the most developed cities in economics and infrastructure. In China these are Beijing, Shanghai, Guangzhou, and Shenzhen

Outside of China, South America is leading the way. According to data provided by the E-BUS Radar platform, Latin America now has a total of 5,057 E-buses in use for public transport. Ecuador has set a target for 100 per cent zero-emission public transport vehicles by 2025 and Chile and Colombia aim for 100 per cent by 2035. In 2021, Colombia became the world’s second-largest E-bus market and by the end of 2023, it had more than 1,589 E-buses²²².

To further accelerate the uptake of E-buses several cities in the region have introduced ambitious targets. In the city of São Paulo, Brazil, SPTrans, the transit agency, with a total fleet of over 13 000 buses has banned the procurement of any more diesel buses and aims to have a 100 per cent electric fleet by 2038. Likewise, Bogotá, Colombia has stopped further procurement of fossil fueled buses²²³.

The introduction of E-buses can impact women’s mobility both positively and negatively. Positively, as their introduction usually means some reform in the sector towards more formalized services, running to timetables with predictable quality levels, as well as a reduction in air and noise pollution. On the other hand, as the vehicles are significantly more expensive than the ICE equivalents, there is a risk that service frequency may be affected, and fewer buses put into circulation. Buses also perform differently according to the local topography and their introduction requires *in situ* testing. For example, the performance and optimization of E-buses and their battery autonomy was studied in Quito because of its steep hills by the Center for Mathematical Modeling (MODEMAT-EPN) a multi-disciplinary center and regional benchmark for its scientific research. Therefore, their introduction needs oversight both from a technology and gender aspect. E-Buses can also present new job opportunities for women, as drivers and technicians and Bogotá took this into consideration when they created the company La Rolita that specifically targets women’s needs.

La Rolitas’ female E-bus drivers

The first stage of La Rolitas Eco-Driving Program in 2021 sought to train and incorporate 450 women as drivers of the E-bus fleet under the Integrated Public Transport System of Bogotá. Private operators figures showed a high monthly turnover of between 10-20 per cent of drivers, in addition to frequent absenteeism. During the program, they found that women were more reliable and followed driving protocols more precisely than male drivers, which helped to improve the performance of the buses. Another benefit observed by the operations personnel was that women took the daily vehicle inspections before starting their routes more seriously. This helps to maintain the buses in better condition. The female drivers’ turnover rate is now practically non-existent and when they do leave, it’s usually for career advancement reasons.²²⁴

Box 12: La Rolita’s female E-bus drivers

Intercity travel by electric coach remains challenging due to range and opportunity to charge²²⁵. Intercity coaches are highly used in regions where intercity rail links are poor or non-existent, as in much of Latin America and Africa. Asia has invested strongly in rail (high speed and conventional) but there are still many LMIC that also have extensive intercity bus/coach networks. Chile is testing intercity travel by E-bus /coach and developing a program to retrofit ICE buses to electric.

²²² Electric bus, main fleets and projects around the world, Sustainable Bus, January 16, 2023, <https://www.sustainablebus.com/electric-bus/electric-bus-public-transport-main-fleets-projects-around-world/>; E-Bus Radar, “América Latina, accessed March 13, 2023, <https://www.ebusradar.org/> & Pipeline of Electric Bus Projects in Latin America

²²³ <https://www.c40.org/wp-content/uploads/2023/10/Pipeline-of-Electric-Bus-Projects-in-Latin-America.pdf>

²²⁴ https://transformative-mobility.org/wp-content/uploads/2023/04/Mujeres-Conductoras_EN.pdf

²²⁵ Panel at COP 28 Chile Minister of Transport. <https://www.worldbank.org/en/events/2022/11/11/financing-the-transition-to-climate-friendly-inclusive-transport>

3.2.1.1 Minibus taxis

The most popular public transport mode for many LMIC countries is minibus taxis. These 14–16-seater buses provide a vital service in many cities where formal public transport does not exist; or for underserved communities, where public transport services might be inaccessible, inconvenient or out of budget for residents. The fleets are usually operated by small independents attached to membership associations. These associations have different names depending on the region they operate. For instance, in Kenya and Uganda these are called SACCO (Savings and Credit Cooperative Organization)²²⁶ and in Senegal GIE (Groupes d'intérêt économique). Minibus taxis largely outnumber formal public transport fleets in Africa, and provide most public transport trips but precise numbers are not recorded. For example, in South Africa the 250 000 minibus taxis account for over 80 per cent of trips taken by public transport. The sector is also a large employer – providing around 600 000 jobs as drivers plus the conductors and assistants jobs²²⁷.

Minibusses also form the backbone of public transport in many Latin American and Asian cities, providing both transport services and employment. Over the last two decades, however, there has been a trend across Latin American cities to formalize the existing informal transportation sector towards bus rapid transit (BRT) systems, often ignoring the informal work that many women performed in the industry. The reforms often include the outsourcing of services performed by women such as ticket control, fare collection, or technical services to private companies.

There are also currently very few EV options that can replace minibuses. As most minibus taxis are owner/operator arrangements and the margins for these operators are typically thin, the cost of a new EV is prohibitively high. Therefore, changing to electric will require both financial mechanisms for the purchase or rental of EVs and significant capacity building and public awareness efforts.

3.2.2. Heavy duty trucks

Ambition to electrify heavy-duty vehicles is also growing. More electric heavy-duty vehicle (HDV) models are entering the market, and some 27 governments have pledged to achieve 100 percent zero emission bus and truck sales by 2040²²⁸. Both the United States and European Union have proposals for stronger emissions standards for heavy-duty vehicles, but this is not yet seen in LMICs. There are also major infrastructure challenges and only few examples of electric truck introduction anywhere yet. Long distance trucking is currently heavily male dominated and despite the worldwide shortage of HDV drivers²²⁹, it is not perceived as an attractive sector for women. Working away from home, with few segregated, safe rest facilities and long hours are not conducive to women.

3.2.3. Light duty commercial vehicles (LDVC)

The sales share of electric light duty (commercial) vehicles grew by over 90 percent in 2023 and overtook the sales growth rate of passenger cars for the first time²³⁰. There are now around 310 000 electric LDVCs on the roads and this growth was against a landscape of declining overall sales of LDVCs,

²²⁶ A SACCO is owned, managed and run by its members who have a common interest in the provision of public transport. Licenses to operate can be awarded to SACCOs rather than individual drivers.

²²⁷ <https://thecityfix.com/blog/electrifying-south-africas-minibus-taxi-industry-a-data-driven-approach/>

²²⁸ <https://globaldrivetozero.org/mou/>

²²⁹ IRU Global Driver Shortage <https://www.iru.org/news-resources/newsroom/global-driver-shortages-2023-year-review>

²³⁰ The Global Electric Vehicle Market Overview in 2024: statistics and forecasts <https://www.virta.global/en/global-electric-vehicle-market>

indicating that these vehicles adapt well to electric. There has been a noticeable increase in urban freight ²³¹ everywhere due to the explosion of e-commerce, especially food deliveries. The Indonesian country report notes that women are already active in local on-demand food deliveries in Jakarta, but they also found, based on interviews, that the women drivers were worried that customers felt that women drivers ‘were perceived as weak’ and were not capable of performing tasks according to their customer needs, and this prejudice may cause people to cancel their order affecting the earning potential of women drivers.

Ecuador and E-logistics

Ecuador has several logistic operators that are shifting to E-Mobility (based on information from the SolutionsPlus project)²³². The Ecuadorian Association of Express Messaging and Courier Companies (**ASEMIC**) is a non-profit civil corporation that groups together the most important companies in the courier and parcels services in Ecuador. Some of the companies are trying to make the transition to electric fleets and have worked on the implementation of E- Mobility projects (i.e. Urbano Express, Servientregas, Tramaco, etc.) as part of SolutionsPlus. Grupo Entregas have been working on several projects to include female courier drivers and EVs in their fleet in Quito, Guayaquil and Cuenca²³³. In addition, the city of Quito has a pilot project to shift local deliveries to electric in line with a zero-emission zone within the historic center.

Box 13: Ecuador and E-Logistics

3.2.4. Passenger cars

Already over 2.3 million electric cars were sold in the first quarter of 2024, and electric cars could account for 18 percent of total car sales for the calendar year of 2024. Three markets dominate global sales and China accounts for around 60 per cent of global electric car sales and more than half of the electric cars on roads worldwide are found in China. It has already exceeded its 2025 target for new energy vehicle sales. The second largest market is Europe where more than one in every five cars sold was electric. Electric car sales in the United States – the third largest market – increased and now represents 10 per cent of all car sales share. Passenger cars such as SUVs dominate electric car sales and account for 60 per cent of available BEV options in China and Europe and an even greater share in the United States, echoing the trend in ICE SUVs.

Large passenger vehicles present higher environmental impacts due to their greater use of minerals and energy, whether they are electric or not. BEV SUVs have batteries that are two- to three-times larger than small cars, requiring larger amounts of rare minerals. SUV sales are also growing in Asia. In 2023, SUVs and large models accounted for the majority share of electric car sales in Vietnam (over 95 per cent), Malaysia (over 85 per cent), Thailand (60 per cent), and Indonesia (55 per cent)²³⁴. This trend is not yet seen in any of the LMICs in Africa and LAC, given that the price of these EVs is prohibitive for most people.

Brazil is the front runner in Latin America for electric passenger cars followed by Colombia, Costa Rica and Mexico, who all have fiscal incentives in place. Last year, electric car registrations in Brazil nearly tripled year-on-year to more than 50 000, (a market share of 3 per cent) mainly with Chinese imports. But the absolute numbers of EVs sold in LAC remain low and the price of EVs is still high and this is a challenge for all low- and middle- income consumers. Women, in particular, find the capital cost of

²³¹ <https://www.polisnetwork.eu/wp-content/uploads/2023/05/Just-Transition-Webinar-Urban-Freight-Report.pdf>

²³² Ecuador country report

²³³ IEA Global EV Outlook 2024

²³⁴ IEA Global EV Outlook 2024 - <https://www.iea.org/reports/global-ev-outlook-2024>

EVs as a barrier as they are still much higher than ICE equivalents. However, as consumer interest and competition increase, a growing number of more affordable models are likely to come to market.

Policy support in Indonesia is boosting E-Mobility

Indonesia has high ambitions for E-Mobility and aims to have 2 million electric cars and 13 million E-2/3Ws on the road by 2030. The new capital city (replacing Jakarta) will mandate EVs as the main means of transportation.

In 2019, less than 100 EVs were sold annually in Indonesia but this increased tenfold between 2020 and 2021 to 1000 and in 2022, annual sales jumped to over 10 000. This trend continued and 17 000 units were sold in 2023, helped with government backed purchase incentives. Electric cars have reduced Value-Added Tax of 1 per cent (compared to 11 per cent for conventional cars) and are exempt from the luxury and import tax that applies to other vehicles. In addition, they are eligible for regional tax reductions.

Increasing the variety of models and manufacturers has helped increase sales and the EV market is no longer dominated by Chinese manufacturers. Their 75 per cent market share of electric car sales (2022) dropped to 45 per cent in 2023 as the Indonesian government limited purchase incentives to models with 40 per cent local content. This combined with rising interest rates for credit-backed car purchases resulted in sales falling below the government's target of subsidizing 36 000 electric cars. The requirement for 40 per cent local content has now been relaxed until 2026, which has re-boosted international OEM interest to set up manufacturing facilities. Battery manufacturing capacity is also being developed in Indonesia, capitalizing on its rich nickel reserves.

Indonesia is aiming to increase its domestic E-2W manufacturing and has allocated USD 455 million in subsidies to reach 800 000 new E-2W sales, along with the conversion of 200 000 conventional 2Ws.

Still, sales of E-buses and E-2/3Ws remain low. In 2023, Indonesia had 100 Chinese E-buses operating in Jakarta with a target of a further 200 to be added in 2024. E-2/3W sales only reached about 11 500 in 2023, below the government target to subsidize 200 000. Reasons for the lower than expected 2/3W uptake include low ranges and lack of charging points to enable interurban journeys.

Box 14: Policy support in Indonesia for E-Mobility

3.2.5. Electric taxis

To move towards more sustainable mobility and reduce carbon emissions, several countries in Latin America are embracing the incorporation of electric taxis into their major cities. Many programs receive governmental support with subsidies and other assistance to promote the transition to electric taxis²³⁵.

Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, and Uruguay are all looking to introduce E-taxis. Brazil is considered to be a pioneer in E-taxis and started trials in 2012 in Sao Paulo and Belo Horizonte. Since 2021, Chile has the "My Electric Taxi" program supported by the Ministry of Energy, implemented by the Energy Sustainability Agency. This program provides financial support for owners of urban collective taxis to exchange their vehicle for an electric one. The support covers both the acquisition of the electric vehicle and finances the delivery and installation of the corresponding electric charger for taxi owners who qualify. Several models of taxi are on offer and 80 taxis have qualified for the support. Additionally, the Ministry of Energy and the Energy Sustainability Agency (AgenciaSE) launched the initiative '+Electric Transport'. This program provides co-financing for the purchase of an EV and its residential charger, including installation, to owners of an urban collective

²³⁵ <https://mobilityportal.eu/electric-taxi-plans-latin-america/>

taxi living in 8 communes of Santiago. The aim is to encourage female participation in the energy and transportation sectors, so slots will be allocated based on gender equity criteria initially²³⁶.

In Colombia, Empresas Públicas de Medellín (EPM) and the Medellín City Hall have been working on the incorporation of electric taxis since 2020. In 2022, they launched a call to introduce 500 new units. The 2x1 program provided financial support for the new EV while allowing the existing ICE taxi to continue to be in operation for a further five years under the same license, allowing the owners to work with both vehicles simultaneously for five years. It was expected that the two incomes would help to cover the extra expenses. Once this period has passed, the ICE vehicle would be scrapped, and the license to operate the electric one would remain valid. However, this program has not been successful and approximately one year after its launch, only 19 of the promised 500 vehicles were in circulation. The Medellín City Hall attributes the strategy's failure to three factors: vehicle costs, limited availability of charging infrastructure, and changes in interest rates by banking institutions. Besides, taxi drivers/operators who did take up the offer are now encountering difficulties in carrying out their work, as most chargers are out of service. Bogotá has also tried to introduce E-taxis since 2020 without success but has recently relaunched a new program. Cali, a second-tier city, also aims to provide support to taxi drivers to introduce at least 300 E-taxis.

Fleets of electric taxis are also found in Ecuador in Loja, Guayaquil, and Quito (Ecuador) but the transition for taxis fleets is challenging, and their experience also shows that many taxi drivers that received financial support for E-Taxis have switched back to gasoline vehicles due to the lack of charging infrastructure and long charging times. Similar experiences were found with an incentive-based program to test E-Taxis in the Galapagos Islands.

No evidence of women taking part in these taxi programs was found – indeed taxi driving everywhere is dominated by men, and it is a tough market for women to enter. But there are a few examples of projects that bring women into the sector driving ICE taxis, and this can provide jobs and increase women's mobility, at the same time, as women are known to prefer taxi drivers to be women. Some companies such as Bolt, with their Women at the Wheel²³⁷ program launched in 2022, and Uber encourage female drivers to sign up to their platform and have introduced extra safety features that allows women drivers and non-binary drivers to select a preference to accept only women riders. There are also some initiatives in place linking EVs and female taxi drivers, usually associated with digital ride hail platforms, such as the Indian example below.

Electric taxi services targeting women drivers and passengers

In an IFC study, 20 per cent of women taxi riders said the lack of women drivers limits the number of trips they take, and 44 per cent said they would be more likely to use the service if they had the option of selecting a woman driver²³⁸. A new partnership between inDrive, a global mobility and urban services platform, and Indian Evera Cabs, an all-electric taxi service in India, has been created (2024) to launch a fleet of electric vehicles (EVs) exclusively for women drivers. inDrive's 'DrivingNaari program', aims to empower women by providing them with equal opportunities to pursue careers as professional drivers and looks to challenge entrenched gender stereotypes within the ride hailing industry. The program is designed to help underprivileged women become professional drivers. and helping them to have financially rewarding livelihoods. As part of the program, candidates receive a car financed by inDrive and commission-free use of the inDrive platform.

Box 15: Electric taxi services targeting women drivers and passengers in India²³⁹

²³⁶ Progress updates are not yet available and the gender criteria is not clear.

²³⁷ <https://bolt.eu/en/driver/women/>

²³⁸ <https://www.ifc.org/content/dam/ifc/doc/mgrt/062020-ifc-gender-segregated-ride-hailing.pdf>

²³⁹ <https://indianstartupnews.com/news/indrive-partners-with-evera-cabs-to-launch-ev-fleet-with-women-drivers-4794565>

3.2.6. Electric two- and three- wheelers²⁴⁰

Globally 2/3Ws are the most electrified market segment today and of the most interest for LMICs. According to the IEA, 90 per cent of the global conventional 2/3Ws stock today is found in the developing world. In all emerging markets and developing economies, they outnumber the registration of electric cars, and there are around 65 million E-2/3Ws on the road. The IEA predicts high growth in this EV category and estimates that E-2/3Ws sales will reach 210 million units by 2030 and 360 million in 2035. Policy measures such as purchase subsidies in countries such as India and Indonesia, and targets for electrifying the 2/3W fleet are accelerating their take up.

Motorbikes in Vietnam

Motorbikes have emerged as an affordable, convenient, and fuel-efficient mode of transportation especially in Asia. Currently, Vietnam has a total of over 72 million registered motorcycles, experiencing a growth rate of 9.3% per year. Notably, E-2W constitute around 2 million registered vehicles, accounting for approximately 2.7% of the total number of registered motorbikes. Hanoi, the capital of Vietnam, is a densely populated city. Since 1996 the city has changed from one where most trips were made by pedal bike to one populated by over 6 million motorbikes, a tenfold increase. Now there are at least two and a half motorbikes per household and the associated high levels of noise from the bikes²⁴¹ cause both traffic and noise pollution. But women in Vietnam use them and a GIZ study conducted in 2021, found 64.7 per cent of EV owner/users were female and 35.3 per cent were male, based on 1,337 responses from vehicle owners²⁴².

Box 16: Motorbikes in Vietnam

Asia is the leading market for E-2Ws. India, China and Association of Southeast Asian Nations (ASEAN) countries are the biggest two- and three- wheeler markets worldwide (electric and ICE combined). China dominates the market for E-2/3Ws. Indonesia, Vietnam, the Philippines and Thailand are the largest markets for sales of both ICE 2/3Ws and E-2/3Ws and all are dominated by Chinese imports.

India is the second largest E2W market globally and over half of India's three-wheeler registrations in 2022 were electric, demonstrating their growing popularity. This is due to government incentives and lower Total Cost of Ownership (TCO) compared with conventional models. Unlike countries in the rest of Asia, the Indian electric 2W market has strong local players and its local market is dominated by five large domestic manufacturers.

The rapid growth seen in India is the result of strong policy support, especially FAME II, which was first introduced in 2019 as a three-year purchase incentive policy combined with India's Go Electric campaign. Both have boosted E-2/3W uptake. Although the capital cost for E-2/3Ws is some 30 per cent higher than ICE equivalents, after subsidies and tax rebates the TCO is attractive and E-2/3W ownership can work out to be as much as 40 per cent cheaper after 5 years compared to an equivalent ICE vehicle.

²⁴⁰ There are still some inconsistencies internationally about standards and vehicle categories in E-Mobility. Two wheelers can be pedal assisted (with an electric motor) or classified by speed (top speeds under 25 km/h). The IEA Global EV Outlook 2024 uses the term two-wheelers to refer to vehicles with a top speed of at least 25 km/hr and which fit the L1 and L3 classes UNECE definitions. This excludes micro mobility options such as electric-assisted pedal bicycles and low-speed electric scooters. The definition of a three-wheeler in the IEA report is aligned with UNECE classes.

²⁴¹ An open dataset on individual perceptions of transport (2024) <https://www.nature.com/articles/s41597-024-02950-9>

²⁴² <https://www.ndctransportinitiativeforasia.org/resources-list/study-of-electric-mobility-development-in-viet-nam>

Kathmandu's female Safa Tempo drivers and entrepreneurs

There are currently 775 women out of the total 1,302 full- and part-time drivers employed in the operation of Kathmandu's 12-seater Safa Tempo fleet (Kathmandu's fully electric three-wheeler public transport vehicles). In addition, 210 women own and run their own Safa tempo business. The World Bank conducted a study on Gender and Public Transport in Kathmandu²⁴³ that analyzed the situation of the city's public transport. During this study, women reported a preference for using Safa Tempos as the face-to-face seating arrangements provide for greater personal security.

The involvement of women in the operation and ownership of Safa Tempos²⁴⁴ began in the late 1990s and has increased in parallel with the growth of E-Mobility. Originally, a group of seven women bought and ran their own Safa Tempo vehicles at a cost of approximately US\$ 5,000 per vehicle. Later, this was extended to 16 additional women with a Swiss funded (Helvetas, Nepal) project providing free training to women operators and entrepreneurs. Safa Tempo drivers earn an average of roughly NPR 12,000 (US\$ 1,200) per month—a good income by local standards. Most of the female drivers who operate Safa Tempos report being primary earners in their households.

Box 17: Kathmandu's Safa Tempo

Early versions of E-2/3W had limited safety features, but today these have been ironed out²⁴⁵ but there remains a high share of models equipped with lead-acid batteries in much of Asia²⁴⁶. Prices of E-2/3Ws equipped with lithium-ion batteries are much higher than those with lead-acid batteries but vehicles powered by lithium-ion batteries have a longer lifespan, are lighter than those powered by lead-acid batteries, are less environmentally polluting and their batteries need replacing less frequently. Their TCO depends on the price of electricity and tax structures. Research in India has shown that women need more time to repay loans on commercial 2/3W as they need to allocate time to family duties²⁴⁷, while men do not need to truncate their working days which affects how quickly loans for EV purchase can be paid back.

Vietnam has a dynamic domestic E-2W market²⁴⁸ and 2Ws are the most common form of transport. The E-2W market is dominated by a small number of local manufacturers (such as VinFast, Pega and Dibao), who together have just over 70 per cent market share²⁴⁹. Local production capacity exceeds domestic sales, giving them the capacity to export to other ASEAN country markets. In Vietnam, E2Ws are both cheap to buy and to run, making them very attractive and even students can afford them.

E-2W pilot in Vietnam

UNEP has been working with the University of Transport Technology in Vietnam since 2019 to mainstream E-Mobility and provide support for scaling up E-2Ws. The project aims at improving public health, mitigating climate change by improving vehicle fuel economy and reducing local pollutants through the adoption of EVs.

²⁴³ <https://www.worldbank.org/content/dam/Worldbank/document/SAR/nepal/Gender-and-Public-Transport-in-Nepal-Report.pdf>

²⁴⁴ <https://documents1.worldbank.org/curated/pt/193791543856434540/pdf/132636-EMADv4-web.pdf>

²⁴⁵ <https://www.linkedin.com/pulse/asiyas-electric-revolution-quiet-takeover-e-scooters-amr-elharony-d82cf/>

²⁴⁶ Lead-acid batteries generate 50% more CO₂ emissions from cradle to grave than Lithium-ion, and also produce acid fumes during charging and maintenance. Lithium-ion batteries can be used for longer, generating less toxic waste, and can be reused another time as a second life battery for energy storage or other uses. See: <https://theicct.org/wp-content/uploads/2022/10/asia-pacific-lvs-NDC-TIA-E2W-mkt-growth-Vietnam-nov22.pdf> & <https://cleantechnica.com/2023/07/24/vietnams-electric-two-wheelers/>

²⁴⁷ Interviews by Urban Catalysts, India (report forthcoming) <https://www.theurbancatalysts.org/our-publications>

²⁴⁸ IEA Global EV Outlook 2024 - <https://www.iea.org/reports/global-ev-outlook-2024>

²⁴⁹ Vietnam country report

Honda Vietnam provided 50 electric scooters to the project for testing. The pilot took place over three years from 2020-2022 in three provinces and cities in Vietnam: Hanoi, Vinh Phuc, and Thai Nguyen.

The research team collected feedback from the users on features including vehicle design, safety, utility, investment needs and environmental impacts. Information received from female users included comments about the scooter weight (too heavy) and lack of maneuverability, lack of comfort (requests for adjustable seats) and no space for belongings (such as handbags or shopping). Women also requested more elegant designs and bright, attractive colors.

Box 18: E-2W pilot in Vietnam

Although the markets are smaller in comparison to Asia, 2/3Ws play a critical role in Latin America²⁵⁰ and Africa for daily passenger and commercial transportation and their electrification is ongoing with several projects. Many of them have been working on including gender aspects. These promising projects are shedding light on several features from a user and owner perspective including aspects of vehicle design, charging, battery options and other aspects where gender may play a role.

Fear of using a motorcycle, scooter, pedal or assisted E-Bike is high for most African women- so training will be key for them to gain confidence²⁵¹. The road space is dominated with cars and lorries and large numbers of ICE motorbikes, mainly driven by men.

Women need to be trained to drive E2Ws if they are to be able to use them. An example is the SolutionsPlus Replication Project with Stima Mobility on Women Boda-boda Empowerment in Kenya, which had the goal of training 50 women to be electric motorcycle drivers. They started with a pool of 100 interested women but only 20 ended up being licensed. Not all have become boda boda drivers and six have so far joined delivery platforms. The major concerns were the vehicle upfront payment (even though it was lowered through the project grant), the high cost of obtaining the license to operate and worries about sexual harassment. The following table presents the main findings from this project on areas that women find challenging.

Key learning from the SolutionsPlus supported Stima Mobility	
Challenges	Description
Financial constraints	30 percent of women participants reported not being able to make a down payment for the electric motorcycles despite being offered a subsidy
Cost of driving license	30 percent of riders were not able to pay for the cost of obtaining a motorcycle driving licenses (including road training registration, exam fee and issue costs of driving license).
Lack of driving experience	35 per cent of the women interested in joining the scheme did not have experience driving a motorcycle, which is a prerequisite to join the fleet management company as driver.
Barriers due to stereotyping	Concerns about stereotyping were a noted as a barrier to enter the sector.

²⁵⁰ <https://www.solutionsplus.eu/>

²⁵¹ <https://p4gpartnerships.org/sites/default/files/2023-03/M-KOPA - BCG - Gender Research On Electric 2-Wheelers In Africa - Dec 2022.pdf>

Lack of trust in financial companies	A general lack of confidence in the financial arrangements and poor reputation of financing companies. They were fearful about being harassed by debt collectors and the risk of repossession of the motorcycles.
Concerns about financial risks	The women preferred to join the delivery services app over the ride-hailing (taxi) services but in both cases, they were still hesitant to take the risk of a vehicle loan.

Box 19: Key learning from the SolutionsPlus supported Stima Mobility²⁵² project in Kenya

African E-Mobility start-ups face more obstacles with the adoption of electric motorcycles compared to Asia, such as lower purchasing power of potential owners, a lack of suitable financing mechanisms, less reliable grids, and a lack of local manufacturing and spare parts. Africa has not yet become flooded with low cost ‘off the shelf’ E2/3Ws and the road and load conditions are much more demanding than in Asian cities, which means locally adapted products are needed. For instance, in Kenya, an equivalent electric motorcycle can cost more than US\$2,000, compared to the average ICE motorcycle cost of US\$1,200. Battery swapping helps to lower upfront costs by keeping batteries under ownership of the battery swap company and removing the costly battery from the purchase cost of the motorcycle. These systems also increase convenience by allowing the quick change of batteries, rather than waiting for the battery to be charged. Providing battery swap stations across the city also reduces customers' range anxiety, allowing them to swap batteries quickly and easily, comparable to an ICE refueling experience. The battery swap model has therefore been adopted by at least 14 E-motorcycle companies in Kenya, including all but one of the largest E-motorcycle companies²⁵³. Even though E-motorcycles typically have a lower TCO²⁵⁴ due to lower energy and maintenance costs, the initial capital investment and financial risks remain as barriers to uptake in the region.

Numbers on women active in the EV industry are not currently centrally collected anywhere, highlighting once again the challenges that limited data collection and availability create for mainstreaming women in the EV sector. For Africa, we were only able to consider information and gender balance in the workforce from specific companies such as Ampersand, the largest E-motorcycle provider in East Africa. It has over 2,500 motorcycles on the road as of April 2024, with over 500 motorcycles of them in Kenya. It also provides battery-swapping services (BaaS) in both Nairobi and Kigali, and it has battery assembly units in Rwanda. Ampersand's staff is 38 percent female, and four out of seven department heads are women. In addition, currently 4.2 per cent of their fleet are women riders, and they aim to increase to 10 per cent in 2024²⁵⁵. Other examples include Roam with 40 per cent of their workforce being female²⁵⁶.

Electrifying 2/3Ws is a promising lever for decarbonizing mobility, improving urban air quality, and it presents many possible benefits for women. Women use motorcycle taxis²⁵⁷ as passengers but there are also openings for employment as motorcycle drivers (for passengers and urban freight). While Asia has the lion's share of the global motorcycle fleet, growth rates of motorcycles in many African and

²⁵² <https://stimaboda.com/>

²⁵³ AfEMA Data Portal - <https://data.africaema.org/>

²⁵⁴ TCO: Total Coat of Ownership

²⁵⁵ Interview with Ampersand, April 23rd, 2024 Kenya Country Report

²⁵⁶ https://assets.publishing.service.gov.uk/media/64914b31b32b9e000ca96a34/WOW_Helpdesk_Query_80_Women_s_economic_empowerment_and_electric_vehicles_in_Kenya.pdf

²⁵⁷ References in country reports

Latin American countries are high, showing a big opportunity to integrate women's needs and skills to make sure these vehicles are safe and electric.

3.2.7. Electric bicycles

Pedal assisted E-bikes are also a promising market. There are more than 300 million pedal assisted E-bikes in China²⁵⁸ and over 3.7 million in Europe. Converse to ordinary pedal bikes use, pedal assisted E-bikes show a high potential for increasing women's mobility. However, cycling as a mobility option for women in LMICs is still constrained by stereotypes and road safety fears. European data suggests that there are more electric city bikes being sold to women than men (who are buying more electric off-road bikes). In the Netherlands more than half of cycling trips are made by women, and pedal assisted E-bikes have enjoyed strong success. A study out of Norway shows that electric bikes cause people to cycle longer and more often, and the effect was strongest on women²⁵⁹. A study in Auckland, New Zealand showed that E-bikes act as a cycling enabler for women and help increase women's cycling confidence and assertiveness and provide less fit women with more empowering physical activity experiences.

Electric bikes offer numerous benefits, including easier uphill climbs, assistance with carrying loads or children, extended range for commuting or leisure rides, and increased confidence for less experienced cyclists. Electric pedal assisted bikes that meet certain criteria depending on the country (e.g. limited speed and power) do not require a special license or registration.

Pedal assisted E-Bikes have not yet become as popular in LMICs for either men or women. The prices of pedal assisted E-bikes are still high, and they tend not to be included in national financial incentive schemes, making their acquisition prohibitive for many women. In addition, the design and use of standard pedal bicycles already pose barriers to many women due to cultural contexts and social norms which restrict women cycling. There are some examples of E-bikes being specially designed for use in LMICs, such as the Africrooze E-bike designed for rural use and developed in cooperation with local partners²⁶⁰. The Africrooze E-bike can be used as taxi, ambulances and for cargo transport including water transport. They are also making the bike look more like a motorcycle because the bicycle is not seen as a status symbol in Africa. EBIKES4AFRICA (Namibia) have also developed a locally assembled affordable solar-powered e-bike. But these examples remain niche and small scale.

3.3. Policy, regulations and international standards

Technical regulations and international standards²⁶¹ are key enablers of EV mass adoption as they increase consumer confidence. The World Forum for Harmonization of Vehicle Regulations, hosted by the United Nations Economic Commission for Europe (UNECE), develops legally binding technical regulations on vehicle design and construction. The "Globally harmonized technical regulations for safer and cleaner electric vehicle deployment" regulation (2018), introduced performance-oriented requirements to address potential safety risks of EVs in both LDVs and HDVs. The requirements are divided according to occupant protection, charging, safety of the rechargeable energy storage system,

²⁵⁸ Promoting charging safety of electric bicycles via machine learning
<https://www.sciencedirect.com/science/article/pii/S2589004222020594>

²⁵⁹ <https://electricbikeblog.com/research-shows-electric-bikes-make-people-cycle-longer-often-especially-women/>

²⁶⁰ FABIO (First African Bicycle Information Organization) for Uganda

²⁶¹ Such as charging plugs and infrastructure to allow interoperability of vehicles.

and post-crash (electrical isolation, battery integrity etc.) categories. These are not yet adopted everywhere but such standards are needed to provide consumer and environmental protection.

Furthermore, there are still difficulties in the classification of some small, intermediate electric vehicles in national legislation. Cities in Europe especially are struggling with developing robust and fair regulations regarding micro-mobility modes. The term micromobility describes personal vehicles that are much smaller and lighter than motorbikes or cars usually with a lower maximum speed but there is no standard definition of the term. Micro-mobility vehicles may partially intersect with or may be outside various vehicle classification or approval schemes used by public authorities or industry associations. Sometimes the category defines the vehicle by weight or maximum speed (or in some cases both). For example, E-scooters and E-bikes should weigh less than ~35 kg, but some only have a top speed of 25 km/h while others go up to 45 km/h.

E-bikes in Indonesia²⁶²

In Indonesia, electric pedal assisted bikes (E-bikes/pedelecs) are often mistaken as electric motorcycles, and vice versa, which causes confusion in terms of law enforcement. The Ministry of Transportation Regulation 45/2020 regarding vehicles using electric motors dictates that E-bikes or E-mopeds should not exceed 25 km/h. The main issue arises from numerous manufacturers producing two-wheelers branded as E-bikes or E-mopeds, yet with speeds surpassing the 25 km/h limit. Once a vehicle reaches 25 km/h, it falls under standard motorcycle regulations, the need for type approval testing, a license plate, and they may not use bike lanes and there are other differences.

There is a lack of rigor in the differentiation of E-2Ws that exceed 25 km/h but only have small batteries compared to motorcycles, and E-scooters. E-bikes with top speeds of less than 25 km/h are sometimes mistakenly prohibited access to some central city areas by local authorities due to the ambiguous rules. Furthermore E-pedal assisted bikes/pedelecs²⁶³ do not qualify for government incentives, while E-scooters/E-motorbikes do. An E-scooter can be obtained with a USD 30 deposit and low monthly installments. Incentives from the Indonesian government to buy a new E-2W (motorcycle) vary from around IDR 7 million (USD 438) rising to IDR 10 million (USD 625). This makes these vehicles more attractive than a pedelec which cost around IDR 9 million (USD 560)²⁶⁴.

Furthermore, sometimes school children are found driving the E-scooters without licenses and proper knowledge of the rules of the road due to these loopholes in regulations, creating a road safety risk.

To address this, precise and explicit regulations regarding the difference in capacity between the vehicles should be established, use of road space, as well as the legal obligations and prerequisites for E-2W use.

Box 20: E-bikes in Indonesia

Regulations and standards are only emerging and are still seen as ‘work in progress’. While many E-Mobility interested institutions and startups express a commitment to promoting gender equality, they often lack formal policies and implementation plans. Decision-makers and project managers often treat gender action plans and gender designed measures as “additional” elements and not as an integral part of the project or program, which may result in delays or non-implementation of gender features.

²⁶² Indonesia Country report

²⁶³ Class I E-bike is also known as a pedal-assisted E-bike. A bike with an electric motor that assists only during pedaling is called a pedelec bike. There are different categories for those with top speeds of 25 kph and 45 kph.

²⁶⁴ Provided by Indonesian reviewers <https://money.kompas.com/read/2023/11/10/163731126/insentif-konversi-motor-listrik-naik-jadi-rp-10-juta-per-unit>.

3.4. Gendered Design of EVs and services

When designing new products and services, women should be involved from the research and design stages, to make sure gender aspects are considered. For example, women and men might use products and services differently and so design and marketing should respond to these differences. Integrating a gender lens into research and development can drive improved product uptake and enhance customer satisfaction and loyalty. This can ultimately increase sales and product adoption. Also, applying a gender lens to after-sales service helps companies ensure female end-users remain satisfied and loyal customers. Female customer service representatives may be particularly valuable in contexts where traditional gender norms impede interactions between men and women.²⁶⁵

There are very few examples of gender-sensitive EV design. The design of ICE vehicles is only just incorporating gender in vehicle safety testing and until 2023,²⁶⁶ crash test dummies were based on a scaled down average male body. It has been shown from crash statistics that women are 73 per cent more likely to be injured in a frontal road collision if they are traveling in a car than men. It is not clear if EVs are tested on female crash dummies or scaled down male ones. Other safety aspects such as the position of rear-view mirrors, airbags, seat belts etc. also need to incorporate differences between women and men. Even women-run technology startups frequently do not consider how technology can help solve gender inequality or exacerbate it²⁶⁷. Furthermore, we did not find any information on adapting EV for the needs of people with disabilities.

Based on our stakeholder interviews it seems that testing is still done with a male user in mind. In the interviews, it was pointed out that it is easier to standardize a male body (weight and strength) for testing purposes than a female body, as there are more diverse heights and strengths. This has some relevance for the design of EVs and the infrastructure - in terms of safety aspects and functionality. Given the lack of information on gender-inclusive designs of E-2/3Ws, companies could ensure that gender is integrated into existing market analysis to identify the needs of women as customers. This could include product testing and identifying design needs; as well as women's preferences and practical mobility needs in general.

The needs of a wide range of women, including women with disabilities and low income, should be considered to avoid leaving anyone behind. This market analysis would allow EV companies to tap into latent demand represented by women using suitable financing arrangements.²⁶⁸

3.4.1. Bus designs

There is some limited work going on in the gendered design of buses. This includes adapting bus interior designs to include the needs of women and people with disabilities such as the height of grab rails and hanging straps, the position and indications of dedicated seats, bus door widths and step heights, restraints, and space for strollers etc. cabs.

Furthermore, buses are still designed to be driven by men, who are physically larger than women. Bus driving positions may present health and safety challenges if they are not adapted to the needs of

²⁶⁵ https://assets.publishing.service.gov.uk/media/64914b31b32b9e00ca96a34/WOW_Helpdesk_Query_80_Women_s_economic_empowerment_and_electric_vehicles_in_Kenya.pdf

²⁶⁶ <https://www.ayvens.com/en-cp/blog/safety/iwd-2024-inspire-inclusion/>

²⁶⁷ <https://www.v4w.org/uploads/documents/What-the-Frontrunners-are-Doing-A-Snapshot.pdf>

²⁶⁸ https://assets.publishing.service.gov.uk/media/64904fca5f7bb7000c7fad03/WOW_Helpdesk_Query_80_Women_s_Economic_Empowerment_and_Electric_Vehicles_in_Kenya.odt

female drivers. For example, if a woman driver is unable to be comfortable using the clutch and brakes, or side mirrors, she may not react in time to avoid a road crash. There is an ongoing initiative in the United Kingdom organized by the network Women in Transport and their partner First Bus to develop a design charter for inclusive bus cab design²⁶⁹ and make the bus drivers' cabin more comfortable for women. All of these design requirements apply equally to ICE and electric buses.

3.4.2. Design of two wheelers

There is some evidence that women prefer scooters²⁷⁰ over larger, more powerful and heavier motorcycles. Zembo, a Ugandan startup that locally assembles motorbikes, wanted to attract women drivers but found that the motorcycles were too heavy for some women and had to adapt the design. A French shared E-scooter company, Troopy, designed their scooters to be lightweight, easily maneuverable and painted in bright attractive colors, but they did not specifically target women as their audience. It was rather 'by default' that they found that women were highly motivated to learn how to ride and use their vehicles for the above reasons. They started to put on women only information days to respond to this and build on this opportunity. On the other hand, electric kick scooters are a major mode for MaaS²⁷¹ services and a new study²⁷² released by the electric scooter sharing company Dott shows that there's a significant gender gap in the electric scooter market. The study shows that men are 71 per cent of Dotts' electric scooter riders.

There is only one category where gendered vehicle design is documented, and this is the design of standard pedal bicycles. Weight and maneuverability are important to women who do not have the same physical strength as men. This was observed in the first generations of bike share systems. Women found the bikes heavy, and they did not have baskets²⁷³, making them less attractive for them. Attention to design detail is important if women in LMIC are to be encouraged onto bikes. For instance, the Ugandan AfricoozE bike has been designed with a low cross bar so that women can also ride them while wearing skirts.

Pedal bikes designed for women

The United Kingdom based company female-founded Liv Cycling offers pedal bikes for women²⁷⁴, the. It designs bikes, including E-bikes, specifically with women in mind and incorporates design features such as frame sizing, component design and suspension tuning. They also employ women engineers, executives, and marketing staff.

Box 21: Pedal bikes designed for women.

Women, especially in occupations such as farmers, gardeners and market traders also need options for carrying cargo. Traveling with children and shopping have been identified as considerations for the design of gender-inclusive 2/3Ws vehicles. Furthermore, vehicle design is only one aspect, and it is also important to look at E-2/3W associated safety products and accessories, especially helmets, and how these could be (better) designed for women.

²⁶⁹ <https://www.womenintransport.com/bus>

²⁷⁰ These are motorbikes with step through frames rather than kick scooters

²⁷¹ MaaS – Mobility As A Service

²⁷² <https://ridedott.com/working-to-bridge-the-gender-gap-in-micromobility/>

²⁷³ Women often travel with handbags and/or shopping usually, so this was a deterrent to use. Baskets are now in place.

²⁷⁴ https://itfvioencefreeworkplaces4women.files.wordpress.com/2016/06/women_bus_workers_2013_eng.pdf

3.4.3. Adapting EVs for rural transport

The availability of transport is a key factor to improving women's access to health, jobs and education. In rural areas, the lack of reliable transportation is a significant barrier to both women's access to reproductive and maternal health services and girls' access to education facilities. Cultural norms and financial constraints may limit women's use of bicycles, scooters or motorcycles.²⁷⁵ Developing a program around electric assisted pedal bicycles for women and girls in rural areas could improve their mobility significantly. However, EVs need to be designed differently if they are to be used for rural transport. The vehicles need to be adapted for rough terrain and lack of grid access. Cargo bikes to carry water have also been designed and E-tricycles have a promising future as multipurpose vehicles.

Zimbabwe and E-Mobility

The population of Zimbabwe is predominantly rural (67 per cent) and much of the urban populations also live in the peri-urban areas. Road networks are particularly poor, making it difficult for the rural population to access essential services (health, education and markets). Women undertake most of the work associated with family care and they also make up a large proportion of the country's small-scale farmers. Poor transport access makes it difficult to deliver their goods and services and food waste is high. A start-up called Mobility for Africa has deployed 485 flatbed E-3W light weight vehicles (nicknamed Hambas) in southeastern Zimbabwe. The project incorporates battery swapping with 445 batteries and 8 solar power charging centers located at strategic points where batteries can be swapped and left for charging. The vehicles are designed without a straddle bar, to be comfortable for women to drive.

Each 'Hamba' can be owned, leased or rented individually on an ad hoc basis, and this is usually managed by a group of women. This arrangement allows them to share the vehicle and they can undertake domestic tasks such as carrying firewood and water, as well as earn an income transporting passengers and /or use them to take their produce to local markets. This saves the women a lot of time and the access to a 'Hamba' helps increase household incomes. In addition, the Hambas are used by healthcare workers assisting births, and other gender related health services including transporting children to clinics and vaccination programs. Building on the success of this project they plan to expand into other parts of Zimbabwe and surrounding countries (Malawi and Mozambique).

Box 22: Zimbabwe and E-Mobility²⁷⁶

Attention to vehicle design (all categories) and more pilot projects are likely to increase the attractiveness and interest for women in E-Mobility for rural and urban transport. The industry also needs to ensure that women have the equal levels of safety and security in all products and services.

3.5. Gender aspects for charging infrastructure and digitalization

There is little evidence of gender considerations in charging infrastructure development or the digital platforms that are often required to use EVs. Studies in Europe suggest that the current charging infrastructure is not easy for women to understand and access. According to a UK study²⁷⁷ women experienced extra difficulties charging electric cars because the cable was heavy and they had issues with the force required to plug it in correctly. The location of the charging points was also cause of

²⁷⁵<https://documents1.worldbank.org/curated/en/099512412082314620/pdf/IDU0a9d235b00e11b040f00ad80077fcc4d1ef74.pdf>

²⁷⁶<https://mobilityforafrica.com/>

²⁷⁷<https://www.flo.com/insights/public-ev-charging-are-womens-voices-being-included/>

concern (for example if they are put in isolated areas or in underground car parks) and other aspects were mentioned such as the need for good lighting around charging points.

Only two European studies²⁷⁸ were found in our review that look at this aspect in detail. They recommend that the location of public charging points should be in line with women's specific mobility patterns, for example, they suggest placing fast-charging stations in front of kindergartens or schools, shops and market areas, doctors' offices and nursing homes, as these are the main centers of interest for women, and not only locate charging points at workplaces. Furthermore, their location should be adapted to different EV categories, the local context, environment, and conditions. An illustrative example are shared E-bike charging stations located in front of park entrances or playgrounds instead of charging stations for cars. Women are likely to use these modes more than cars. In addition, if charging points and E-bike sharing systems are located near or at the places of interest that women use, their presence can be leveraged to help increase the understanding of what E-Mobility is and how women can benefit from it.

The time it takes for a full charge is cited as one of the main concerns for all consumers. This takes on increased importance if the EVs are used for commercial purposes. The examples of E-taxis found by our country study teams indicated that it was the availability and time required for charging that reduced the attractiveness of their use. The time it took offset any benefits of lower operating costs (fuel and maintenance) for commercial drivers as income was lost during charging²⁷⁹. Until fast charging points and/or battery swapping options are more wide-spread this could restrain the use of E-taxis, and light commercial vehicles. Both aspects could prevent women becoming more involved in this part of the E-Mobility ecosystem until they are reassured that charging will be easy and fast.

The ADB 2023 framework for Enhancing Gender Equality in Infrastructure Development²⁸⁰ provides some useful insights and can be applied for E-Mobility infrastructure as follows:

(i) Better physical design: Women's needs and priorities are not often reflected in design, and women are traditionally underrepresented in professions related to urban development or infrastructure. Integrating and prioritizing women's needs in infrastructure design codes, standards, and guidelines, for example, embedding requirements for universal design standards into procurement for charging stations and bus stops can result in increased usage of the infrastructure by everyone, including women, but also older people or people with reduced mobility.

(ii) Inclusive service design: Beyond the physical design and location of infrastructure, the design and delivery of services play a crucial role in shaping women's access and impact. For that sex-disaggregated data and market analysis is needed to, for example, inform tariff structures, fees, and financial products, to make E-Mobility attractive for women. Incorporating women's travel patterns into transport service planning—including for E-buses—leads to enhanced women's mobility and access to economic opportunities, education, and health care.

(iii) Increase stakeholder understanding: Supporting stakeholders to better understand and respond to women's needs and priorities through training, capacity building, and awareness raising. In addition, public outreach and communication campaigns on sexual violence can lead

²⁷⁸ Electric charging infrastructure and gender equality: An overview for USER-CHI (H2020 project) - <https://open-research-europe.ec.europa.eu/articles/3-47>

²⁷⁹ As the taxi drivers or local delivery operators could not service clients during this time

²⁸⁰ ADB 2023: Enhancing Gender Equality in Infrastructure Development

to shifts in social norms around the acceptability of key issues of concern to women related to infrastructure, such as gender-based violence and harassment.

(iv) Increase women’s decision-making: Measures to recruit and retain women employees and setting requirements for women’s direct and meaningful representation in decision-making bodies are important since women are best placed to plan and design for the needs of other women.

(v) Institutional change: Shifting institutional practices, systems, and cultures of municipal authorities, utility providers, and transport companies to incorporate women’s needs and priorities in policies and processes (leading to transformative changes) is necessary. For example, establishing requirements for transport planning and urban development plans to include E-Mobility and incorporate the needs and priorities of women at the same time will lead to greener and better mobility for women.

Digitalization is now part of our daily lives and provides new avenues for the economic empowerment of women. This includes accessing the Internet, digital platforms, smartphones and digital financial services. The OECD²⁸¹ researched the digital gender divide with a view to identify barriers and opportunities for women to benefit from the digital transformation. They found that today worldwide some 327 million fewer women than men have a smartphone and can access the mobile Internet’.

Women are also under-represented in ICT²⁸² jobs, top management and academic careers and men are four times more likely than women to be ICT specialists. The OECD report *Bridging the Digital Gender Divide* found that girls tend not to see ICT as a career choice and only 0.5 per cent of 15-year-old of them aspire to become ICT professionals, compared to 5 per cent of boys. They found that affordability, lack of targeted education as well as inherent biases and sociocultural norms deter girls from studying ICT. This also curtails women and girls’ ability to benefit from the opportunities offered by the digital transformation. Thus, girls’ relatively lower educational enrolment in STEM disciplines that would allow them to perform well in a digital world, coupled with women’s and girls’ more limited use of digital tools could lead to inequalities and their exclusion of the benefits of the global shift to E-Mobility.

As there are more men than women in ICT, men are usually those developing the interfaces and platforms for accessing E-Mobility platforms and payment services. Research is needed to ensure that these are inclusive and intuitive for everyone, including women and the elderly. Suggestions to include gender sensitive functions include the information provided at public charging points, the use of bright colors, simple-to-use interfaces, better accessibility for users of different heights, screens giving more privacy, and designs that allows users to see clearly the charging spaces and parking configurations.

Digital technology is being introduced in many areas of the sector, sometimes with a narrow focus on downsizing the workforce to cut costs and achieve productivity gains. This can be seen in public transport as it shifts to automatic ticket vending and access to transport services. The introduction of self-service ticket vending machines has already displaced many women ticket sellers in LMICs. In addition, the introduction of ITS to improve public transport with the introduction of formal bus systems can lead to many informal jobs now held by women, such as checking bus timetables and

²⁸¹ <https://www.oecd.org/digital/bridging-the-digital-gender-divide.pdf>

²⁸² ICT, or information and communications technology (or technologies), is the infrastructure and components that enable modern computing.

counting passengers in minibus taxis, being lost²⁸³. As women are often employed in these low skilled face-to-face interactions with passengers, digitalization is likely to affect their ability to earn.

A labor impact assessment of new (electric) public transport systems is therefore needed and public transport stakeholders (authorities, managers, and operating companies) to ensure that technology integrates with, rather than excludes, the direct human interactions between workers and passengers, keeping it an essential aspect of the service. While not always formally recognized in job descriptions, these interactions are essential to service safety, inclusivity, accessibility, and quality, and should be included in the transition to E-Mobility.

Technology can also be used to bring women benefits, especially to raise awareness and share knowledge about E-Mobility and safety. For example, in Sri Lanka, an IFC study found that 64 percent of women riders of a local ride-hailing platform PickMe, said that they can access more or better jobs thanks to ride-hailing, a service that is rapidly electrifying across the world due to EVs lower operational costs. Yet, women's financial and digital exclusion may prevent them from using ride-hailing apps. Also, women riders who use these services also report a lack of women drivers as a safety concern and one of the reasons they do not use ride-hailing. The high cost of vehicles, devices and data plans, ID requirements, risk of abuse, combined with women's lower capacity to access loans are major barriers for women entering the EV ride-hailing business as drivers²⁸⁴. It is also documented that women use phone-based applications in different ways to men. For instance, a recent study in Bangladesh²⁸⁵ looked on the gender gap in smartphone app usage and the impact of gender on smartphone-based social networks and social support. Results showed that women were more likely to utilize the smartphone's camera, but men were more inclined to make phone calls and use apps developed expressly for smartphones. The findings also revealed unique behaviors associated with the use of smartphones in the upkeep of interpersonal connections. Women tended to be more likely to use their cell phones to improve already-strong social connections, whilst men used them to boost weak social relationships.

3.6. Manufacturing and assembly of vehicles

China dominates the manufacture of EVs but new entrants from other emerging markets are increasing the number of options for electric cars and motorcycles. There are now 500 electric car models available, more than double the options available in 2018. However, outside of China, there is a need for original equipment manufacturers (OEMs) to offer more affordable options in order to enable mass adoption of EVs. Electric Bus assembly plants are now in place in a growing number of LMICs, including Colombia and Kenya.

Ethiopia's ambition for transitioning to E-Mobility.

Ethiopia spent USD\$ 6 billion²⁸⁶ on fuel imports in 2023, over half of this went to fueling vehicles, according to the Ethiopian Ministry of Transport and Logistics. As part of its 10-Year Development Plan from 2021 to 2030, the Ethiopian government wants to make a shift to E-Mobility. The Ministry of Transport and Logistics has recently announced (March 2024) that the number of imported and domestically assembled electric vehicles in Ethiopia has surpassed 100,000. The National Agenda for Green Energy allows duty-free importation of EV parts to promote EV use. This policy aims to help local businesses as they are encouraged to manufacture locally.

²⁸³ https://www.itfglobal.org/sites/default/files/node/resources/files/ITF_Just-Cities-Report_FA.pdf

²⁸⁴ World Bank (2023) Accelerating Gender Equality: Let's Make Digital Technology Work for All.

²⁸⁵ The Use of Smart Phones for social networking – men vs women – case study Bangladesh
<https://link.springer.com/article/10.1007/s44282-023-00028-2>

²⁸⁶ <https://english.news.cn/20240309/ff06b3a49a904a1a8cae38a3613880cc/c.html?s=35>

Local company Belayneh Kindie Metal Engineering Complex has assembled 216 15-seater E-mini buses using components imported from China and 12-m city buses are planned to be locally assembled. Additionally, Dodai, an Addis Ababa-based electric vehicle startup secured USD\$ 4 million funding marking one of the largest amounts raised by startups in Ethiopia in a single round²⁸⁷. At the same time the Government is trying to ban motorcycle use in the Addis Ababa, Ethiopia’s capital. Motorcycles already face temporary bans during significant events like the African Union annual meeting and national holidays and now the Addis Ababa city administration is implementing a complete ban on ICE fueled 2Ws, phasing them out in favor of electric ones (April 2024). No new licenses will be issued for ICE 2Ws and existing ones must be converted to electric, but the time frame is still to be determined by the authorities. This is the second attempt of a ban, first introduced in 2019 then relaxed and again in 2023 a mandatory digital identification became a prerequisite for all 2W drivers. It is mainly men who drive the 2Ws but women use them for short trips, and therefore it is likely that their mobility may be impacted by these bans until E-motorcycles are widespread.

Box 23: Ethiopia’s ambition for transitioning to E-Mobility.

However, a lack of gender-responsive policies within manufacturing companies manifest as disparities in wages, promotions, and job stability between male and female workers. Therefore, the Kenyan government established the affirmative action Women Enterprise Fund (WEF), and the Buy Kenya Build Kenya (BKBK) government initiative, to increase opportunities for women in the manufacturing sector²⁸⁸. Such initiatives are not yet widespread in LMICs.

3.7. EV customer profiles

Data on consumer profiles (purchasers or users) of EVs is patchy at best. It is documented that more men than women own ICE vehicles worldwide, as fewer women drive (or hold a license). For example, national statistics in Ecuador show 72 per cent of men own vehicles compared to 28 per cent of women and men are the ones who use the private vehicle the most individually or jointly²⁸⁹.

There is also some evidence that men own more EVs than women, based on European information. A recent survey²⁹⁰ in 27 European Member States show a gender bias in ownership. It found that the average electric car driver profile is “a -35-year-old male, living in a detached house, and with a monthly income between 2,000 € and 3,999 € with a university or higher education diploma”. The survey found that 81 percent of electric car owners were men. See details in Table 3.

Table showing EV ownership profiles in Europe

Gender	EV ownership
Female	19%
Male	81%
Other	0%
Age group	
Under 35 yrs	16%
35-55 yrs	51%
55 & over	34%
Net income band	
< 800 EUR	4%

²⁸⁷ <https://shega.co/post/addis-ababa-based-ev-startup-dodai-raises-4-million-in-series-a-funding/>

²⁸⁸ https://www.icrw.org/wp-content/uploads/2020/09/Women-in-Manufacturing-Africa_9.17_ICRW_KAM.pdf

²⁸⁹ Ecuador country report

²⁹⁰ [2022 EAFO Consumer Monitor](#).

800- 1 999 EUR	17%
2 000 – 3 999 EUR	39%
+ 4 000 EUR	49%

Table 3: Socio-demographic results from the European Alternative Fuels Observatory Country Report 2022 survey on electric car owner profiles.

This gender imbalance is confirmed with a new study in the United Kingdom on electric car ownership, based on a poll of more than 2,000 EV drivers with data collected from an independent charging app called Bonnet. The study showed that only one in ten (11 per cent) EV owners are women²⁹¹. The EV-dedicated website Electrifying.com (founded by a woman) also commented that one reason associated with the gender gap is safety of charging EVs in public space. Their data showed nearly 25 per cent of people have felt unsafe when charging in public space and women feel less safe when using public chargers.

'We know that women directly influence 85 per cent of all family car buying decisions and 46 per cent of driving license holders in the UK identify as female, so the clear gender imbalance in electric car ownership is something that both industry and legislators need to take seriously,'

Founder of Electrifying.com

One additional possible answer for the gender bias in EV ownership may relate to the attractive fiscal advantages for company cars as EVs in numerous countries in Europe. National policies provide companies with fiscal advantages for fleet purchases, and this has boosted European electric car sales. It is also likely that this may benefit men over women, as men are more likely to be in full time employment and may benefit from a company car as part of their remuneration package²⁹², while more women work part-time. Therefore, it is more likely that the EV company car is also bought afterwards by the driver at a discount.

The major hurdles for widespread EV adoption remain the capital cost of investing in the vehicle and the lack of available charging infrastructure, both of which have intrinsic gender challenges. But women's shorter trips are particularly suited to the smaller EVs and charging profiles. We were not able to source information on the gendered purchasing of EVs for LMICs, beyond small scale projects.

Women already tend to buy smaller, more fuel-efficient ICE vehicles, and are more environmentally conscious, so there is high potential for them to become EV owners. However, women in emerging economies suffer from wide gender pay gaps which makes it currently difficult for them to be able to buy any type of vehicle, let alone an EV. Several academic papers document a lack of access to loans for women necessary for vehicle purchase²⁹³ but there are a growing number of specially designed programs to attract women to buy EVs.

²⁹¹ <https://www.thisismoney.co.uk/money/electriccars/article-12296095/Study-finds-just-one-ten-electric-car-drivers-Britain-women.html>

²⁹² Based on the differences between men and women and full-time employment compared to part time. Women are more often in part time jobs or public sector jobs such as teachers and nurses that are unlikely to benefit from a company car scheme.

²⁹³ Gender research on Electric 2-Wheelers in Africa: <https://p4gpartnerships.org/sites/default/files/2023-03/M-KOPA-BCG-Gender-Research-On-Electric-2-Wheelers-In-Africa-Dec-2022.pdf>

Attracting women to experience and purchase EVs

An example based on the results of the McKinsey Center for Future Mobility annual survey of 30,000 mobility customers²⁹⁴ show that women are an interesting market for EVs. US 2022 information purchase statistics show 67 per cent of all EV buyers are men and 33 per cent are women (similar to the information in table 3). However, the survey showed that women are happy to purchase EVs as secondary cars for neighborhood travel and they also like hybrid vehicles due to range concerns. Hyundai Evolve+ took this information on board and has introduced a monthly subscription offer so clients can experience driving an EV at an affordable price. The subscription fee covers insurance, maintenance and roadside assistance and clients can travel up to 1000 miles. Their buying research cites that 85 per cent of all new-vehicle purchases made in relationship are influenced by women, and women make 60 per cent of all service decisions for the family car. But they look for different buying experiences to men. Hyundai developed this program based on the concept that dealerships that build a sales experience designed for women will also experience success in selling them EVs.

Box 24: Attracting women to experience and purchase EVs

Some E-Mobility startups are also actively trying to reach women as clients, but they need to deepen their knowledge and understanding of women customers which are in turn influenced by individual circumstances and life stages, such as education, career transitions, family planning, and wealth accumulation. Online tools such as Net Promoter Score (NPS), which measures experience and loyalty following the use of their product or service can be used for gaining customer insights. These tools can be used to help spread experiences as happy customers also make recommendations to their peers. Women value the opinions of their friends and family more than sale representatives²⁹⁵.

Gender-inclusive approaches in the EV sector present a number of opportunities for businesses and manufacturers to reach new customers and realize latent demand, through increasing the customer base and appealing to women. Women are interested in sustainable travel behaviors, and as they tend to travel shorter distances, they are an interesting market segment for EVs which could provide an expanded customer base. Financing is an issue and providers should develop tailored cost and payment options for EVs that respond to the diverse roles women play. For example, women's repayment rates on pay-as-you-go products are often higher than that of men, meaning that, through targeting a female consumer base, companies can drive increased repayment rates and reduce the administrative costs associated with chasing non-payments. Furthermore, for loans to purchase commercial use vehicles the repayment timings may need to be longer as they tend to work fewer hours due to their family responsibilities. There are also opportunities to enhance innovation and productivity by increasing the numbers of women employees, and to strengthen supply chains by engaging with women entrepreneurs.²⁹⁶

3.8. EV supply chains and batteries

The increase in demand for electric vehicles is driving demand for batteries and related critical minerals. The mining of rare minerals brings its own environmental and social challenges. Battery manufacturing is an important component of the E-Mobility ecosystem, and it continues to expand, encouraged by the outlook for EVs. Batteries are one of the most expensive components of EVs and

²⁹⁴ December 2022 information with responses from 30,978 current mobility users across 15 markets: Australia, Brazil, China, Egypt, France, Germany, Italy, Japan, Norway, Saudi Arabia, South Africa, South Korea, the United Arab Emirates, the United Kingdom, and the United States. <https://www.autodealertodaymagazine.com/373876/five-ways-to-bridge-the-ev-gender-gap> (June 2024).

²⁹⁵ <https://www.theguardian.com/small-business-network/2015/jul/21/win-over-women-men-follow-marketing>

²⁹⁶ https://assets.publishing.service.gov.uk/media/64904fca5f7bb7000c7fad03/WOW_Helpdesk_Query_80_Women_s_Economic_Empowerment_and_Electric_Vehicles_in_Kenya.odt

therefore affect the price to the consumer. As the cost of batteries has decreased over the past decade and this is expected to continue, bringing the cost of EVs down to parity with ICE equivalents.

Accelerating battery manufacturing in Indonesia

One of the main objectives of the battery electric vehicle acceleration program for road transportation in Indonesia is to develop local BEV industries. To help achieve this, the Government of Indonesia is spearheading the establishment of the Indonesia Battery Corporation (IBC) to position Indonesia as a global leader in electric vehicle battery manufacturing and establish local battery electric vehicles industries. IBC is a collaboration among various State-Owned Enterprises (SOEs) in the energy and mining sectors. This initiative builds on Indonesia's substantial nickel reserves accounting for 22 per cent of global reserves. Our Indonesian country report notes the under-representation of women in employment in this industry but also indicates that women were not interested in working in the rare mineral mining sector and companies had difficulties recruiting women - out of over 6,000 applications received only 21 per cent were from female applicants²⁹⁷. The lack of interest of women working is also based on fears that if they work outside of the home, they may be unavailable to complete household duties, which they consider to be their primary duties, but also due to working conditions. Employers should provide support to address these issues such as flexible working arrangements and childcare support.

Box 25: Accelerating battery manufacturing in Indonesia

One of the main differences between ICE vehicles and E-Mobility is that EVs can more easily be broken down into individual components that can be replaced or recycled. They also have lower maintenance costs, and there are different purchase or leasing business models for batteries during the use of the EV and in recycling. Policy has an important role to play in battery developments. Traceability, quality, safety, and sustainability of recycling practices are all key issues. A new regulation in China (announced in December 2023) will assign responsibility for EV battery traceability and recycling to EV manufacturers and to battery manufacturers for battery-as-a service applications, with the view to bring the suppliers and consumers of end-of-life EV batteries closer together²⁹⁸.

Second life batteries are those that have reached the end of their useful "automotive" life (first life) but still have a residual capacity of about 70-80 per cent and can be used for other purposes. The development of viable second life for batteries reduces waste and environmental pollution, increasing circularity. As part of the ecosystem for the energy transition to E-Mobility, maximizing the storage capacity and use of batteries will reduce the depletion of the Earth's rare minerals. In their second life, the batteries can be used in stationary systems, sometimes in combination with wind and/or solar renewable energy generation. Rural communities, for example, can use the battery for mobility but to pump water, provide lighting and/ or run cooling systems to keep produce fresh for longer. This will benefit women in particular as water collection and food provision are typically some of their duties.

Standards and regulations are an integral part of the E-Mobility ecosystem, and this will require international and local research and development capacity and local systems for quality control, recycling and end of life treatments. Battery recycling and second life opportunities are still 'work in progress' in much of the Global South. As many ICE vehicles already end up as used vehicles in LMICs, it is likely that this will continue with EVs. The new business models that will emerge to cope with this, and the reuse and recycling of EV batteries will also present opportunities. Many of these can be made accessible to women, and they can add value to create jobs and new industries.

²⁹⁷ This information came from two sources: the National Commission on Violence against Women results from focus groups indicated that women were not interested in working in this sector and Mediatama (2023) found that companies had difficulties recruiting women.

²⁹⁸ IEA Global EV Outlook - <https://www.iea.org/reports/global-ev-outlook-2024>

Section four:

Data on the linkages between E-Mobility and gender

*"If you don't know where you're going, any road will take you there."
The Cheshire cat, from Lewis Carroll's classic children's tale, Alice in Wonderland.*

4.1. Available datasets

There is no global index that tracks gender inequalities in mobility despite the growing evidence about the benefits of a gender-transformative approach to mobility for transport decarbonization, jobs, and human capital advancement. The lack of adequate attention is partly due to a lack of a fuller understanding of the wider benefits that gender-responsive transport service brings to development, which itself is caused by the lack of sex-disaggregated mobility data. Efforts are made by international institutions such as the World Bank to improve both the quality and quantity of transport data to better capture gendered experiences of mobility.²⁹⁹

Improved evidence is needed so E-Mobility can be designed for inclusivity rather than just changing the technology within the current planning and investment paradigms. Governments need to be more aware of the mobility challenges women face and make adjustments that cater to their needs. This needs systematic evidence on the linkages between gender and e-mobility. Currently, datasets on mobility behaviors disaggregated between women and men, age or life stage are not easily or widely available. Traditionally, transport surveys have undervalued the 'reproductive' or care related trips that women make, considering (and counting) only the 'productive'³⁰⁰ trips or those made by a commuter who is usually male, for the design of transport systems. The current way origin and destination transport data is collected is usually biased towards the choices made by the head of household (more often a male), as these are the people that answer the survey in the household. These unrepresentative datasets are the backbone of transport planning, leading to underestimates how people, other than commuters, use transport systems.

Data collection methods focus traditionally on origin and destination trip patterns only (e.g. travel to and from work or to and from education/study locations) and exclude the transport requirements of many women who trip chain when they travel. Typically trips under 15 minutes (i.e. mostly those made by walking or cycling within neighborhoods) are not counted in transport models used to predict demand³⁰¹. First and Last mile connections and short urban freight trips are either not included or undercounted, yet these present promising entry points for both E-Mobility and for women. The regional multilateral development banks CAF and Inter-American Development Bank (IDB) have developed the Latin American Urban Mobility Observatory (OMU) to provide mobility data on Latin-American cities. Quito is included at the OMU, but the data is not disaggregated by gender with the last records from 2015.

²⁹⁹ Kurshitashvili N., Humbert A-L., Ait Bihi Ouali L., (2024) Toward Developing a Mobility and Gender Index World Bank Group, Washington <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099012224120015202/p1801641e6a4d40c1aaa71eecdafa3960a>

³⁰⁰ In this context the word productive is used to describe paid employment, undervaluing the contribution women make to unpaid family care, looking after the elderly and bringing up children

³⁰¹ Such as the widely used four stage planning model and demand forecasting models that generally categorize trips according to the steps involved in the traditional planning process. The four steps include: (a) trip generation, (b) trip distribution, (c) modal split (or mode choice), and (d) traffic flows.

An example of data collection - an open dataset for Hanoi, Vietnam³⁰²

An example of an open dataset has been created as part of the Urban Transport Modelling for Sustainable Well-Being in Hanoi (UTM-Hanoi) project. The survey of nearly 30,000 respondents gathers data on households' demographics, perceptions, opinions and stated behaviors. The UTM-Hanoi dataset is 54 per cent male and 46 per cent female and while this diverges from parity (50/50), it is close. The project has examined the age-gender distribution in UTM-Hanoi and the national census data. The Census dataset has been collected for all household members while the UTM-Hanoi dataset has been collected by asking one single household member per household. This has led to an over representation of the 26 to 35 male age group in the UTM dataset. The occupations that can be selected do not represent women's occupations and this can lead to unconscious bias. For instance, the 2010 UTM dataset³⁰³ used in this open data exercise does not have 'student' as an occupation, so people who were students might have been included as 'unemployed'. As this dataset has been used for transport modeling it indicates how bias against women can be easily incorporated into transport planning.

Box 26: An example of data collection - an open dataset for Hanoi, Vietnam

The information that is collected is frequently not analyzed with a gender lens, even for projects that are designed to be inclusive. This is because gender expertise is rarely to be found in transport departments of ministries or institutions responsible for transport planning and network design. Trips made for care purposes may slip through unnoticed in data collection exercises, as the purpose of travel often as set out in a defined list rarely includes caring, although it might include shopping. Thus, the mobility of care goes unnoticed and unrecorded in current data collection methods.

The way transport data is collected is slowly changing, and new tools are being developed (often digital). The database that accompanies this study has documented several of them. An example includes the IDB Client Map Methodology which breaks a trip's experience into 12 segments and has been used in Bogotá, Santiago and Medellín. Different profiles of riders (women, elderly, people with disabilities) can be assessed and the results used to better design urban transport.

Therefore, the current data collection methods have to be reformed so current biases and inequalities in the transport paradigm of decision making, investing and planning are not transferred from fossil fuel-based transport to E-Mobility.

4.2. Data collection and information from practitioners

Due to the limited availability of gender disaggregated data about views on E-Mobility, we conducted an online survey. The survey ran from October 2023 to March 2024 and was prepared in English and Spanish. These languages were chosen to cover our countries of interest in Africa and Asia where English is widely spoken³⁰⁴, and Latin America where Spanish is dominant. In addition, the country teams collected national information for their country baseline reports. Their methodology included reviewing local and international published literature, validated with interviews and a stakeholder consultation workshop. They also looked at the local capacity for the collection of disaggregated data that could provide the evidence for gender responsive EV market development.

³⁰² <https://www.nature.com/articles/s41597-024-02950-9>

³⁰³ UNDP. Urban poverty assessment in Hanoi and Ho Chi Minh city (2010).

³⁰⁴ This might have resulted in lower responses from Asia given the linguistic diversity, and we were also aware that this would exclude francophone countries.

The main findings are presented here, disaggregated between the two language versions where this was considered to show important differences.

4.2.1. Survey methodology

This study collected information from an internet-based survey to establish if women could enter this emerging and dynamic market as easily as men, and to identify examples of where this was the case and share any learning. We also looked to identify international and local initiatives and projects which had been successful in integrating the gender topic in E-Mobility. The findings were validated by a series of short interviews (15) with representatives from the Global North and South. The survey questions can be found in Annex 1 and the list of interviews can be found in Annex 2.

A total of 176 cleaned responses were analyzed from the total received (212) as some were either not finished or not correctly filled out. There was a reasonable gender balance in the responses, with 91 female, 82 male and 3 who chose not to say. The respondents came primarily from two regions – Africa (predominantly Sub-Saharan Africa) and Latin America. Many mentioned the 6 countries of particular interest for this project: 36 were active in Kenya (the most represented country), 18 in Colombia, 8 in Ecuador, 5 in Uganda, 4 in Indonesia and 2 In Vietnam. Over and above these countries the most mentioned country was India where 10 respondents were active (Figure 3).

Location of respondents by region

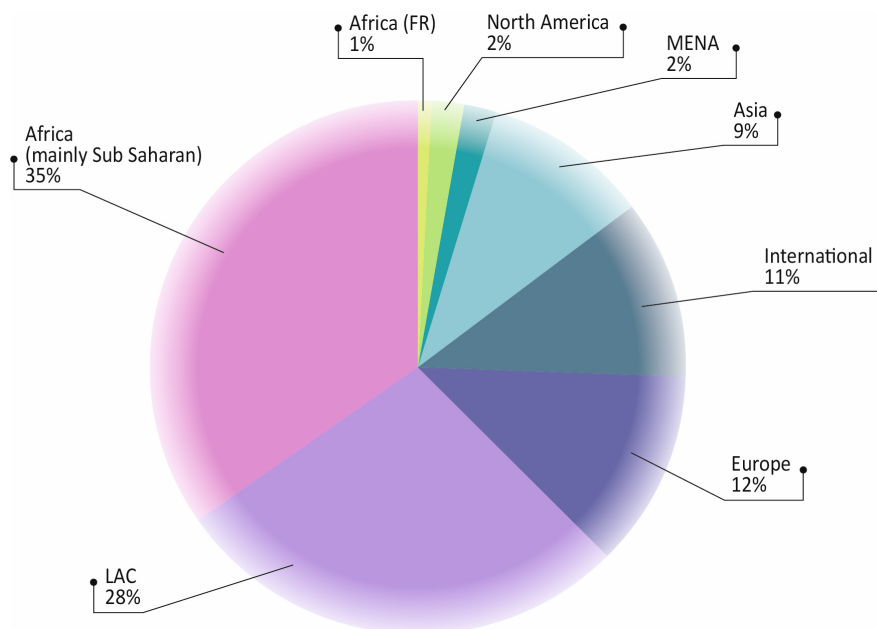


Figure 3: Location of respondent by region

4.2.2. Profile of respondents

The professional profiles of the respondents were interesting from a gender perspective, with many selecting more than one main role from a predefined list. All those that self-identified as a funder were female (6), with a mix of foundations and international development agencies, while the majority of project implementers were male (26 compared to 3). Again, somewhat surprisingly there were no men who identified with the manufacturing/ supply chain description apart from two who selected this combined with project implementer, while 17 women elected this single option. Out of those women who self-identified as being part of the manufacturing/ supply value chain nearly half are also working on some aspect of charging infrastructure.

Furthermore, more women than men self-identified as policy/decision makers as their most important (single selection) role: 48 women compared to 15 men (who all came from the Latin American region). Policy makers came from both national and local governments. Men heavily identified with being researchers and academics and 34 selected this single option compared to 2 women. All those who selected professional associations were also female. Approximately equal numbers were working locally and as part of a larger organization or group (i.e. research consortium or multi city/country pilot).

Over 50 per cent of the respondents are working on more than one aspect of the E-Mobility ecosystem – including service offers and infrastructure. These came predominantly from the urban passenger arena (16 per cent) over (urban) freight (6 per cent)³⁰⁵. Just over 6 per cent were working in rural or peri-rural areas rather than urban areas.

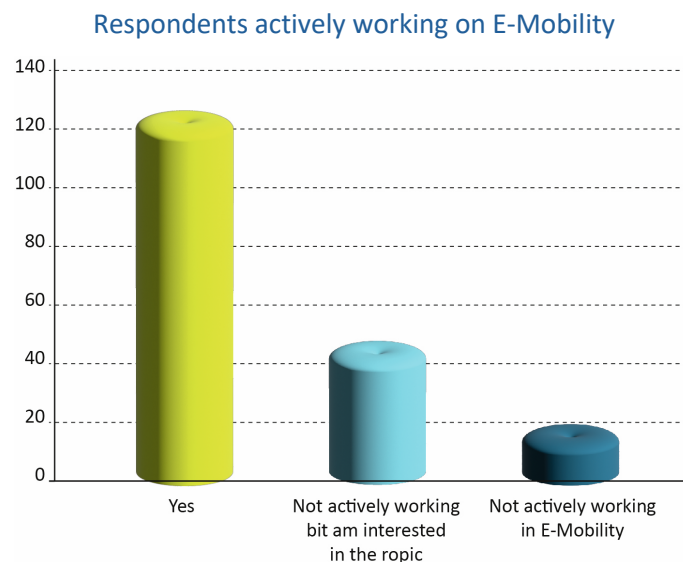


Figure 4: Number of respondents to survey actively working on E-Mobility (n176)

When asked if the respondents would be able to provide more detailed information about their current work focus, a wide and broad number of examples were offered. These included assembly of EVs (specifically for E-bikes – passenger and freight, and E buses), developing accessible EVs for PWDs,

³⁰⁵ The author combined the answers of respondents when they selected more than three options such as the choice ‘Passenger, Urban, Rural or peri urban, Freight ‘and ‘Passenger, Urban, Freight, Infrastructure’ into ‘all’.

standards for EVs, digital platforms for charging, fleet management and e-commerce, networks for knowledge exchange and activism, data collection, working on informal transport, labor issues including promoting women to work in the sector and renewable energy. Battery swapping and infrastructure were often mentioned while it was noted that no-one who answered is involved with battery recycling which is seen as a major area of possible future interest.

4.2.3. E-Mobility Modes

We also wanted to understand what E-Mobility modes our respondents were working on. The following graphic shows the modes and topics of particular interest drawn from the question “*If you are involved in vehicle supply or project implementation - please indicate the type of vehicle*”. Those that chose more than one option from the drop-down menu of suggestions have been combined into all as they often chose a mix of E-buses (large city bus and minibus), 2/3 W, light duty freight and infrastructure.

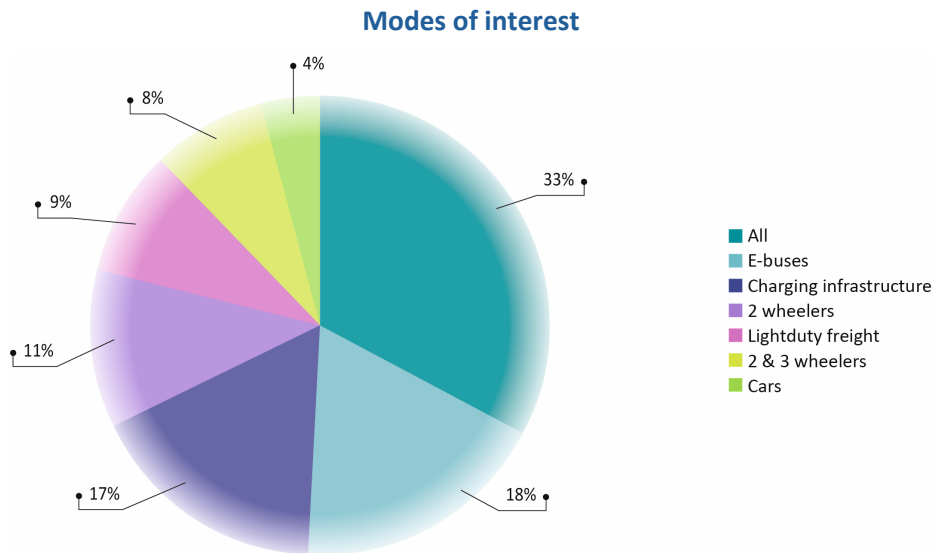


Figure 5: Modes of interest for the respondents (n=126)³⁰⁶

Around a third of the respondents chose more than three options from the predefined menu (counted as all modes in the graphic) with E-buses being the second highest choice. Often a mode was combined with charging infrastructure or light duty freight as a secondary choice. Some 17 per cent were working specifically on charging infrastructure and the vast majority were working on shared or commercial modes (buses, 2/3Ws) rather than individual cars (4 percent). Almost all of those who chose E-buses were also working on charging infrastructure. E-buses and E-2/3Ws were the most chosen combination – light duty freight also featured often, and this was combined with interest in cargo bikes and three/four-wheeler vehicles designed for light cargo loads.

4.2.3. Opportunities for women

There was unanimous agreement that it was ‘easy’ for women to work in E-Mobility from both men and women. Nonetheless there are interesting nuances which tell a somewhat different picture. The question was understood with an ‘equal opportunities’ lens, in other words there are no, or few legal impediments to women working in E-Mobility. This was more prominent from the male respondents

³⁰⁶ Not all respondents answered all the questions.

who responded 96 per cent with a ‘Yes’. Women had different differing responses and more gave more detail such as the quotes in the Box 27 below. More women thought that this only applied to certain positions and jobs, and only women answered a clear no – it was not easy.

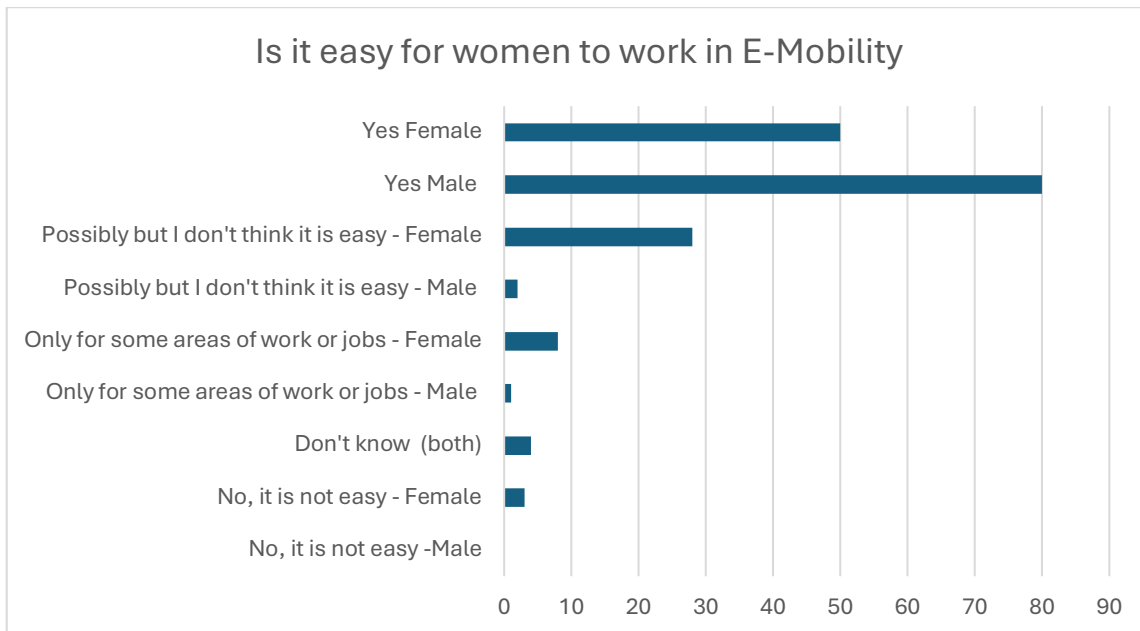


Figure 6: Male and female responses to the question on how easy it was for women to work in E-Mobility.

It was also encouraging to see that over 90 per cent of the respondents actively encouraged women to join their organizations. Examples include “For the leadership positions, I actively seek out fellow women to take up those spaces. I also have a 50/50 gender ratio for staff at my organization, even at this young stage of development”; “We train women technicians, riders and hire women in various positions in our startups” and “specific mandatory inclusion of women in workshops”.

Quotes from respondents

No it is not easy for women - there are still many barriers in countries like Mexico, the transportation sector is dominated by male professionals.

They cannot easily join the sector even though they have the qualifications, there are other factors such as violence and unpaid care that impact on women's access to employment in this sector.

Yes, but there are still significant barriers. It is always more challenging as it is a male-dominated sector, but there are plenty of female colleagues leading projects to deploy electric vehicles in different areas

The 'right qualifications' is a bit of an odd term. I think anyone can join the E-Mobility sector. You don't need to be a qualified 'electric mobility' expert per say. You just need to have a passion for an area that it touches on. Whether that be around captive car users, equity and access, etc.

The transition to E-Mobility opens a key window of opportunity for women and job equality in the transport sector, as it requires a new set of qualifications for which, unlike for ICEVs, women are not at a disadvantage.

Training is essential but without special attention to workplace culture, sex discrimination, gender-based violence and other barriers faced by women transport workers, it will not be equal and problems will not be resolved.

Training in isolation also does not result in increased women's participation in the sector.

Box 27: Quotes from respondents

The majority (over 80 per cent) of respondents were willing to assist us in sharing information about projects in their region, although many were found to be duplicates. The database that accompanies this report ([here](#)) has these examples and others.

4.2.4. Information provided by survey respondents

There is a growing evidence base – both on gender and transport, E-Mobility in general and information about disaggregated data collection (second highest number of examples). Respondents made suggestions of reports and information, and there are now several toolkits available for public download with advice and guidance on data collection and gender analysis (a selection can be found in the database). This was a welcome surprise as there is still much discussion about the lack of disaggregated data, or information on gendered aspects of E-Mobility. We found that many of the suggested reports were similar by different respondents, but it is, nonetheless, encouraging. Policy development, promoting women in STEM and women’s economic empowerment are also aspects that were strongly supported by those who took part in the survey.

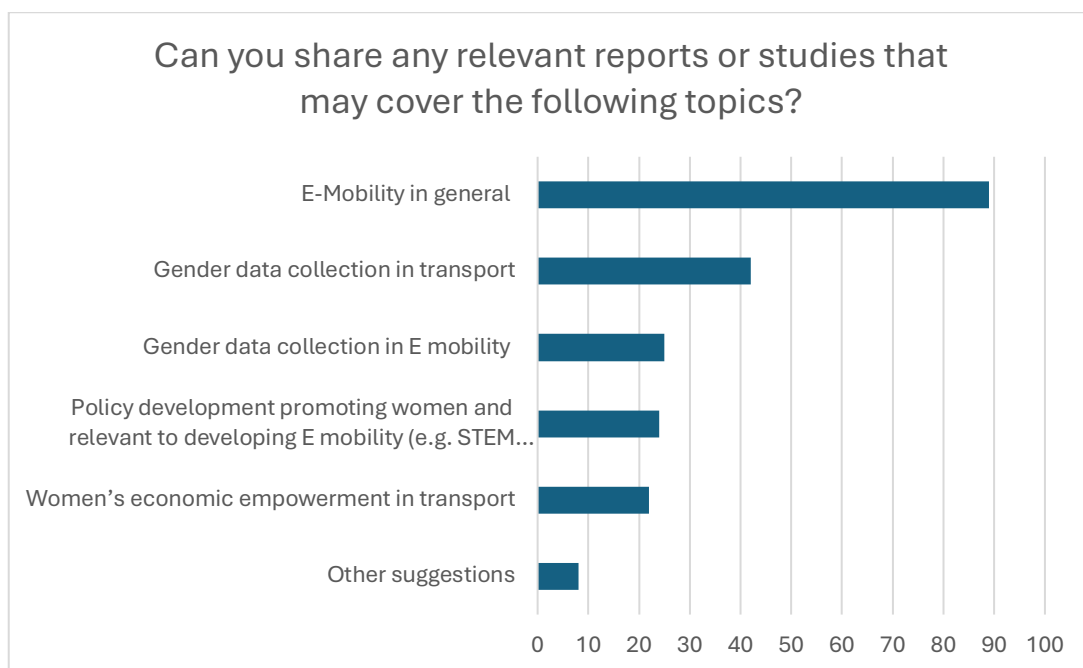


Figure 7: Ability to share reports of interest from their country or region (n=150).

We were also encouraged by the willingness of respondents to assist in advancing the topic of gender and E-Mobility with suggestions for interview candidates, names of local and international experts, and interest in joining the Global Gender and E-Mobility Working Group – all of which we appreciated.

Transport sector is heavily male dominated, E-Mobility even more so due to all the technical and electrical aspects in a fairly new technology. Women need to be made aware of the possibilities in the sector and trained to deliver as much as the male counterparts.

We need to ask: how can we make this sector more attractive for women?

Quote from survey respondent

Section five: Conclusions and main findings

This section brings together the information gathered in the previous sections highlighting potential entry points for women, as well as aspects that may need to change to accelerate the introduction and take up of gender responsive E-Mobility measures. Engaging women in this transition isn't just the right thing to do, it's the smart thing to do. It is an investment in the future, but it is also helping to ensure that our collective talent, creativity, and resilience are made good use of³⁰⁷.

Suggestions are made on how to unlock the untapped potential that women's involvement may bring to E-Mobility, based on recommendations for different stakeholders such as governments, academia, industry players, NGOs and CSOs and other interested parties, paying attention to the local context.

5.1. Key observations and findings relevant to gender in the transition to E-Mobility

Our findings show that women face the same, or similar socio-economic, cultural, and institutional barriers to access E-Mobility as they do to conventional (fossil fueled) transportation. Women need better access to transport if they are to reach their economic potential, and the transformative nature of E-Mobility presents a key tipping point for change if gender is included as a core component of this transition. Thus, shifting to E-Mobility is an opportunity to address many of the current constraints women face in the transport sector, and can be used to bring greater diversity to the workforce.

5.1.1. Gender disparities in access to Electric Mobility

The main barriers that impede the mass up-take of EVs are similar for both women and men and include the current high purchase cost of vehicles and charging concerns (especially battery life, availability and speed of charging). The high purchase prices of EVs are of particular concern to women, who have less access to capital than men. The time it takes for a full charge (especially at public charging points) is cited as a concern for all consumers, this takes on increased importance if the EVs are used for commercial purposes. But charging in public space is considered a major concern for women who are more fearful of waiting alone during charging and are more at risk from harassment in public space. The location of public charging points is also cited as a concern.

5.1.2. Safety and security

Women are generally more risk averse and safety and personal security are of great importance to them. This is reflected in their travel and transport choices. Our findings suggest that gender specific safety and security aspects of E-Mobility are under researched. This applies to the technical safety features of EVs (as in vehicle crash testing and how they are designed), as well as their use (ease of use, digital interfaces, maneuverability and weight e.g. for E-2Ws).

The safety of batteries and charging infrastructure is also important for everyone and as more locally designed and assembled vehicles emerge in LMICs there is a need for robust regulations and

³⁰⁷ https://www.lerenovaveis.org/contents/lerpublication/res4africa_2024_mar_a-just-transition-or-just-a-transitionmaking-the-case-for-women-in-energy.pdf

standards. This was highlighted in our Indonesian country report where research on (assisted) pedal E-bikes showed that there are no standard chargers, non-uniform battery management communication protocols and no information about battery safety³⁰⁸.

5.1.3. Infrastructure and services

The lack of availability for refueling (charging) EVs is a big concern in most LMICs as charging points or battery swapping stations are nowhere near as widespread as fossil fuel refueling infrastructure. EV companies should go beyond simply focusing on their products, and also consider how accessible and safe related EV spaces are to women. This includes charging points, points of sale, parking and areas where service operators such as taxi operators may congregate. Making these spaces accessible and safe for women can help boost uptake of EVs amongst women, both as users and for commercial purposes. Measures could include, for example³⁰⁹:

- Subsidize initial grid connection charges for women-owned businesses, low-income and female-headed households that cannot necessarily afford the initial large outlay such as through discounts, or options to pay in installments.
- Gender safety audits of charging points and their locations.
- Analysis of routes and trips taken by women and installing charging points or battery swapping stations that take these routes into account.
- EV sales teams that include women so that women feel more welcome and supported to enquire and purchase vehicles.
- Provide women-only services or spaces if appropriate, for example women-only taxi services offered via EVs.
- Improve lighting design in streets and public spaces, including at charging stations and bus stops/waiting areas to improve safety.
- Consider the design of charging apparatus and infrastructures including the physical strength needed to attach chargers, the weight of batteries in swapping programs and ways of paying for charging.

5.1.4. Digital literacy gender gap

There is a known digital literacy gender gap. Digital literacy and data use via smartphones are areas that will determine access to E-Mobility for both men and women and is especially important in relation to ease of access to charging infrastructures. Globally women are 17 per cent less likely than men to own a smartphone, women are 21 per cent less likely than men to access the internet³¹⁰ globally and 310 million fewer women than men are using mobile internet in LMICs.

The forthcoming World Bank Gender Strategy states that the global gender gap in mobile internet remains relatively unchanged although it may be slowly narrowing, so it may still disadvantage women

³⁰⁸ Promoting charging safety of electric bicycles via machine learning (2022):
<https://www.sciencedirect.com/science/article/pii/S2589004222020594>

³⁰⁹ https://assets.publishing.service.gov.uk/media/64904fca5f7bb7000c7fad03/WOW_Helpdesk_Query_80_Women_s_Economic_Empowerment_and_Electric_Vehicles_in_Kenya.odt

³¹⁰ <https://documents1.worldbank.org/curated/en/099013107142345483/pdf/SECBOS04cf7b650208a5e08b784c0db6a4.pdf>

in their take up of E-Mobility³¹¹ for the foreseeable future. For example, in Kenya, mobile phone ownership is common (92 per cent of men and 86 per cent of women own one) however, there is a noticeable gender gap in accessing mobile internet. Kenyan men are more able to do so (56 per cent of men and 32 per cent of women)³¹².

Connectivity of the network also varies widely between regions and even within countries. GSMA, states in their latest report that Sub-Saharan Africa has the largest gaps in mobile phone coverage and usage. Rural areas are less connected everywhere, which implies that offline options are needed to serve these communities³¹³.

If women are to benefit equally in the transformation that E-Mobility will bring, there is a need to ensure that women are able to access, understand and use the digital interfaces that will be developed in relation to E-Mobility.

5.2. Women as E-Mobility users

Women own fewer ICE vehicles compared to men, and this is the same for EVs. Although they are high users of some categories of EVs, such as the E-2/3W, especially in Asia. Based on our findings, the 2 and 3-wheeler categories of EVs have probably the highest potential to change women's lives and are a lynch pin in the just transition to E-Mobility. E-2/3W can be used for personal as well as commercial uses and are attractive to women, as owners and users. They can provide important first and last mile connections and can be used for mobility needs in both urban and rural settings. As prices decrease, more women will be able to afford to buy them.

Access to EVs can reduce time poverty for women by replacing slower means of transport, such as walking. E-2&3W, including those used in E-micromobility can support the independent mobility of women due to their low operating costs, light weight and suitability for first and last mile connections and short trips around the local neighborhood. The main concerns for women are lack of safe infrastructure, fears about other road users speeding, illegal parking on sidewalks and accident risks.

In addition, while E-2Ws clearly have the potential to offer sustainable transport in LMICs, in many countries women do not drive ICE motorized two-wheelers or use pedal bikes, so they will need support to become used to driving independently. There are gender differences in safety and security considerations, and women using EVs cannot afford to be stranded in the 'wrong part of town' or at the 'wrong' time of day due to a dead battery. EV reliability is therefore not only more critical to them but also an important consideration to ensure fair and just distributional impacts across the population.³¹⁴

Women use E-buses if they are available, especially as the vehicles are often modern and offer a higher level of comfort. But the availability of the buses and services where and when they need it is not their choice, whether they run on fossil fuel or electricity, as this depends on decisions and investments made by the city authorities or private sector.

³¹¹ <https://www.gsma.com/r/wp-content/uploads/2021/06/The-Mobile-Gender-Gap-Report-2021.pdf>

³¹² <https://www.gsma.com/r/wp-content/uploads/2021/06/The-Mobile-Gender-Gap-Report-2021.pdf>

³¹³ https://www.gsma.com/r/wp-content/uploads/2023/07/The-Mobile-Gender-Gap-Report-2023.pdf?utm_source=website&utm_medium=download-button&utm_campaign=gender-gap-2023

³¹⁴ <https://energyfutureslab.blog/2022/03/07/the-e-mobility-revolution-in-low-and-middle-income-countries-the-consumer-perspective/>

However, the adoption of E-buses in cities, especially in LMICs, has not been rapid enough. In addition to technological and contextual barriers, informality of transport operations, financial barriers including low credit worthiness of operators, the lack of sustainable financing options and the higher cost of E-buses has hindered the growth of widespread adoption of them in the LMICs. Gender assessments are needed to ensure that the routes selected for electrification are not those primarily used by men. Electric on-demand transport options and light electric vehicles for first and last mile could be added to serve the different needs of women riders.³¹⁵

An additional observation is that attracting and retaining more women into the E-Mobility workforce will not only create new job opportunities for them, and diversify the workforce, but may also stimulate more inclusive planning and design of mobility systems and services that cater to the needs of all users. Women tend to have stronger preferences for improving sustainability and can be change agents, triggering improvements in transport policies and behaviors for a faster decarbonization of the sector.³¹⁶

5.3. Women as transport workers and access to green jobs

Labor statistics show there is a large gender imbalance in the labor market, which in turn constrains economic development. Disaggregated data on the workforce is generally poor, and we were not able to identify data sets that indicate how many women are working in E-Mobility. However, we did find that women who had joined the E-Mobility sector were proud to be part of the transition and appreciated the opportunity to work in a future looking sector. The women participating in the small-scale pilot projects in Africa were very enthusiastic about being part of the transition to more environmentally friendly transport.

Many cities in Latin America are introducing E-buses and women are being recruited as bus drivers. E-buses do provide opportunities for women to drive and examples of where women are bus drivers (either ICE or electric buses) indicate that bus ridership satisfaction is increased as they take better care of the passengers, and their driving styles give more comfortable rides³¹⁷. Furthermore, they are often more careful drivers leading to few(er) accidents or crashes.

Our example of the bus company La Rolita in Bogotá documents the satisfaction that women working there felt as well as their appreciation of obtaining new skills and the benefits to them of having stable work and salaries. Another promising example is the project between the E-Mobility provider ZEMBO and the NGO Women Rising for Africa supported by the EU funded SolutionsPlus project³¹⁸. They collaborated to provide job opportunities and safe mobility to women in the male dominated E-2W taxi industry in Kampala, Uganda, and have plans to expand to other cities. The main objectives include empowering women, promoting gender equality, promoting economic independence, developing E-Mobility and ensuring security. So far, they have helped 28 candidates obtain driving certifications and work as electric motorcycles drivers for ride hailing apps and urban delivery providers.

Transport provides a lot of jobs and the shift to E-Mobility provides additional opportunities for employment. As the EV sector seeks to grow, engaging women as employees presents a critical

³¹⁵ <https://energyfutureslab.blog/2022/03/07/the-e-mobility-revolution-in-low-and-middle-income-countries-the-consumer-perspective/>

³¹⁶ OECD/ITF 2020: The gender dimension of the transport workforce

³¹⁷ There is some evidence that women drive more smoothly so there are fewer small accidents of people falling (especially the elderly) while traveling in the bus

³¹⁸ <https://www.solutionsplus.eu/>

opportunity for enhancing productivity and growth, as well as accessing a skilled workforce. Making the transport sector more attractive to women will also yield economic gains greater than an equivalent increase in male employment, as gender diversity creates benefits on its own through the inclusion of new skills, differences in risk preference and response to incentives as stated previously. Investors and lenders are also increasingly interested in ESG³¹⁹, impact investment and gender-lens investment, which provides opportunities for EV companies to access climate finance through making their operations and products more gender-inclusive.³²⁰

If women and men could participate equally in the workforce, global GDP could increase by 3-6 per cent³²¹ (adding two to five trillion USD to the global economy). Making more conscious efforts to include gender in the shift to E-Mobility is both a pathway to women's economic empowerment and can also help the sector perform better and more efficiently. Closing the current gender gaps in the transport workforce will bring large benefits at many levels: economic, environmental, societal and business.

5.4. Women as entrepreneurs in E-Mobility

The introduction of E-Mobility presents new opportunities for women's empowerment through entrepreneurship. Women-led enterprises are, on average, small and they are also less likely to start a business than men³²², yet women own about a third of the small-to-medium sized businesses in the world. They are less likely than men to believe they have the skills to start a business and are more likely to cite a fear of failure as a barrier. This seems to be due to two main reasons: firstly, due to their time poverty largely because of the care burden, and secondly their limited access to capital. However, providing financial capital alone is not sufficient and needs to be accompanied by financial literacy and management skills training for women to be successful in their entrepreneurial journey.

Nonetheless E-Mobility as a new sector needs innovation, and new actors including women do not face the same historical or engrained barriers. The current fossil fuel-based sector is populated by companies and people who are incumbent and may be resistant to change, making it difficult for new entrants.

There are many new roles in the E-Mobility ecosystem where women can play a role. Examples include:

- EV drivers
- EV owners or Fleet Managers
- Mobility Service provider (MSPs)
- Charging site owner (building, parking, workplace, public)
- Charge Point Operators (CPO)
- Distribution System Operators (DSO)
- Transmission System operators (TSO)
- Digital platform integrators
- Balancing Service Providers (BSP)

³¹⁹ ESG – Environmental Social Governance

³²⁰ <https://www.mckinsey.com/featured-insights/employment-and-growth/how-advancing-womens-equality-can-add-12-trillion-to-global-growth>

³²¹ <https://cherieblairfoundation.org/why-women-entrepreneurs/-:~:text=If women and men participated,and more sustainable global economy.>

³²² The Women's Business Council: Women and Enterprise: Evidence Paper - <https://assets.publishing.service.gov.uk/media/5a79b7c040f0b642860da363/wbcevidencepaper5.pdf>

- National coordination bodies responsible for EV introduction, safety and implementation of standards.
- Consultants in EV deployment and electricity market integration

Women are also actively participating in the ‘gig’ economy. However, this sector faces challenges on several levels such as the personal security of drivers and in terms of social safeguards, employment contracts and protection.

Integrated support packages are needed to systematically address the multiple barriers to growth faced by female entrepreneurs that cover technical, managerial, business management and marketing aspects of E-Mobility businesses as well as guidance in leadership and decision-making. Advisory services to women entrepreneurs such as the Accelerating Women Climate Entrepreneurs (AWCE)³²³ help to support women entrepreneurs in climate-related value chains, while also building a roadmap for international development practitioners to advance more gender-responsive business support. This can also help build the capacity of lenders on the specific needs of e-mobility and gender.

Beyond supporting female owned EV businesses, governments and investors could decide to support or invest in companies that have a high share of women represented in leadership; are committed to a gender-diverse and equitable workforce; procure their assets from a gender-inclusive value chain; or offer and design products or services that consider the distinct needs of women as a consumer segment.

5.5. Women as decision-makers

A report from the World Bank points towards a significant positive correlation between the proportion of women managers in the transport sector and the total female participation in the transport workforce.³²⁴ Evidence also reveals companies with greater parity in senior leadership better manage ESG risks. The top 25 per cent of companies in male-dominated industries that have the most gender-diverse executive leadership teams are [47 per cent more profitable](#) than those in the bottom 25 per cent. [Inclusive business cultures](#) lead to almost 60 per cent increase in creativity, innovation, and openness and close to 40 per cent better assessment of consumer demand.³²⁵ Supporting women’s career progression including identifying women leaders to showcase the role of women in the sector and building leadership and managerial capacity of women is therefore crucial for an accelerated transition to E-Mobility.

We found that women do not yet have a strong voice in E-Mobility – this is true for all domains, from policy and finance to research and development. However, there is room for change, as seen in the visionary leadership by women in decision making roles presented before. Providing greater visibility to these leaders would help other women to see what is possible.

Although electric mobility may be a national policy objective, much of the implementation and investment will need to take place at the city level. A lack of gender capacity in transport decision makers at local level was noted in our country reviews so support for capacity building will be needed.

³²³ <https://andeglobal.org/awce/>

³²⁴ <https://www.bcg.com/publications/2019/winning-the-20s-business-imperative-of-diversity>

³²⁵ <https://documents1.worldbank.org/curated/en/099512412082314620/pdf/IDU0a9d235b00e11b040f00ad80077fcc4d1ef74.pdf>

5.6. Gender and environmental benefits of Electric Mobility

5.6.1. Gender and sustainable development

Gender inequality and the climate crisis³²⁶ are major challenges of our time. They pose threats to our current accepted ways of life, to livelihoods, health, safety and security affecting all. The commitment to a just transition to E-Mobility can be reflected in national climate actions. The creation of opportunities for women is highlighted in some countries' NDCs, climate change and/or energy sector roadmaps. Promoting gender-inclusive electric mobility will contribute to the reduction of emissions from transport but also help achieve the SDGs. E-Mobility can improve access to education, jobs and health care which in turn can contribute towards achieving the SDGs.

5.6.2. Health Impacts

There are undeniably positive health impacts that a shift to E-Mobility will bring. Noise in urban areas and poor local air quality has a direct and dangerous effect on everybody, but particularly women, older adults and young children. Increases in asthma have been observed in children living near busy roads in low-income urban areas³²⁷. Studies conducted on the health impacts of traffic pollution (especially PM2.5, PM10, ozone and nitrogen oxide) are strongly correlated with low social-economic status. Many women in LMICs walk as their main mode of transport and are therefore exposed to high levels of traffic pollution. The tangible health benefits of cleaner air benefit everyone but especially young children and the elderly³²⁸ who suffer most from respiratory diseases. This in turn can help to relieve some care duties off women³²⁹.

5.7. Data collection and monitoring

Disaggregated data collection about women's travel behaviors and their participation in the workforce is lacking almost everywhere. At country level gender disaggregated datasets for transport were often non-existent or there were issues with age, robustness, transparency and ownership of the data. Many transport datasets in LMIC are in the hands of the private sector and are not available for policy development. There are some at international level, mainly due to investments by international players (such as Women Mobilize Women, SUM4ALL, multilateral development banks and philanthropic foundations), but without a specific focus on E-Mobility. The data referred to in our survey of E-Mobility practitioners looked at this from a project, rather than national or city level.

It is not sufficient to disaggregate data to produce impactful insights on the gendered experience of transport. Women are not a single homogeneous group, and their needs and pain points will differ greatly depending on their age, occupation, race, household structure, and income levels.³³⁰ If E-Mobility can be used to provide women with safer transport this can benefit many sectors of society who are currently not able to travel outside of the home, beyond a short walk. Capturing these people

³²⁶ <https://www.forbes.com/sites/davidcarlin/2020/04/20/time-to-tackle-humanitys-greatest-challenge-climate-change/?sh=5a55a90b70d8> & <https://impact.economist.com/sustainability/social-sustainability/gender-inequality-and-climate-change-are-not-separate-challenges>

³²⁷ Research published in 2023 tied two air pollutants, ozone and PM2.5, to [asthma-related changes](https://www.niehs.nih.gov/health/topics/agents/air-pollution) in children's airways <https://www.niehs.nih.gov/health/topics/agents/air-pollution>

³²⁸ Although our research has not identified any statistical evidence that women benefit more than men from clean air.

³²⁹ A growing number of children suffer from asthma and respiratory problems and who need increase care <https://www.theguardian.com/environment/2019/apr/10/vehicle-pollution-results-in-4m-child-asthma-cases-a-year>

³³⁰ <https://genderdata.womenmobilize.org/women-to-the-back-a-new-study-sheds-light-on-barriers-to-womens-mobility/>

who are currently immobile but could be potential users of new E-Mobility modes is part of the transformational nature of E-Mobility.

Conducting an intersectional gender analysis is key to understanding the barriers women face in accessing E-Mobility and when assessing the implications of a policy or a project. This requires gathering sex-disaggregated data and information across several key domains that include institutional and legal frameworks; cultural norms and beliefs; gender roles, responsibilities and time use and transport data.

However, gender bias in data collection is real and was observed in the approach to transport data collection in many countries. This falls into three broad types:

- Overgeneralization—adopting the perspective or experience of one sex and applying it to both sexes with the implication that what is good for one is good for the other;
- Gender Insensitivity - ignoring sex and gender as important variables; and
- Double Standards - assessing the same or essentially the same situation, trait or behavior differently on the basis of sex. This includes classifying all women as being vulnerable.

Awareness raising on the importance of collecting sex-disaggregated transport and impact data for better product, policy design and E-Mobility investment decision making is key. Gathering gender-disaggregated data on users to show mode share, preferred vehicles, travel patterns, vehicle ownership, and access to vehicles combined with additional specific data on E-Mobility preferences, needs, design, technology, and barriers for women, is crucial for a just transition. Such comprehensive data would serve as a foundation for designing targeted policies and interventions to ensure inclusivity in E-Mobility initiatives, fostering equitable access and participation for all genders. Knowledge and data on mobility patterns and behaviors will be key to decide where to place E-Mobility infrastructure. There are now an increasing number of tools and guidance on how to collect and analyze gender-disaggregated transport data, and examples can be found in the accompanying database ([here](#)).

In order to incentivize the collection of gender-disaggregated data by governments, transport companies, NGOs and private investors, a standardized impact measurement framework for E-Mobility policies and projects with a gender focus has to be developed. This needs to be complemented with a systemic data collection and monitoring framework to ensure that data stays relevant, and up-to-date, and that the capacities for data management are strengthened to be able to track progress on measures taken to enhance gender inclusion in E-Mobility and other transport projects. It will also be important that these data collection efforts are designed and implemented in partnership with national and local governments, to avoid having datasets that are unused or outdated quickly and to leverage synergies with other ongoing government led climate initiatives.

There is a similar need for gender-disaggregated data on employment trends within the E-Mobility sector. It is currently not possible to analyze the women working in transport disaggregated by mode, occupation, qualifications, age or sex. Understanding the representation of women in various roles from design, manufacturing, engineering, operations and management positions will show if women are benefitting as much as men economically from the transition to E-Mobility. Additionally, it's important to track factors like salary disparities, promotion rates, and access to training and professional development opportunities to address any gender-based inequalities. By understanding these aspects, initiatives can be developed to promote gender diversity and create a supportive environment for women to thrive in the E-Mobility workforce.

This data can inform research and reporting on the economic, social and environmental benefits of gender equality in the workforce. This can shift cultural norms and perceptions that affect women’s participation in the sector by advocating that gender equality creates benefits for everyone. As an example, the UN’s Women Count initiative³³¹ seeks to overcome institutional and financial constraints that limit the production of gender statistics by building technical capacity of national statistical systems and providing financial support to improve data collection.³³²

Example of Ecuador’s mobility knowledge management system

UNEP’s GEF Project ‘Support the shift towards low-carbon electric mobility’ in Ecuador will create a gender-sensitive mobility knowledge management system housed in the Ministry of Transport and Public Works for use by policy makers and key stakeholders. This seeks to enhance the organization and efficiency of the information and data management for the transport and energy sectors of public entities in Ecuador. This system will allow to systematically measure and compile attributes of a transportation system that can help to indicate: the best way to improve general transportation efficiency and quality for a given region; the achieved and potential benefits of a transition to E-Mobility for various types of vehicles/applications; and the most effective instruments and approaches for transitioning to E-Mobility.

Box 28: Example of Ecuador’s mobility knowledge management system

5.8. E-Mobility as a catalyst for change

As with all technological change, electrifying transport will be disruptive on many levels, triggering major reforms and changes in the sector itself but also in other related activities. There will be major transformations especially in infrastructure and business models. For instance, battery leasing is becoming a popular alternative to ownership and the use of digital platforms for charging provides different possibilities for payment (e.g. prepaid cards or digital payments with or without service contracts).

The transition to E-Mobility therefore presents many entry points for women to join the transport workforce, and this can address the skills gap that the sector faces. New jobs will be created in both the formal and entrepreneurial arenas and women must step forward to claim these.

Our survey indicated that those already involved in E-Mobility saw few barriers to women working on an equal footing as men, although they recognized that it would not be easy to enter. Women, themselves, can also create new businesses and green jobs but access to finance for them to start businesses connected with E-Mobility will determine this.

Some examples of entry points for women in the E-Mobility sector are provided in Table 4.

Area	Description	Opportunity for women
Vehicle production	EVs have fewer moving parts & work is less physical with increased automation. New & different skills needed (mechanical, digital and electrical)	Access to new and green jobs. Increased automation reduces the need for physical strength and increases the need for digital and electrical skills.

³³¹ <https://data.unwomen.org/women-count>

³³² <https://data.unwomen.org/features/it-will-take-22-years-close-sdg-gender-data-gaps>

EV Purchase	Demand & purchase decisions are strongly linked to price comparison to equivalent ICE vehicles.	Women currently tend to buy smaller more environmentally friendly vehicles & this may increase EV purchases as their prices decrease and more smaller models are available
Operations	Public & private transport operations will undergo change & require new behaviors. Reform & rationalization of bus services & the introduction of E-Mobility as MAAS will change and create jobs.	Transport operations are currently resolutely male. The transformation that E-Mobility will bring will disrupt the current workforce & allow women to enter it (as drivers, conductors, services providers & entrepreneurs).
Maintenance	The frequency & cost of service maintenance for EVs is less than for equivalent ICE vehicles, as there are fewer moving parts. New maintenance skills and battery monitoring are needed.	Lower service costs make EVs attractive for women who have lower transport budgets ³³³ . New jobs in battery management and electrical engineering for maintenance can be of interest to them.
Charging infrastructure	Gasoline & diesel supply infrastructure will be reduced & possibly become obsolete. New locations for charging points will need to be found & the electricity supply increased. Location of charging points need to be at places where women need them such as outside of the CBD, and their location also needs to be safe (i.e. well-lit and not isolated). In addition, EV charging is usually not paid in cash, so women will need access to banking or alternative payments options such as mobile payment systems and/or pre-paid cards.	Pressures on public space for charging may affect women in unforeseen ways (sidewalks reallocated to charging, parked vehicles etc.) for on /off street charging while charging implementation may offer new employment opportunities. The location of public charging infrastructure must take into account women's needs and requirements for personal security, digital access, literacy & access to bank accounts for payments.
Total Cost of Ownership (TCO)	Cost of operations per km is linked to the price of electricity vs petrol/diesel. Since EVs are more efficient their energy use is lower. However, if batteries need to be replaced this can be costly. Current insurance options are often based on vehicle value (higher for EVs) and require several years of 'no claims' or minimum years of driving experience. This disadvantages women who may not have the same length of time driving as men.	Women generally earn less so lower operational costs are important for them, and BAAS options may allow them to access EVs easier than ICE vehicles. Special programs giving women more favorable terms for repayment on loans for EV purchase and insurance to lower operational costs.

³³³ A transport budget is the amount of disposable income that can be allocated to transport. Women usually have less than men in LMICs as they spend more on family (food, education and other needs associated with children).

Battery Recycling & repurposing	This new area in the E-Mobility ecosystem is likely to create a lot of new business models & jobs. Standards, regulation, monitoring and reporting practices and processes will need to be developed and implemented.	Women can play a role in these new areas of employment. There are also options for battery second life that can provide women with access to energy that they would otherwise not have for example lighting in rural off-grid areas). Women can also influence the development of standards as part of E-Mobility agencies.
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Table 4: A snapshot of entry points for women

The business case for gender-inclusive E-mobility is based on the potential to increase the customer base, enhance innovation and productivity through women employees, and strengthen supply chains by engaging women entrepreneurs. Designing transport to be safe, attractive, convenient, and affordable for women can increase ridership, revenue, and emissions savings from green transport investment³³⁴.

5.9. Recommendations for a just transition to E-Mobility

We know that what we do not measure, we cannot improve – and we need to know our starting point. Gender specific indicators for e-mobility policies and projects are fundamental to secure the political will and investments needed for the transition. Therefore, we put forward the following list of recommendations and key performance indicators (KPIs) that can be useful to monitor the transformative benefits of E-Mobility for women.

1. Recommendations for data collection

The data on gender in E-Mobility is currently poor and needs to be improved. Without a robust evidence base it will be difficult to ensure that women and other marginalized groups are able to fully participate and benefit from the transformation of transport towards of E- Mobility. We realize that this is complex as there are many players to consider but we make the following suggestions with metrics as Key Performance Indicators (KPIs) that can help both governments, companies, industry, academia and other organizations to monitor progress.

Actions and Measures

- Invest in better and more comprehensive data collection to fully understand the gender dimensions of E-Mobility. This requires an intersectional analysis of mobility, which in addition to its primary focus on gender, would include other factors that contribute to inequalities such as economic status, class, ability, race, age, and sexual orientation. There are new and emerging methods to improve disaggregated data collection, especially using digital technologies. In addition, the growing number of gender observatories should monitor and evaluate the gender aspect of regional and /or national E-Mobility initiatives.
- Work with the private sector, governments and others to collect (and regularly update) gender disaggregated data on employment and labor force participation and publish information from national statistics offices on:

³³⁴https://assets.publishing.service.gov.uk/media/64904fca5f7bb7000c7fad03/WOW_Helpdesk_Query_80_Women_s_Economic_Empowerment_and_Electric_Vehicles_in_Kenya.odt

- Numbers of women in senior managerial, leadership (executive) and decision-making positions³³⁵ in electric mobility companies.
- Numbers and percentages of women in vehicle manufacturing and assembly jobs in E-Mobility
- Percentage of women employed in operations of E-Mobility service offers (public transport, taxi, deliveries etc.).

Suggestions for Key Performance Indicators

1. Numbers/ Percentage of women employed in the E-Mobility sector by sub-sector (manufacturing, operation, sales and after-sales, service and maintenance, battery management and recycling, digital payment systems and other parts of the E-Mobility ecosystem).
2. Numbers/percentage of women EV owners (based on vehicle registrations) of total EV registrations (by category).
3. Numbers/ percentage of women who are the designated registered name or owners of E-Mobility companies compared to the total number of company registrations on E-Mobility. This looks to capture the success of any programs designed to increase the entrepreneurship of women in E-Mobility.

2. Recommendations for Policy and Governance measures.

Positioning E-Mobility within an integrated national strategy for sustainable mobility will help ensure a just transition, but this also requires deep and fundamental shifts in how transportation is organized, managed, and operated. Countries should prepare for and promote E-Mobility as a critical component in their overall shift toward more sustainable transport and energy systems and ensure that this transition is both equitable and just.

Transitioning to E-Mobility is complex, calling for coordination across a wide range of public institutions responsible for transport, standards, planning, safety, gender and energy aspects which may not necessarily have any history of collaborating. Typically, ministries that are responsible for transport are not used to working with those that work on gender issues. Institutionalizing gender in transport planning and transversal government coordination would also help to mainstream gender into decision making and policies. New agencies will be created and the gender balance of their leaders and senior positions will send a clear message about the opportunity of this transition and help ensure it is just. Simple measures such as shifting government fleets to EVs will also help boost confidence in E-Mobility.

Governments play a strong role in creating an enabling environment with standards, regulations and policies. Working in partnership with multiple stakeholders will help to build confidence and capacity and this will boost interest and investments in E-Mobility.

Actions and Measures

- Strengthen the awareness of the gender, transport and climate change policy nexus and adopt gender-based targets in decarbonizing transport policies. This will require new skills and

³³⁵ Decision making positions would mean on the Executive Board and/or in senior executive positions (e.g. Chief Executive or Chief Financial Officer, Head of Operations etc).

training. All E-Mobility policies should consider how E-Mobility will impact different genders and social groups.

- Establish mechanisms for gender balanced institutional coordination. For instance, the transportation, gender and electricity sectors need to work closely together to ensure that power infrastructure is increasingly aligned with transportation and gender demands.
- Review import duties, taxes and excise duties for EVs looking to accelerate take up of vehicle categories that are affordable (including assisted E-pedal bikes) and used to meet women's travel needs. Further financial measures can be introduced to stimulate local industries, assembly, manufacture and battery development and include conditions for women's employment or ownership. Ensure all fiscal incentives have been gender screened to avoid any unforeseen consequences that might lead to women being excluded or otherwise negatively impacted.
- Improve capacity building and sharing of know-how to systematize gender mainstreaming in national, regional and local transport institutions. Training programs to engage and inform city officials about gender, data collection and the intersection with E-Mobility combined with targets on gender and inclusion in E-Mobility policies, plans and initiatives will help ensure that the transition is just.
- Engage with financial institutions to help create attractive financial packages that will allow women to buy and operate EVs.

Suggested key performance indicators:

1. Monitor the gender balance of national institutions and agencies that are responsible for the introduction of E-Mobility. This should also include departments within existing ministries responsible for E-Mobility related aspects such as standards (vehicles and charging), battery use (safety, recycling etc.), compliance etc. Suggestions for near term targets could be 25 per cent gender balance of senior positions in E-Mobility agencies in period 2024 to 2029 and a long-term target of 50 per cent for period 2030 to 2040.
2. Support and report on the numbers of workshops, training or other capacity building actions at national and local level that focus on increasing the numbers of women in E-Mobility. Aim for 25 per cent of transport ministry staff to be trained on gender and E-Mobility in period 2024 to 2029 and 50 per cent for period 2030 to 2040.
3. Promote and support multi-stakeholder partnerships that promote gender and E-Mobility.

3. Recommendations for academia and education (universities, colleges, schools and vocational training centers).

The introduction of E-Mobility will require investment in education, research and development. Building technical capacity, attracting women into STEM and creating vocational qualifications that prepare women to find jobs in E-Mobility are all crucial to a just transition.

Regional and national research capacity on EVs in LMICs also needs to be built up. Local conditions such as weather (very low or very high temperatures or humidity levels) and topography are known to affect EV and battery performances, and this needs local knowledge.

Furthermore, battery recycling and second life are domains that will require local solutions. Academia and private sector players, such as E-Mobility and labor representative organizations can jointly establish practical courses (in-person and on-line) and curricula for upskilling (with emphasis on

digitization) designed to engage with women and other underrepresented groups provide them with the skills necessary for them to work in all areas of the E-Mobility ecosystem.

Actions and Measures

- Build local research and development capacity for E-Mobility.
- Invest in research on batteries as their performance in local conditions affect the ultimate attractiveness of all categories of EVs. Examples include innovative battery design, second life use, recycling and disposal.
- Curate international knowledge and develop research exchange programs on E-Mobility and gender topics.
- Create faculty positions and awards, academic prizes or special grants to recognize high potential female researchers in E-mobility

Suggested key performance indicators:

1. Percentage of women participating in E-Mobility vocational courses
2. Number of women receiving certification from vocational and technical E-Mobility training courses
3. Percentage of women participating in STEM majors in university.
4. Number of funded research programs on E-Mobility and gender.
5. Number of female researchers who are part of or research teams working on E-Mobility projects

4. Recommendations for industry and the private sector.

The private sector will play an important role in demonstrating leadership and providing employment in E-Mobility. It will also be able to shape the profile and culture of the E-Mobility workforce across the new E-Mobility ecosystem. This in turn is likely to create new opportunities and women (and men) can add value with their entrepreneurship. However, access to finance has been found to be a major barrier to women entrepreneurs and the business community can work with financial institutions and governments to improve the conditions for women.

Actions and Measures

- Develop programs to create gender balance in the E-Mobility workforce and boost women's access to green jobs in traditionally male dominated occupations created by the E-Mobility transition. These opportunities can be introduced across the full value chain – from design, vehicle production, operations, and maintenance to end of life and can apply to established companies as well as newly formed ones.
- Work with academia to increase the pipeline of trained suitable female candidates. This could include private sector supported programs/partnerships with universities and vocational schools to train women, apprenticeships and/or mentoring from practitioners and on the job training.
- Develop programs to help women's access to finance and increase their business competences. Specialized support for women-led companies in E-Mobility could be linked to government grants or preferential rates of borrowing or preferential procurement.

Suggested key performance indicators (KPIs):

1. Percentage of companies in the electric mobility sector with structured gender empowerment programs.
2. Percentage of female led³³⁶ new E-Mobility companies registered annually
3. Percentage of females in private sector E-Mobility workforce
4. Number of women led companies in E-Mobility created as part of a defined program
5. Number of female intern/apprenticeships and/or numbers of female mentorships.
6. Amount of funds lent or given in grants to women led companies in E-Mobility
7. Percentage of women compared to men benefiting from skills training and education programs in EVs

5.10. Conclusions – Taking E-mobility forward with a gender lens

Electric mobility is increasingly relevant for LMICs. The main growth markets for LMICs are in the E2/3 W categories, followed by E-buses. In Asia, women are already strong users of E2/3Ws for both for passengers and light duty freight purposes for their own needs but also as commercial ventures, but this needs to be built up more strongly in Latin America and Africa.

From a female consumer perspective, the two main challenges for widespread E-Mobility take up remain: the high capital cost of vehicles, and availability of charging infrastructure leading to range anxiety. Battery range is a particular concern to women who may be traveling with children, or elderly parents who are unable to walk far if the battery runs out. The time a charge takes combined with the availability of a charge point, and the cost of a charge are also of great importance to women using EVs for commercial, income generating purposes. Batteries are the most expensive components of the vehicle, although prices are expected to fall by 40 per cent³³⁷ in the period 2022-2025. Women already own fewer ICE vehicles especially in LMIC due to their lower disposable income, they might be even less able to purchase an EV.

Using E-Mobility for all types of public transport will also benefit women. Public transport with E-Buses improves their mobility and comfort and there are driving jobs they can access. N EVs are quieter and less polluting so women will also benefit from lower noise levels and better air quality.

Governments should provide an enabling environment for women to enter the E-Mobility sector. Without this neither the private sector nor academia will be motivated to make the extra effort to include women in the E-Mobility transition. their support can take many form such as partnership, programs and initiatives. Capacity building programs for public and private sector E-Mobility players, training programs for women to enter the market and support to education centers to provide vocational courses for women in E-Mobility are all critical elements that are needed for the shift to E-mobility to be just. In addition, resources and financial support for monitoring and evaluation of the implementation of policies related to gender equality in the electric mobility sector should be budgeted.

Having more women in leadership and decision-making positions will help accelerate the changes that are needed for women to fully participate in the transition to E-Mobility. Training and education for women in STEM subjects, access to finance for female entrepreneurs, and disaggregated data on workforce participation and transport users are also critical. At company level increasing gender

³³⁶ 'Female led' means that the designated, responsible person(s) that registers the company is a woman.

³³⁷ <https://www.goldmansachs.com/intelligence/pages/electric-vehicle-battery-prices-falling.html>

sensitive recruitment, campaigns to attract women, flexible working arrangements, childcare facilities, and better facilities for women are also seen as being important.

Community leaders and women's local associations can also play important roles to help to build local capacity and knowledge. Thus, all current transport stakeholders have a role to play in making the transition to E-Mobility just.

In any transition there will be initial winners and losers. The E-Mobility transition will shrink the massive and complex fossil fuel-based infrastructures which have been built over more than a century, especially refueling infrastructures – stations and distribution systems - leaving stranded assets. It will also affect many national fiscal regimes and funding sources, as the excise duties on petroleum products or transport boost public purses. But on the other hand, interconnected E-Mobility services will create many new business and employment opportunities. A totally new ecosystem will largely replace the current fossil fuel based one, over time. Women can step into this area and play a role in the new system in new roles such as charging point management and battery swapping.

On a global level, E-Mobility can certainly bring significant decarbonization benefits, but it also has the potential to contribute to several other important development agendas—notably women's empowerment, inclusive mobility, local air quality, energy security, and industrial policy. If a strong and proactive public policy framework is in place, the transport sector in its transition to E-Mobility could become a strong backbone of smart, sustainable and just mobility.

Understanding the intersection of gender and electric mobility is essential for ensuring an inclusive and equitable transition to sustainable transportation systems. By addressing gender disparities and promoting women's participation in the electric mobility sector, we can maximize the social, economic, and environmental benefits of this transformative technology. The shift to greener, more inclusive and just mobility systems needs to move beyond a mere technological fix and incorporate the strengthening of active mobility and public transport infrastructure and services. Being the main mode of transportation for women in most LMICs, it is important to include safety and strengthening of infrastructure and services for active mobility and public transport in the shift to E-Mobility. This baseline study sets the stage for further research, policy development, and advocacy efforts aimed at advancing gender equality in electric mobility.

Annex 1

Survey questionnaire in English ([separate document](#))

Survey questionnaire in Spanish ([separate document](#))

Annex 2 – List of Interviews

The following people were interviewed virtually by the author or responded to specific questions by email. The interviews were conducted between November 2023 and May 2024, and they were used to validate the information found and the recommendations for high potential entry points for women to participate more actively in E-Mobility. Those interviewed responded giving their personal rather than organizations views and position on the topics discussed. The list of questions changed over the period of time as the report developed and more information came to light.

No.	Name of organization	Description of organization
1	Asian Transport Outlook (Researcher)	Transport statistics for Asia.
1	Clean Energy Works	International partnership working with policymakers and community advocates to advance equitable clean energy solutions.
1	ERTICO	ITS Europe brings together the public and private sector to make mobility safer, sustainable and efficient.
1	Federation of Motorcycles	Fédération Internationale de Motocyclisme – international representative body for motorcycles and motorcycling.
1	Intermobility (co-founder)	A European network of over 500 organizations (in particular SMEs) from all aspects of the electric mobility ecosystem
1	Kuehne Foundation Climate Action	A philanthropic foundation working on developing how the transport and logistics sector can support climate-friendly and sustainable development at a global and local level.

1	OEM (European bus manufacturer) - communications	Small scale bus manufacturer
2	Private sector consultancies	Working on E-Mobility projects in the developing world
1	POLIS	Network of cities with working group on E-Mobility
1	University Professor	Working on Smart Mobility in Sub Saharan Africa
1	UEMI Asia (Representative)	Working on Smart Mobility in Asia
1	Urban Catalysts	Indian research consultancy working on sustainable & equitable transport, public spaces and cities.
2	Researchers	One in Asia and one in Latin America
15	TOTAL	