Support the shift towards low-carbon electric mobility in Ecuador

Part I: Project Information

Name of Parent Program
Global Programme to Support Countries with the Shift to Electric Mobility.

GEF ID
10630

Project Type
MSP

Type of Trust Fund
GET

CBIT/NGI
CBIT **No**
NGI **No**

Project Title
Support the shift towards low-carbon electric mobility in Ecuador

Countries
Ecuador

Agency(ies)
UNEP

Other Executing Partner(s)
Ministry of Environment, Water and Ecologic Transition (MAATE)

Executing Partner Type
Government

GEF Focal Area
Climate Change

Taxonomy

Focal Areas, Climate Change, Climate Change Mitigation, Technology Transfer, Energy Efficiency, Sustainable Urban Systems and Transport, Influencing models, Transform policy and regulatory environments, Convene multi-stakeholder alliances, Strengthen institutional capacity and decision-making, Deploy innovative financial instruments, Demonstrate innovative approache, Stakeholders, Private Sector, Capital providers, Large corporations, SMEs, Non-Grant Pilot, Type of Engagement, Consultation, Participation, Civil Society, Academia, Awareness Raising, Communications, Education, Public Campaigns, Behavior change, Gender Equality, Gender Mainstreaming, Sex-disaggregated indicators, Capacity, Knowledge and Research, Learning, Capacity Development, Knowledge Generation, Enabling Activities, Knowledge Exchange, Innovation

Sector

Transport/Urban

Rio Markers

Climate Change Mitigation

Climate Change Mitigation 2

Climate Change Adaptation

Climate Change Adaptation 0

Submission Date

7/10/2020

Expected Implementation Start

7/1/2022

Expected Completion Date

6/30/2025

Duration

36In Months

Agency Fee($)

115,225.00

A. FOCAL/NON-FOCAL AREA ELEMENTS

Objectives/Programs	Focal Area Outcomes	Trust Fund	GEF Amount($)	Co-Fin Amount($)
CCM-1-2	Promote innovation and technology transfer for sustainable energy breakthroughs for electric drive technology and electric mobility	GET	1,280,275.00	6,237,493.00
		Total Project Cost($)	**1,280,275.00**	**6,237,493.00**

B. Project description summary

Project Objective

Accelerate the introduction of low-carbon electric mobility and reduce fossil fuel consumption, greenhouse gas emissions and air pollution in the transport sector of Ecuador

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
Component 1: Institutionalization of low-carbon electric mobility	Technical Assistance	Outcome 1: The government demonstrates enhanced coordination, consultation, and capacity for promoting the scaling up of electric mobility in Ecuador	Output 1.1: A national electric mobility coordination body (MNME) is created to enhance efforts of all levels of government Output 1.2: A multi-stakeholder consultation, communication, and engagement strategy is made available to support the government in scaling up electric mobility through a just transition Output 1.3: Private and public stakeholders increase awareness/capacity/knowledge on technical, financial and regulatory aspects of electric mobility through a capacity building mechanism and the global program on electric mobility Output 1.4: A gender-sensitive mobility knowledge management system housed in the Ministry of Transport and Public Works is made available for use by policy makers and key stakeholders	GET	316,628.00	1,132,764.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
Component 2: Short-term barrier removal through low-carbon e-mobility energy demonstrations	Investment	Outcome 2: The private sector gradually adopts electric vehicles for their operations	Output 2.1: The viability of light duty electric vehicles and associated charging infrastructure is demonstrated to local and national stakeholders in the logistics and services sector in Quito Output 2.2: Data from the pilots is collected, analyzed, and disseminated to key stakeholders	GET	433,404.00	1,041,002.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
Component 3: Preparation of scale-up and replication of low-carbon electric mobility	Technical Assistance	Outcome 3: Key actors (government, private sector, and financing institutions) implement regulations and innovative mechanisms to incentivize a just transition to electric mobility	Output 3.1: Business models and a policy framework for leasing, renting and subscription to electric vehicles are developed and submitted for adoption by the government, logistic companies, car dealers, financial institutions, and insurance companies Output 3.2: Standards and a policy framework for regulating the energy efficiency, emissions standards, and safety of conventional and electric vehicles are updated and adopted by the MNME Output 3.3: Standards and a policy framework for regulating fuel quality are updated and adopted by the MNME Output 3.4: Regulations for the installation of public and private electric vehicle charging infrastructure are adopted by the MNME Output 3.5: A just transition strategy for the up-scaling of e-mobility is adopted by the MNME	GET	300,473.00	2,215,727.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing($)	Confirmed Co-Financing($)
Component 4: Promotion of long-term environmental sustainability of low-carbon electric mobility	Technical Assistance	Outcome 4: The national government takes action towards implementing standards for ensuring the environmental sustainability of electric mobility	Output 4.1: A proposal for regulating the re-use, recycling and disposal of electric and conventional vehicles is adopted by the MNME Output 4.2: Waste companies are trained in reusing, recycling, and disposing used vehicles (both conventional and electric) and electric vehicle batteries	GET	79,782.00	898,000.00
Monitoring and evaluation	Technical Assistance	Project is effectively monitored and evaluated	Monitoring and evaluation products are delivered (see section 9)	GET	33,600.00	
				Sub Total ($)	**1,163,887.00**	**5,287,493.00**

Project Management Cost (PMC)

GET	116,388.00	950,000.00
Sub Total($)	**116,388.00**	**950,000.00**
Total Project Cost($)	**1,280,275.00**	**6,237,493.00**

Please provide justification

C. Sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
Recipient Country Government	Ministry of Environment, Water and Ecologic Transition (MAATE)	In-kind	Recurrent expenditures	350,000.00
Recipient Country Government	Ministry of Environment, Water and Ecologic Transition (MAATE)	Public Investment	Investment mobilized	1,140,000.00
Recipient Country Government	Ministry of Transport and Public Works (MTOP)	In-kind	Recurrent expenditures	350,000.00
Recipient Country Government	Ministry of Transport and Public Works (MTOP)	Public Investment	Investment mobilized	520,000.00
Recipient Country Government	Ministry of Energy and Natural Non-Renewable Resources (MEyRNNR)	In-kind	Recurrent expenditures	350,000.00
Donor Agency	Deutsche Gesellschaft f?r Internationale Zusammenarbeit (GIZ)	Grant	Investment mobilized	1,379,400.00
Other	Escuela Polit?cnica Nacional (EPN)	In-kind	Recurrent expenditures	206,500.00
Private Sector	KIA	Equity	Investment mobilized	550,000.00
Private Sector	Empresa Electrica de Quito (EEQ)	Equity	Investment mobilized	1,391,593.00
			Total Co-Financing($)	**6,237,493.00**

Describe how any "Investment Mobilized" was identified

Investment mobilized was identified through bilateral meetings with potential co-financiers within the government. The breakdown is as follows: - Empresa Electrica de Quito (EEQ) is the utility in charge of distribution in Quito. It will invest USD 1.39 million in fast-speed charging infrastructure in the urban & inter-urban level, and also provide the charging infrastructure for the project?s pilot. - The Ministry of Transport and Public Works (MTOP) will invest USD 0.57 million in studies and technical support as part

of their contribution to the development of the National Policy for Urban Sustainable Mobility (PNMU). The PNMU will play a key role in establishing guidelines for the governance structure for the mobility sub-sector in Ecuador. It will support the creation of an information system, the development of Public Private Partnerships (PPP) and leasing frameworks in the transport and mobility sector, and the revision of vehicle efficiency and fuel quality standards. - The Ministry of Environment, Water and Ecologic Transition (MAATE) will invest USD 1.14 million in studies and technical cooperation as part of the development of the National Plan Towards Decarbonization (?Plan Nacional de Decarbonizaci?n?). This work will result in a roadmap for the decarbonization of the transport sector, including the identification of changes required in existing legislation and policies. - The Deutsche Gesellschaft f?r Internationale Zusammenarbeit (GIZ) will invest ? 1,210,000 (? USD 1,379,400) from the German Climate and Technology Initiative (Deutsche Klima- und Technologieinitiative, DKTI). Through this investment, the GIZ will provide technical assistance to Ecuador in meeting future energy demand with clean energy. These resources will also serve to strengthen supply and demand for the financing of sustainable technologies in urban mobility. This technical assistance co-financing supports the achievement of outcomes 1 to 3 of the GEF project. Work under this co-financing includes: * Defining the baseline of current energy demand to develop scenarios of future electric mobility penetration impact to design a roadmap to meet energy needs with clean energy (GIZ project: analysis and prospective for e-mobility in Ecuador and its generation mix for 2030); * Supply and demand strengthening for the financing of sustainable technologies in urban mobility (GIZ project: enabling new technologies for urban transport in Ecuador). Due to the nature of this GIZ co-financing, it does not contribute to co-financing of project management costs. Annex I-2 of the UNEP project document provides a breakdown of the co-financing by project component. Detailed descriptions of each co-financing commitment can be found in annex I-2. The co-financing letters are in annex N. Note: overall project co-financing has increased as compared to the original estimate considered at the time of drafting the PFD for the parent project (i.e. from 5,925,000 to 6,237,493). The preliminary estimate identified at the concept note evolved as additional stakeholders were engaged during the project preparation phase. This includes mainly in-kind co-finance from actors not previously identified, such as the Escuela Polit?cnica Nacional, who will provide access to its facilities and equipment (i.e. the Center for Training and Research in Vehicle Emissions Control, CCICEV, and of the National Scientific Calculation Laboratory of the MODEMAT Mathematical Modeling Center). Refer to section C and annex I-2 for further information.

D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNEP	GET	Ecuador	Climate Change	CC STAR Allocation	1,280,275	115,225	1,395,500.00
			Total Grant Resources($)		**1,280,275.00**	**115,225.00**	**1,395,500.00**

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

F. Project Preparation Grant (PPG)

PPG Required **true**

PPG Amount ($)

50,000

PPG Agency Fee ($)

4,500

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNEP	GET	Ecuador	Climate Change	CC STAR Allocation	50,000	4,500	**54,500.00**
				Total Project Costs($)	**50,000.00**	**4,500.00**	**54,500.00**

Core Indicators

Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)	0	452279	0	0
Expected metric tons of CO?e (indirect)	0	1808500	0	0

Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)				
Expected metric tons of CO?e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)		452,279		
Expected metric tons of CO?e (indirect)		1,808,500		
Anticipated start year of accounting		2022		
Duration of accounting		15		

Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)
Target Energy Saved (MJ)		26,140,283,067		

Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)

Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female		336		
Male		784		
Total	0	1120	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

Explanation on targets and methodologies: ? GHG emission mitigation (indicator 6) has been estimated by the UNEP Sustainable Mobility Unit (SMU) using its GHG emission reduction calculation model (?e-mob calculator?), which has been consistently used for all the projects under the Global Programme to Support Countries with the Shift to Electric Mobility. Further details on this indicator are available in ?Annex L - Estimates of direct and consequential greenhouse gas emission reductions?. ? Direct beneficiaries (indicator 11) are defined as all individuals estimated to received targeted support (i.e. direct assistance) from the project. The number of unique beneficiaries is estimated based on the expected participation in the project?s 12 workshops and planned capacity building activities (Component 1), as well as direct users of the pilot project. Disaggregation of beneficiaries by gender was estimated based on attendance registered during the workshops held along the PPG phase and considering sectoral representation of women, in alignment with the project?s Gender Action Plan (see below). It is important to highlight that as per the Guidelines on Core Indicators and Sub-Indicators, indicator 6 is calculated considering a post-project estimate. (GEF, Guidelines on core indicators and sub-indicators (ME/GN/02, last updated in March 2019). Para. 4 (d).)

Part II. Project Justification

1a. Project Description

1) Global environmental and/or adaptation problems, root causes and barriers that need to be addressed

A global transition to low- and zero- emission mobility is essential to meet international climate commitments, including the Paris Climate Agreement. While Ecuador is the country with the highest biodiversity index per square meter in the world, urban growth is putting pressure on its natural resources. One of the main factors contributing to this involves mobility, whose main source of energy is fossil fuels. The 2019 National Energy Balance of Ecuador shows that between 2009 and 2019, CO_2eq emissions grew 19.3% (from 32,743 kton CO_2 to 39,058 kton CO_2) due to the increase in energy demand, being the consumption of fossil fuels from the transport sector the largest single contributor to this growth.[1][1]

With the COVID-19 pandemic, governments around the world are working to protect public health and safeguard economies. Preliminary results from many global studies show that elevated levels of air pollution can weaken the respiratory system?s ability to fight infections, and higher particle air pollution concentrations are correlated with higher death rates from COVID-19.[2][2] Electric vehicles (EVs) and investments in infrastructure can help overcome these challenges on two fronts. First, when coupled with a clean, renewable-based generation mix, electric vehicles can significantly reduce air pollutants from the transportation sector. Second, economic growth can be stimulated from investments in electric transportation through direct, indirect, and induced job creation for its development, including maintenance of the vehicles, setting up charging infrastructure, electricity distribution upgrades, and electricity generation. Combined with the large fuel and maintenance savings from EVs, private and public fleets can decrease transportation costs over time.

In Ecuador, electricity generation (2019) is largely dominated by renewable energies, with a 76.3% share from hydroelectric, 21.9% thermal and a 1.8% share from other renewables (biomass, wind, biogas and solar), and an average grid emission factor of 0.4509 kg/kWh, relatively lower than the global average. A large share of renewables is also expected for the mid-term future: according to Ecuador?s grid capacity expansion plan (the *Electricity Master Plan*), around 6 GW of new capacity will be introduced between 2021 and 2027, 81% of which will come from hydro power plants and other renewable sources.[3][3] This represents a great opportunity for the introduction of electric mobility, which will be largely powered by a clean grid. Thus, shifting from a fossil fuel-based mobility to electric mobility has been identified as one of the prominent strategies to achieve the reduction of GHG emissions required to meet the country?s Nationally Determined Contribution (NDC).[4][4]

Several first steps had been taken in the country to allow the introduction of electromobility, such as a recently published proposal for a National Strategy for Electric Mobility (ENME) and the definition of a differentiated electricity rate for charging electric vehicles.[5][5] While the ENME sets an initial target

of 10,000 electric vehicles (EVs) up to 2025 (and an ambitious target of 750,000 units up to 2040), the market is still very incipient and sales are below 150 vehicles per year, representing 0.11% of yearly sales. So far, the development of electromobility in Ecuador has been uncoordinated and its potential remains untapped.

a. Barriers for the introduction of EVs in Ecuador

So far, the development of electromobility in Ecuador has been uncoordinated and its potential remains untapped. Barriers towards the introduction of a greener fleet have been classified into four groups, each of which is presented and discussed below, together with their underlying root causes. All these issues are presented in context and in more depth in the baseline section (section 2 below).

i) Fragmented institutions lacking resources and capacities for coordination and planning

Lack of governmental coordination on e-mobility, with unclear distribution of competencies

Due to the cross-cutting nature of e-mobility, efforts on this matter are still highly uncoordinated, with several ministries pursuing different projects and competencies not clearly established.

The Ministry of Transport and Public Works (MTOP) is the institution in charge of sectoral planning at the national level. However, many institutions have taken a major role in developing policies and implementing projects to promote e-mobility, including the Vice-presidency, the Ministry of Economy and Finances; Ministry of Production, External Commerce, Investments and Fishery; Ministry of Energy and Non-Renewable Natural Resources; and the Ministry of Environment, Water and Ecologic Transition (MAATE). In many cases, these efforts have been uncoordinated, with projects either disconnected or overlapping.

An electric mobility institutional body involving the main ministries related to the topic (Transport, Environment, Energy) was promoted by the Vice-presidency; however, due to the lack of institutionalization, it was discontinued following the change of authorities after the latest presidential elections, and no action plan or concrete roadmaps resulted from the previous work. Currently, ministries are considering to re-launch the idea through a sustainable mobility body or through a commission in the context of the National Policy for Urban Sustainable Mobility[6][6]; however, no concrete progress has yet taken place. It is important that these efforts are dynamic and executive, while at the same time leading to the institutionalization of these coordination entity to ensure continuity of its work.

Difficulties in coordination are further aggravated by the uncertainty regarding the competences involved in a sector that is inherently cross-cutting, requiring significant planning and where actions often lead to fiscal, environmental, logistic and social consequences. Competences of transit and road transport in Ecuador are divided between several institutions such as the Ministry of Transport and Public Works, the National Agency of Transit and the local municipalities, according to the Organic Code of Territorial Organization (COOTAD). Municipalities of similar size can have different responsibilities according to their capacities, following a nation-wide decentralization process that is still underway[7][7]. The autonomy given to local authorities is sometimes misunderstood and each territory applies its own political strategy without necessarily aligning to national guidelines[8][8]. These

difficulties in coordination can be even more challenging for technologies that have not yet been widely adopted ? such as e-mobility.

Lack of coordination is also evident from recent pilots undertaken in the country by different institutions which were not aligned with achieving a common, clearly defined aim. A number of pilots involving electric mobility have taken place in Ecuador; however, all of these have been implemented independently from each other, without a common goal or approach. Results from some of these pilots have been mixed, in some cases leading to additional reluctance from the public.[9][9]

Insufficient capacities to facilitate the transition to electric mobility

There is a significant lack of institutional capacity for the promotion and adoption of electric mobility. Officials in the main institutions involved in the regulation and planning of the transport sector such as the Ministry of Transport and Public Works and the National Transit Agency have traditionally focused on conventional means of mobility, and recent sectoral studies (including the National Strategy for Electric Mobility and the National Policy for Urban Sustainable Mobility) required the support of international cooperation. Lacking capacities are further accentuated at the municipal level, which generally faces additional challenges due to a lack of resources required to assume the competencies that are delegated from the central government[10][10].

Without capacity, technical staff is ill-equipped to issue much-needed standards and regulations of low-carbon electric mobility (discussed below), and policy makers lack the in-depth understanding of the various technical, social, economic, and environmental impacts required to develop sectoral plans and implementation roadmaps for implementing the national strategy.

Lack of social acceptance for changes affecting transport costs

The severe 2019 social disturbances across Ecuador[11][11] have highlighted the challenges of effecting social-technological transitions which disrupt the state of play. While interest in electric mobility is high, levelling up the total cost of ownership equation will require the correction of historical market distortions created by existing regulations, mainly on vehicle emissions, fuel quality and subsidies to fossil fuels.[12][12] Thus, an important barrier is related to the social acceptability of such a technological transition in transport and mobility, including as related to perceived costs, changes to services, and effects on local livelihoods. Such perceptions are increased by the COVID-19 pandemic, which has placed greater focus on the need for ensuring local economic and social well-being.

Considering the significant differences among regions, there is a need to ensure that efforts to facilitate the transition to a low-carbon electric mobility system incorporate the views and participation of different representative groups of local civil society actors, thus ensuring a just transition where the allocation of costs and benefits, as well as any distributional impacts in terms of income, are well understood and communicated to all the parties involved.

ii) Scarce knowledge of the potential of e-mobility

Lack of confidence amongst private and public fleet owners

Consumer understanding of the attributes of electric vehicles influence users for choosing a particular kind of vehicle. There is a significant lack of confidence amongst national and local stakeholders as to whether electric vehicles would be able to fulfil the needs and particularities of the Ecuadorean topography. For instance, operative and topographic variables such as ambient temperature, route slope, passenger cargo and driving intensity may increase the energy consumption of an e-bus by a factor of two or three as compared to the one declared by the manufacturer.[13][13] Moreover, concerns exist regarding charging infrastructure (e.g. charging infrastructure in high altitude, range anxiety, deadhead miles, time costs of charging), as well as regarding the replacement of batteries and the re-sale price of used EVs. Lastly, regulatory uncertainty has also played a part in delaying the adoption of this technology. Thus, private car users, public transport drivers and logistic fleet operators lack not only the confidence in the technical capability of the vehicles to satisfy the required operation, but also awareness and knowledge on how to harness the advantages of electric mobility for improving the quality of service through the use of such technologies.

As mentioned earlier, a few projects involving electric mobility in the transport sector took place in Ecuador; however, these have been uncoordinated and implemented at a very early stage in the transition to e-mobility, resulting in mixed perceptions from the users that were widely covered by the media.[14][14] [15][15] This has led to hesitation on behalf of authorities to support such a transition, knowing that failure in technology adoption would be politically and economically costly. Such hesitation trickles down to the private sector, which consequently waits on others to enter and test the market first (fear of first entry).

Lack of data and information to support decision making in e-mobility

Mainstreaming information on this technology is crucial to aid a transition to electric mobility. Informing key stakeholders as to the potential benefits of EV, the available financial offer, infrastructure availability and fuel-related savings is essential for building acceptance on EV. Due to the limited experience with electric vehicles in the country, there is also a lack of data on the use of electric vehicles, specially under the varying topography and climate conditions of each of its four distinct regions ? the Pacific Coast, Gal?pagos Islands, Andes Mountains, and Amazon Jungle. There are currently no programs for compiling and spreading necessary information about the transport sector in general[16][16] and electric vehicles in particular, making the few consumers of EV choose the cheapest vehicle without taking into account important long-term factors such as battery lifetime. Likewise, the social and environmental benefits of EVs are underrepresented in educational programs, advertisements, and media communications plans. This results in a lack of information to inform public and private decision-making and for supporting national and regional governments in developing, monitoring and evaluating policies, regulations and initiatives for promoting the uptake of electric mobility in the country.

iii) Nascent market and lacking regulatory framework for EVs

Incomplete regulatory framework favoring traditional internal combustion engines

Ecuador?s experiences with EVs have been very limited: few EV models are available, and all electric units are imported, as opposed to conventional vehicles, which are numerous and have locally assembled models; limited charging infrastructure is only available in a few of the main cities, and maintenance and repair services are rare. Electric vehicle sales are not increasing and continue to be less than 0.11% of sales.

The incipient development of e-mobility is both a cause and an effect of the lacking or inadequate regulatory framework. New standards and regulations are required, for example, to level the field between conventional vehicles and EVs, mainly those involving vehicle emissions, fuel quality and fossil fuel subsidies. While vehicles are required to comply with the Euro 3 standard, their efficiency is limited by poor fuel quality, among the lowest in the region.[17][17] Paired with a strong, long-established subsidy policy for fossil fuels, low quality fuels tilt the total cost of ownership equation in favor of traditional internal combustion vehicles. For example, the most used gasolines (*ecopa?s* and *extra*, accounting for 91% of the market) have an octane level of 85 (as compared to minimum octane level of 91 in European countries since the Euro 3 standard) and receive subsidies between 10-20%.[18][18] It is estimated that shifting to fuel qualities aligned with the Euro 5 standard could require an increase in the fuel price higher than 20% when compared to the *super* gasoline (i.e. the top quality sold in Ecuador, at 92 octanes but with less than 10% of the market share), and as high as 77% when compared to *extra* and *ecopa?s*. [19][19]

Other regulations are entirely lacking, e.g. safety standards for the protection of people and property during normal operation and charging, standards for EV charging systems, and local regulations for charging infrastructure in apartment buildings, public institutions, and common spaces.

Limited availability of EV models, infrastructure, and services.

According to the President of the National Association of Companies in the Automotive Sector (AEADE by their Spanish acronym), despite local interest of dealers to increase the portfolio of electric vehicles to offer in the market, international brands do not have interest in introducing electric vehicles for a country without clear objectives and policies for transport electrification. Given the relatively limited production of electric vehicles worldwide, brands are focusing on countries with higher purchase power, clearer policies, and greater introductory benefits; thus, the limited range of car models available in developing countries is often targeted at consumer segments with a higher purchase power. Most of the electric vehicles introduced in 2019 were automobile (57%) and SUVs (23%), from brands that are relatively unknown to local consumers, resulting in a high depreciation of the vehicles as soon as they leave the car dealer. According to a sectoral expert consulted during the preparation of this document, the value of vehicles in the secondary market is highly dependent on the brand. For example, local favorite Toyota loses 5% of its value (on top of the 12% from the Value Added Tax) after the car is taken from the dealer, whereas newer brands that are less established can suffer discounts as high as 15%. This has been the case of hybrid and electric vehicles, as they are perceived as riskier by consumers.

Vehicle owners are also concerned about the lack of charging infrastructure. By 2020 there are 32 charging stations distributed throughout the cities of Quito, Guayaquil, Cuenca, Loja, and the Galapago

Islands.[20][20] The number of charging stations is extremely low in comparison to the 1,085 filling stations for conventional vehicles[21][21], and no charging infrastructure exists outside the main cities. This has been identified as a critical challenge for massive adoption of EVs, as this limits EVs to urban usage within the few cities with charging stations. A similar statement can be made about lacking mechanics specialized in EVs and other related service providers.

Lack of adequate business models and legal framework to facilitate adoption of e-mobility

Changing customer preferences, among them the waning interest in owning physical products, have accelerated the shift to subscription-based offerings beyond software and digital services. In addition, the COVID-19 pandemic drove many urban residents and commuters away from public transit and shared mobility modes to seek the safety of private vehicles.[22][22] In Ecuador, finance for vehicles is generalized, and a few financial institutions have already developed products with lower interest rates for clients interested in buying EVs.[23][23] However, innovative business models and commercialization methods that are more friendly towards newer technologies that are perceived as riskier are currently unavailable. From the consumer?s perspective, car leasing and car subscriptions are gaining traction as compared with car purchasing, offering convenience, flexibility, and a minimal commitment.[24][24] [25][25] [26][26] The customer avoids the substantial upfront cost of a car purchase, along with the other (often underestimated) costs of ownership.

Under the current Ecuadorean tax legislation, the only viable alternative to traditional purchases is car renting (i.e. short-term car rental usually limited to a few days), and only conventional vehicles are being offered. Leasing ? a system that is widely used throughout the region ? is not considered by vehicle fleet operators as these are not considered deductible expenses for tax purposes. This lack of alternative, innovative models prevent consumers who have zero to very little experience with electric vehicles from accessing the technology at an affordable cost while at the same time keeping risks low.

iv) Insufficient development of end-of-life vehicle management systems

Unregulated end-of-life vehicle management

The average age of the Ecuadorian fleet in 2020 is 15.8 years. Almost 55% of the vehicles in circulation are older than 10 years, and almost 28% of the fleet is older than 20 years. [27][27]

End-of-life vehicle management is not regulated, even for conventional cars. Public service vehicles in Ecuador are allowed for a limited age that varies according to the type of service. However, there is no clear regulation on what happens to vehicles after the allowed end of their useful life. Vehicles that exceed the legal retirement age are generally used for the provision of irregular services in places with

little or limited control. Ad-hoc scrapping campaigns were undertaken between 2008 and 2012 to remove old vehicles from the public transport fleet, including taxis, buses, and light & heavy-duty vehicles older than 10 years; however, following this no additional campaigns have been implemented.

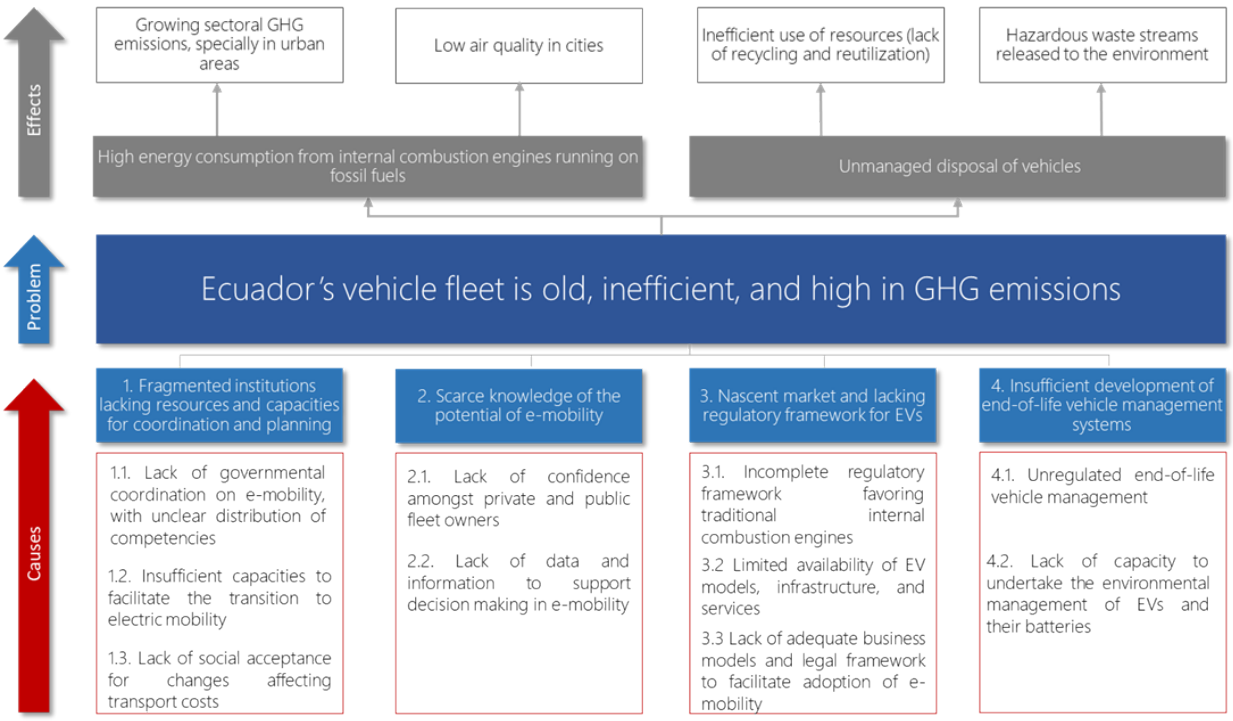
While the Organic Environmental Code (national environmental law) adopts the Extended Producer Responsibility (EPR) approach, there are few instruments to implement this locally or within business practices (car dealers). Specific regulations exist for some waste streams originated from vehicles (e.g. lead-acid batteries, used tires, and electronic equipment); however, there is no consolidated legislation that tackles the issue in an integrated way, considering all the aspects involved in the environmentally-sound handling of end-of-life vehicles. Moreover, the introduction of EVs will bring additional challenges, such as the disposal of lithium-ion batteries. This leads to policy hesitation amongst decision-makers on promoting electric mobility and hesitancy among vehicle manufacturers and importers. Furthermore, the lack of legal clarity on responsibility and cost of vehicle disposal hinders the development of circular economy business models for vehicles and their batteries.

Lack of capacity to undertake the environmental management of EVs and their batteries

The incipient development of e-mobility is also reflected in the lack of capacity of national actors to facilitate the environmental management of electric vehicles and their batteries, leading to hesitation amongst public decision-makers in promoting electric mobility. The absence of electric vehicles in the country makes it difficult for local actors to gain experience on managing the recycling and disposal of electric vehicles and their batteries. Furthermore, such actors, and particular the private sector in the waste industry, have little knowledge of market opportunities and business models for the reuse and recycling of electric vehicle components and electric batteries. This absence of capacity combined with a lack of regulations leads to hesitancy on the part of authorities in promoting electric mobility as they are unsure of the environmental implications and associated costs. In Ecuador, old vehicles ? including heavy vehicles such as buses ? can be found abandoned in the streets, and there are no specialized centers for the scrapping of vehicles. Concerning electric vehicles, the presence of a different type of batteries adds further complexity.

b. Problem tree

Figure 1. Problem tree



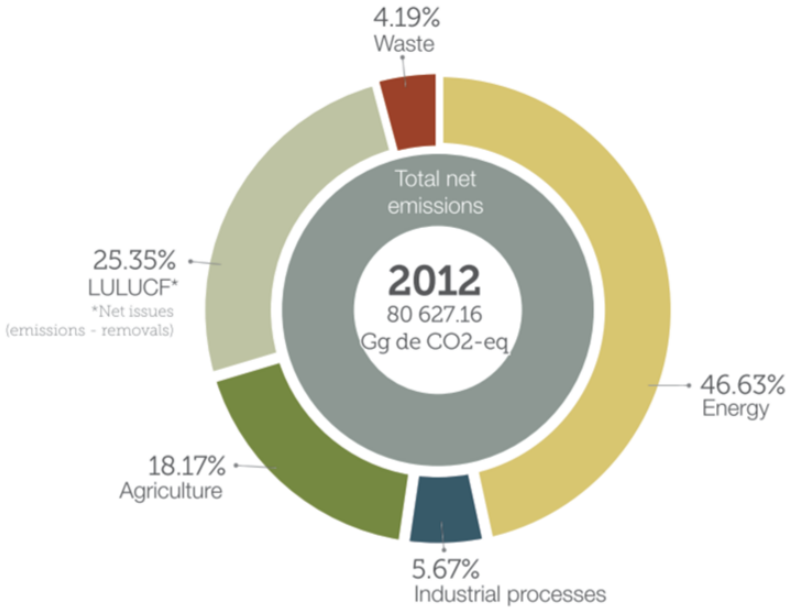
2) Baseline scenario and any associated baseline projects

The following section presents the baseline for e-mobility in Ecuador, including a general description of the context and relevant national circumstances. The discussion starts with information on the electricity sector (including its governance structure, the national energy mix, price and GHG and pollutants emissions), followed by a depiction of the transport sector (also including aspects related to governance, the evolution of the vehicle market and its associated infrastructure and national incentives for deployment of EVs). This is followed by a discussion on national policies and strategies -in energy, transport, and environment- of relevance for e-mobility. Other topics included in the analysis involve regulations on the end-of-life of vehicles and waste management, inclusiveness, and gender issues in mobility, as well as a list of key actors and baseline projects of relevance to this proposal.

a. Sectoral emissions: contributions from energy and transport

According to the Third National Communication for Climate Change of Ecuador (2017), energy stands out as the largest emitting sector in the country, with close to half of Ecuador?s emissions (46%). It is followed by net emissions from land use, land-use change and forestry (LULUCF), with 25%, agriculture (18%), industrial processes (6%) and waste (4%)[28][28].

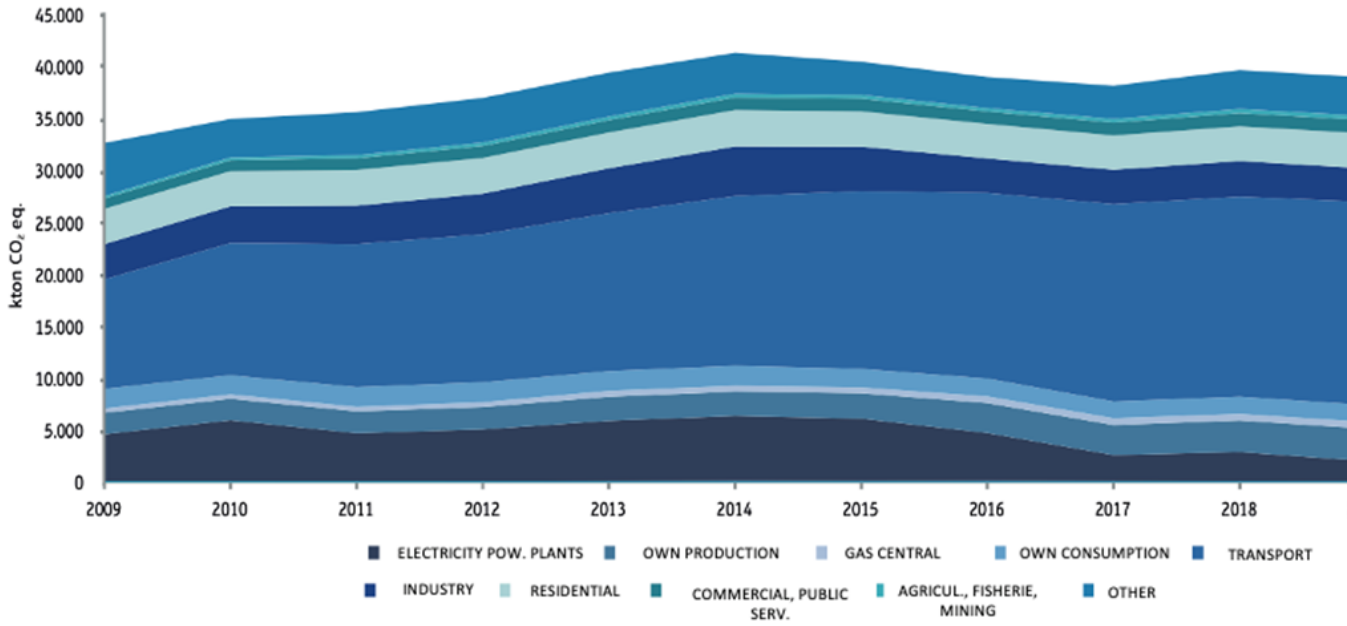
Figure 2. Distribution of emission of GHG. **[29]**[29]



In turn, emissions in the energy sector are largely dominated by the transport sub-sector, accountable for 45% of the sector?s contribution. It is followed by energy industries (32%) and manufacture and construction industries (13%).

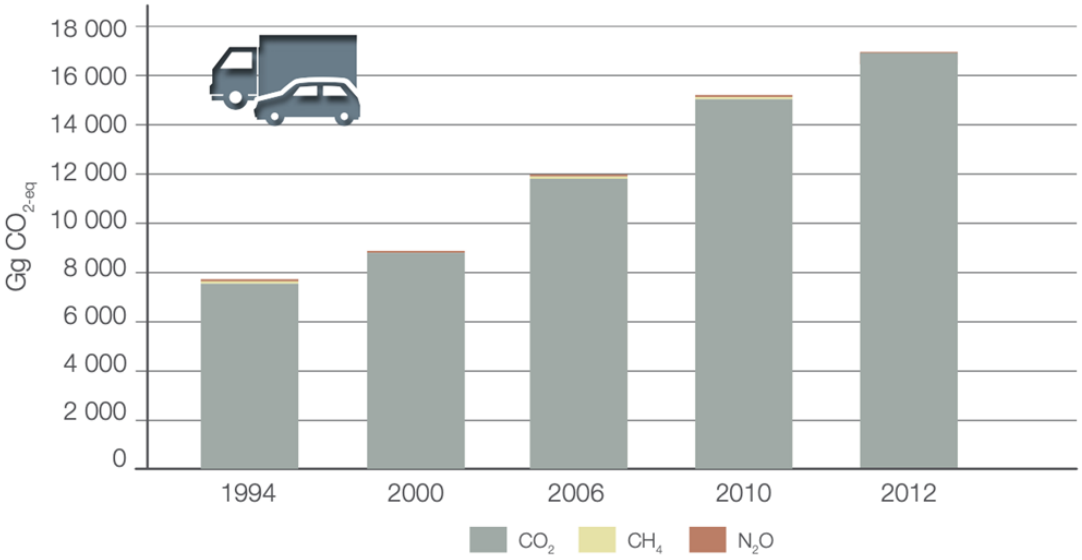
Furthermore, the National Energy Balance of 2019, shows that between 2009 and 2019, the CO_{2eq} emissions of the transport sector had an average inter-annual growth of 6.4%, more than three times the average for the entire energy sector (1.8% for the same period).[30][30] This growth is explained by the increase usage of diesel and gasoline, in turn resulting from the increase in the number of vehicles.[31][31] While the national inventory of GHGs does not include specific estimates by type of vehicle, the 2019 National Energy Balance[32][32] estimates that 46.8% of yearly energy consumption corresponds to heavy-duty vehicles, followed by light-duty vehicles (20.8%), private cars and SUVs (17.3%), taxis (4.1%), buses (3.7%) and others (1.7%). As all of these use a combination of diesel and gasoline, with a very small share of EVs (<1%), the emission profile by vehicle can be expected to follow a very similar pattern.

Figure 3. Evolution of GHG emissions in the energy sector, by sub-sector.**[33]**[33]



The following figure taken from the Third National Communication of Ecuador for Climate Change presents the growth of emissions due to transport between 1994 ? 2012, showing a permanent increase along the years.

Figure 4. Tendency of emissions of transport 1994 - 2012[34]



b. Administrative organization of Ecuador: central government and GADs

Before moving into the energy and the transport sectors, it is important to understand some general aspects regarding governance and competencies in the country. Ecuador is a unitary, decentralized, representative, and intercultural republic. The 2008 Constitution introduced a series of reforms that bring forward the role of planning and defines decentralization and deconcentration as central aspects of the State. In terms of decentralization, two of the key elements are i) the establishment of competences by level of government, and ii) the rationalization of the resource transfers in accordance with territorial and equity criteria that are objective, concrete, measurable and predictable. Recipients of these funds are the so called Decentralized Autonomous Governments (?GADs?, from its Spanish acronym), and their roles are regulated by the Organic Code for Territorial Organization, Autonomy and Decentralization (COOTAD, from its Spanish acronym).

Ecuador is divided into four regions: Coast, High-lands, Amazonia and Gal?pagos Islands; within these regions, 24 provinces exist, which in turn are divided into 221 Municipalities (GADs). The Metropolitan District of Quito is the most populous city in Ecuador with 2,781,641 inhabitants (2020)[35][35] representing 15.9% of the national population; distributed in 32 urban parishes (70% of the population) and 33 rural parishes (remaining 30%). It is located in the center of Ecuador, occupying a territorial area of 4,235.2 km2. Its status as political and administrative capital makes Quito a node of concentration of activities, regional articulation and national influence and representation.

The COOTAD and local laws (province and city ordinances) define the competences of each type of GAD (i.e. provincial, municipal, parishal). The COOTAD sets various types of competencies and established the Council of National Competencies to organize the decentralization process. Competencies may be exclusive (when only one government level retains full titularity) or concurrent (when titularity may belong to more than one government levels).[36][36] Thus, the central level retains exclusive competencies in the areas of defense, security, international relations and economic policy, health, education, planning at the national level, migration, protected natural areas, biodiversity,

national public companies, housing, natural disaster management and protection, energy resources and hydrocarbons, among others. Other topics (such as river basins management, planning at the local level, public services, transport and transit, among others) are delegated to GADs.

The decentralization process, however, is still an on-going effort that can pose political, administrative, and fiscal challenges[37][37], often depending on the capacities of each GAD, increasing the complexity of coordination of national policies.

c. General institutional framework of Climate Change in Ecuador

Article 261 of the Constitution gives the exclusive competency of natural resources to the Central Government. Mitigation and adaptation to climate change were declared as State policies, through Executive Decree No. 1815 of 1 July 2009. That same year, the Ministry of Environment approved the Ministerial Agreement 104, on 29 October 2009, in which it re-adjusted its organic structure for the creation of the Under-Secretariat of Climate Change (SCC), as the unit in charge of exercising the rectory on the subject, through various lines of action: mitigation, adaptation, vulnerability understanding, knowledge management / generation, understanding of the climatic phenomenon, capacity building in the subject, climate finance, among others.

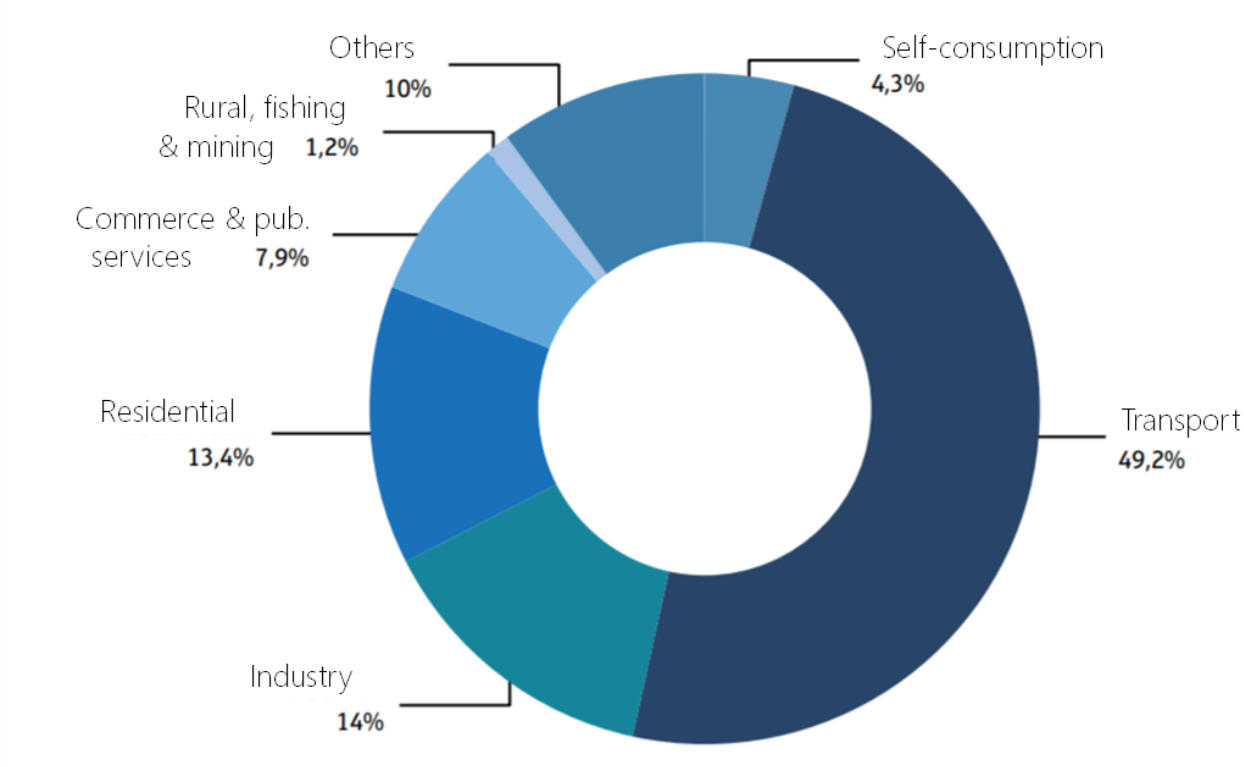
Based on Executive Decree No. 495 of 2010, Ecuador currently counts with a Climate Change Interinstitutional Committee (CICC acronym in Spanish), which, among other functions, has the role of coordinating, dictating, and facilitating the comprehensive execution of national policies relevant to climate change, the National Strategy for Climate Change, and the commitments assumed with respect to the application and participation in the United Nations Framework Convention on Climate Change and its instruments (discussed further below). Therefore, it has the responsibility of coordinating the National Climate Change Policy, that is, in climate adaptation, mitigation, and means of implementation. The CICC is currently comprised of the Ministry of Environment, Water and Ecologic Transition (MAATE, acting as the Chair of the Committee), and comprised by other ministries (transportation, energy, economy and finance, among others) and municipal, provincial and rural representatives. It has presented yearly Work Plans since 2018.

d. Energy and electricity

Primary energy

According to the National Energy Balance 2019, the primary energy matrix in Ecuador was composed of Oil (86.9%); natural gas (4.4%); hydraulic (6.8%); cane products (1%); firewood (0.8%) and other primary (wind, solar and biogas, 0.1%). The demand for energy in the country was 94 million of Barrels of Oil eq. (BOE) in 2019, which is 0.8% higher than the demand of 2018. The single largest energy demand came from the transport sector, accounting for 49.2% of the total. While oil is the dominant source in the primary energy matrix, renewables are dominant in the electricity generation matrix, presented and discussed next.

Figure 5. Primary energy consumption by sector.[38][38] Total consumption: 94 million BOE (2019)



The electricity sub-sector: governance and regulatory framework

According to the National Constitution of 2008, the State retains the right and obligation to manage, regulate, control, and arrange all strategic sectors, among which the electricity sub-sector is included. Electricity falls under the competency of the Ministry of Energy and Natural Non-Renewable Sources.

The Organic Law of the Energy Public Service (2015) regulates the sector. While the State is responsible for the generation, transmission, and distribution of energy, any of these can be delegated to the private sector. Nevertheless, it is important to mention that the distribution companies in Ecuador are formed by several shareholders, the majority coming from the public sector. While less than 3% of all generation is privately generated for self-consumption[39][39], new incentives given in the new Organic Law of Electric Energy Public Service (LOSPEE) and other regulatory changes expect a higher participation of the private sector in the generation of energy.

The entity responsible for the control and regulation of the energy sector is the Energy and Non-Renewable Natural Sources Regulation and Control Agency (ARCERNNR, formerly ARCONEL), which regulates the entire sector ? from generation to distribution. Ecuador has a ?unique price? policy per type of user, domestic or commercial, the time of day, and the region within the country. Prices throughout the chain (generation, transmission, distribution, and commercialization) are set annually by ARCERNNR[40][40].

The national grid: generation, transmission, distribution

According to the 2019 National Energy Balance, electricity is the largest source of secondary energy, accounting for 27% of Ecuador?s secondary energy production. In Ecuador, the generation mix is largely dominated by renewables. Electricity supply was 32,315 GWh in 2019, an increase of 66.7% compared to 2009, with an average yearly increase of 5.3%. In 2019, the energy matrix has a share of 76.3% hydro, 21.9% thermal and a 1.8% share coming from other renewables (biomass, wind, biogas and solar). It is important to mention that between 2018 and 2019 the hydro power generation had a growth of 19.3%, while the thermoelectric production was reduced by 11.9%[41][41]. The resulting carbon intensity of the national electricity matrix is 0.4509 kg/kWh[42][42], which is relatively lower than the global average.

Table 2. National interconnected system of Ecuador**[43]**[43]

Indicator	**Status (2019 data)**
Installed capacity	8,826.89 MW (nominal) / 8,182.58 MW (effective)
Peak demand	3,933.41 MW (April)
Renewable share of the generation mix (%)	78.10%
Transmission and distribution losses (%)	11.40%
Electrification coverage (% of total population)	97.05%

A large share of renewables is also expected for the future. According to Ecuador?s grid capacity expansion plan (the *Electricity Master Plan*), around 6 GW of new capacity will be introduced between 2021 and 2027, 81% of which will come from hydro power plants and other renewable sources.[44][44] Moreover, it is estimated that the country has an additional 13 GW of untapped hydro power capacity viewed as technologically feasible and cost effective[45][45]. This represents a great opportunity for the introduction of electric mobility, which will be largely powered by a clean grid. Thus, shifting from fossil fuels-based mobility to electric mobility can have a big impact in the reduction of GHG.[46][46]

Figure 6. Capacity additions expected for 2021 ? 2027 (total: 5,950 MW)**[47]**[47]

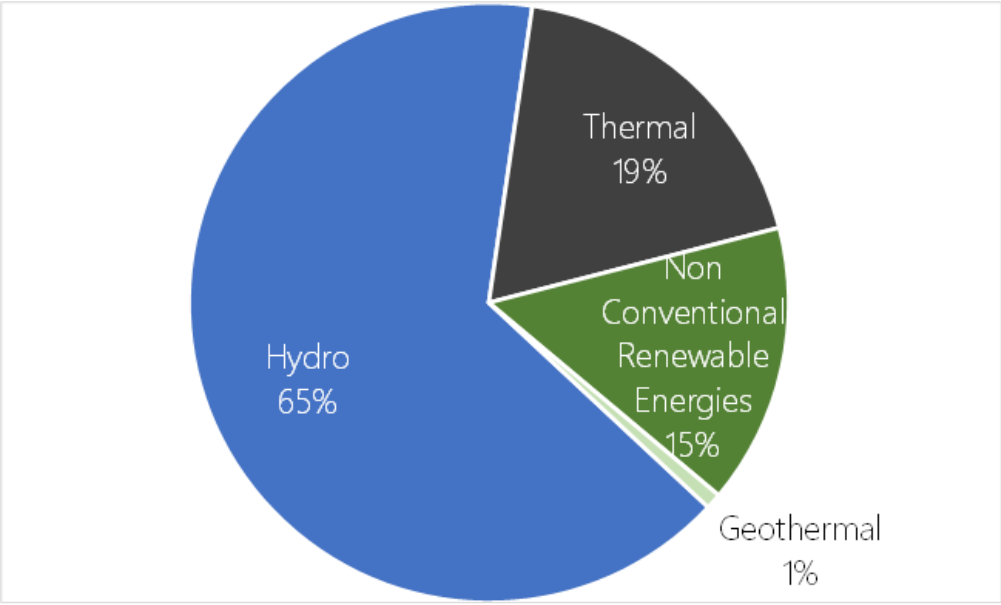
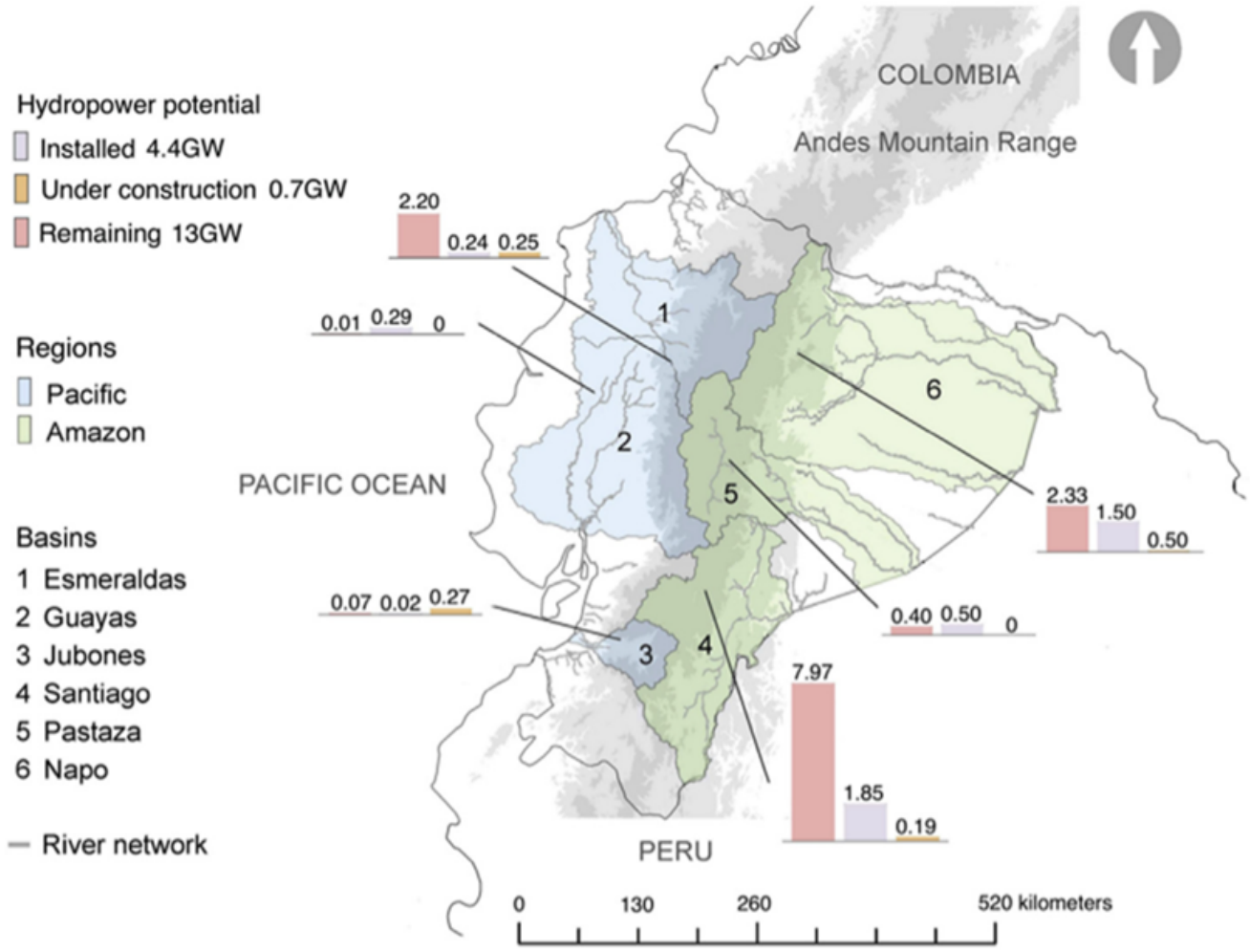


Figure 7. Ecuador's six major river basins and geographical distribution of the Government's assessment of hydropower potential[48][48]



The electricity service is provided through 10 distribution and commercialization companies[49][50], which cover the entire territory of the country and are mostly owned by the public sector. Concerning the conditions of the electric distribution grid, all the distributors have a 99% and 98% of stability and efficiency, which shows that the current EV users can charge their vehicles without a negative impact on the system; however, the Regulation and Control Agency of Energy and Non-Renewable Resources mentions that it is important to maintain the demand management restrictions in peak hours, and stability studies for the large-scale deployment of EVs are underway.[51]

Concerning the price, the electricity tariff in Ecuador is established by the Agency for Regulation and Control of Electricity in the National Price List, which is mandatory for all the distribution companies; it is classified in two main categories: residential and general (including several sub-categories according to the activity), and in three levels of voltage: low, medium, and high. This tariff can slightly vary from region to region (coast/Amazon/highlands). The tariff category for each consumer is

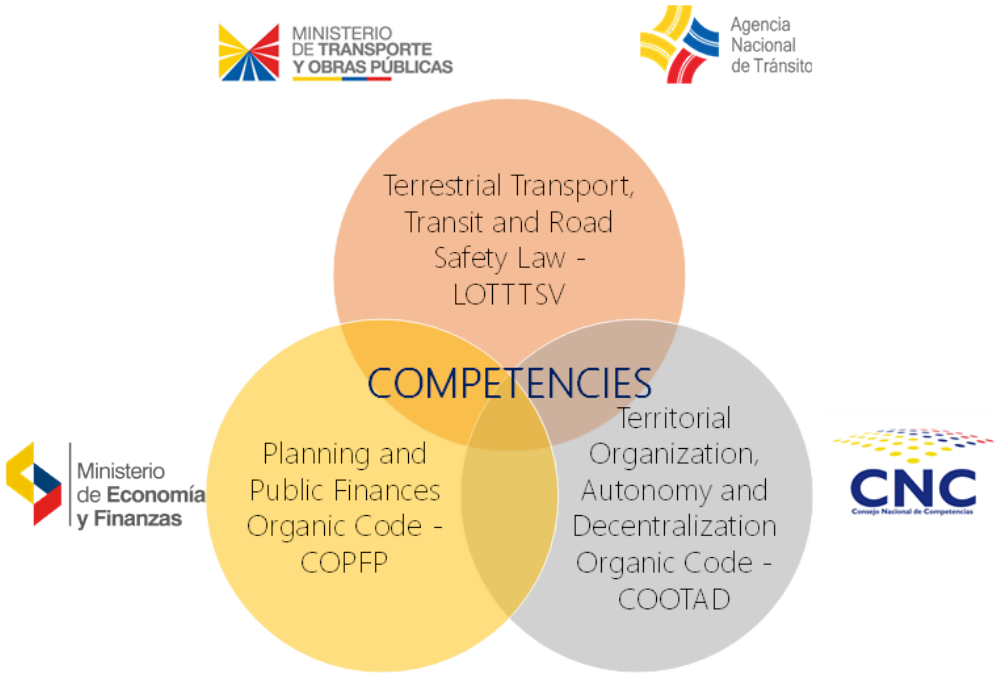
determined by each distributor according to the charging characteristics and use of energy; however, the monetary value of the tariff will respect what is stablished in the National Price List. As a reference, the low voltage (i.e. up to 500 V) residential tariff in 2021 was 0,105 USD/kWh. Depending on voltage and type of activity, the general tariff (including industrial and commercial usage) is generally below residential levels.[52][52]

e. The transport sector

Governance and regulatory framework

The regulatory framework in Ecuador results from the interaction of three pieces of legislation:

Figure 8. Main legislation and institutions involved in the regulatory framework of the transport sector



1. The Terrestrial Transport, Transit and Road Safety Law (LOTTTSV, from its Spanish acronym) sets the main regulatory framework and organization of the transport sector. It involves two main institutions: the Ministry of Transport and Public Works (MTOP, from its Spanish acronym), responsible for the general overview and to provide policies and guidelines of the entire transport sector, and the National Transit Agency (ANT), an autonomous entity responsible for the regulation and planning of the sector, in line with the policies established by the MTOP. It has full competence at the national and provincial level, but delegates authority at the cantonal (GAD) level, as described below.

2. The Territorial Organization, Autonomy and Decentralization Organic Code (COOTAD), which establishes the division of competencies across different governmental levels and has the National Competences Council as its main authority. The MTOP has established three competencies levels that can be assigned to the GADs according to their capacities. The simplest competency model (?model C?) transfers only the issuance of intra-cantonal transport permits; the most complete model (?model A?) transfers operation permits for private and public transport (i.e. issuance of licenses and operation permits), vehicle registration, technical revisions, and transit control.

3. The Planning and Public Finances Organic Code (COPFP), through the Ministry of Economy and Finances, assigns the relevant resources according to the delegated competencies, as each competency model has different budgetary implications.

Due to the complexity in the competences division, discrepancies occasionally arise between the national and local entities about the limits of action of each, making it difficult to implement national policies.

Moreover, there is no specific governance structure for electric mobility, as the latter poses specific challenges due to its cross-cutting nature, involving elements and competencies from different ministries - i.e. environment, transport, energy (renewables and non-renewables), and finance. An electric mobility institutional body involving the main ministries related to the topic (Transport, Environment, Energy) was promoted by the Vice-presidency between 2018-2020; however, due to the lack of institutionalization, it was discontinued following the change of authorities after the latest presidential elections, and no action plan or concrete roadmaps resulted from the previous work. Currently, ministries are considering to re-launch the idea through a sustainable mobility body or through a commission in the context of the National Policy for Urban Sustainable Mobility.[53][53] The need for a coordination body was also a central necessity identified in the proposal for a National Strategy for Electric Mobility (ENME)[54][54]; however, no concrete progress has yet taken place.

Fleet

Vehicles in Ecuador need an annual registration to circulate; this information is used to assess the fleet under operation in the country. The stock of circulating vehicles in Ecuador is presented in the table below.

Table 3. Composition of the fleet according to 2020 data**[55]**[55]

Type		Number of registered vehicles	%
Non-commercial	Automobile	1,135,501	42%
	SUV	572,374	21%
	Pickup	626,025	23%
Commercial	Truck	245,028	9%
	Bus	38,785	1%
	Van	60,538	2%

Total	2,678,251	100%

Note: ?trucks? includes light and heavy vehicles

Focusing only on automobiles, since 2010 there was a 79% growth for diesel cars, 86% for gasoline and an 85% overall growth. On average, in 2010-2019, the vehicle fleet grew at a yearly rate of 7.10%, considerably higher than the increase in population for the same period (1.57% according to the national census bureau[56][56]).

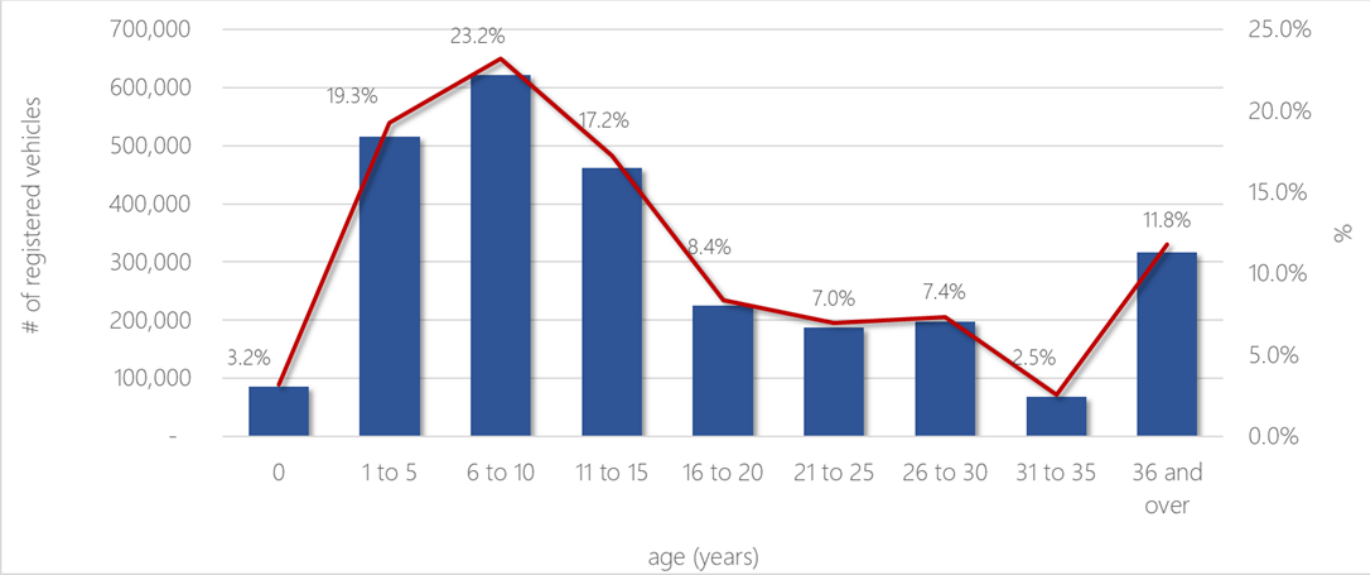
According to the National Association of Car Dealers, the average annual number of new vehicles sold in Ecuador in the last 10 years (2009 ? 2019) was 111,052[57][57], with a range between 63 and 132 thousand units. The vehicle fleet includes units from 26 different countries. China was the main provider of vehicles in 2019 with 21% of the share; this provider had important growth considering that in 2016 it represented only 5,2% of the sales. Other markets with an important share are Colombia, Korea, Mexico, and the European Union, with 15%, 12%, 9%, and 6%, respectively. Locally manufactured vehicles represented around 19% of sales.

It is important to stress that imports of used cars (of any kind) are not permitted in Ecuador.[58][58]

Fleet age

According to AEADE data, the average age of the fleet in 2020 is 15.8 years. Almost 55% of the vehicles in circulation are older than 10 years, and almost 28% of the fleet is older than 20 years.

Figure 9. Fleet age[59][59]



Electric vehicles and charging infrastructure

Electric vehicles still represent a tiny fraction of the vehicle market in Ecuador[60][60], as the country is only taking its first steps towards the transition to a cleaner, more sustainable model of mobility that is based on EVs. Sector information is not systematically compiled and published, and information about the development of electric mobility is still scarce in Ecuador. However, the Ecuadorian Association of Automobile Enterprises (AEADE) registered in their annual reports the sales of battery electric vehicles: 109 (2016), 123 (2017), 130 (2018), 103 (2019) and 106 (2020)[61][61], which is less than 0.11% of the sales for each of these years. In addition to this, since 2015, an average of 1,807 hybrid vehicles are sold. This means that 0.43% of the total fleet presented in Table 2 above is either hybrid or electric; and **only 0.02% of the fleet is entirely electric**.

Most of the electric vehicles introduced in 2019 were automobile (57%) and SUVs (23%), from the brands Dayang, Kia and BYD. Nevertheless, it is important to mention that in 2019 the first fleet of 20 electric buses was introduced in the city of Guayaquil; a similar trend was observed in 2020, when the first five light duty EVs were sold. [62][62]

Any vehicle produced, distributed, or imported in Ecuador needs to obtain a homologation certificate, which is issued under the responsibility of the National Agency of Transit (ANT) according to the ?Regulation for the General Procedure of Vehicle Homologation and Measurement Devices, Control, Safety and Certification of the Commercialization Vehicles? (2016). The company or owner needs to follow several administrative requirements, as well as to present a technical form (from the manufacturer in case of import for the analysis of the ANT. In the regulation mentioned before, the homologation of EV is also normed. The requirements are the same as for conventional vehicle, but additionally a certification of the battery (emitted by the responsible entity) needs to be presented. Nevertheless, the technical norms are still not defined for electric vehicles and the responsible entity to emit the certification of the battery is still not determined.

Concerning charging infrastructure, as of 2022 there are 59 charging stations distributed throughout the cities of Quito, Guayaquil, Cuenca, Loja, and the Galapagos Islands,[63][63] with a relatively even number of level 1 and level 2 chargers and only six fast (>50kW) chargers. This infrastructure is typically located in the retail shops of KIA and BYD, shopping malls and vehicle high transit areas.[64][64] The number of charging stations is extremely low in comparison to the 1,085 filling stations for conventional vehicles[65][65], and no charging infrastructure exist outside the main cities. This has been identified as a critical challenge for massive adoption of EVs, as this limits EVs to urban usage within the few cities with charging stations. It is also important to take into account that Ecuador has an unregular topography, which means that in cities such as Quito, located in the highlands, there are important hills which probably will consume more energy from the battery, and this issue has not yet been thoroughly assessed and understood. The battery autonomy under local conditions still needs to be studied and determined, in order to give users (and authorities) proper information to reduce range anxiety.

Figure 10. Charging infrastructure in Ecuador (December 2021)[66][66]

A general regulation for the provision of electric charging services to EVs has been recently issued: the norm ARCERNNR 003/20, *Model contract for the provision of energy charging services to electric vehicles* regulates the relationship between electricity distribution companies and firms providing charging services, as well as between the latter and end-users; a resolution for the regulation of maximum prices for end-users is currently being prepared by ARCERNNR. A proposal technical regulation establishing the technical and safety characteristics of connectors, chargers, wiring and battery for charging electric vehicles to protect the life and health of people and preserve the environment was drafted in 2017, but was not formalized.[67][67] Local regulations for charging infrastructure in apartment buildings, public institutions, and common spaces are also not available in the municipalities.

Pilot projects involving electric mobility

In recent years, a number of pilots involving electric mobility have taken place in Ecuador. Unfortunately, these have not always been successful, which resulted in increased perception of risks from the relevant stakeholders. The main pilots included:

? **Taxis in Loja:** One of the first projects concerning EV was the taxi cooperative using EVs in Loja, a small city in the south of Ecuador. Although the project started with high expectations, after some time the drivers were disappointed especially due to the short autonomy of the battery. The main lesson learned from this project was the need for a strong communication and stakeholder engagement campaign that would involve the drivers more actively in the project design, actively contributing towards the management of expectations.

? **EV in Galapagos:** Another pilot was recently promoted in Galapagos, thanks to a regulation from the Government that allowed the families to own ultra-compact electric vehicles.[68][68] While several brands manifested interest in this market, the population opted mainly for the cheapest vehicles, which had a shorter autonomy. This disappointed the population in the daily use and currently the population have the impression that EVs are not suitable for driving long distances or through hilly terrain. As a result, the National Government is still working to eradicate the myth of low autonomy that resulted from the Galapagos experience. As in the previous case, the lack of communication and education in e-mobility has affected its adoption in the country.

? **Electric buses in Guayaquil and Quito:** BYD created a partnership with the municipality of Guayaquil and Sausinc (local public transportation company) to implement 20 electric buses. In Quito, BYD also lent an electric bus to the municipality so they can pilot it as a first step for a potentially larger project. The buses and the electric charging stations are currently working, but since it is a relatively new project (2019) the medium- and long-term results are not yet visible. However, the main challenge faced by these projects has been related to the financial sustainability and difficulties in recovering costs through the existing transport rates. For example, in Guayaquil, electric buses require a rate of $0.35 per passenger per trip (as compared to the $0.30 rate charged by internal combustion buses), which generated opposition from users. [69][69] Discussions with the National Financing Corporation (CFN) and the Inter-American Development Bank (IADB) during the preparation of this document revealed that they were also facing similar challenges for structuring a $33 million credit line for electric buses and taxis (e.g. lack of financial closure at existing regulated prices for public transport).[70][70]

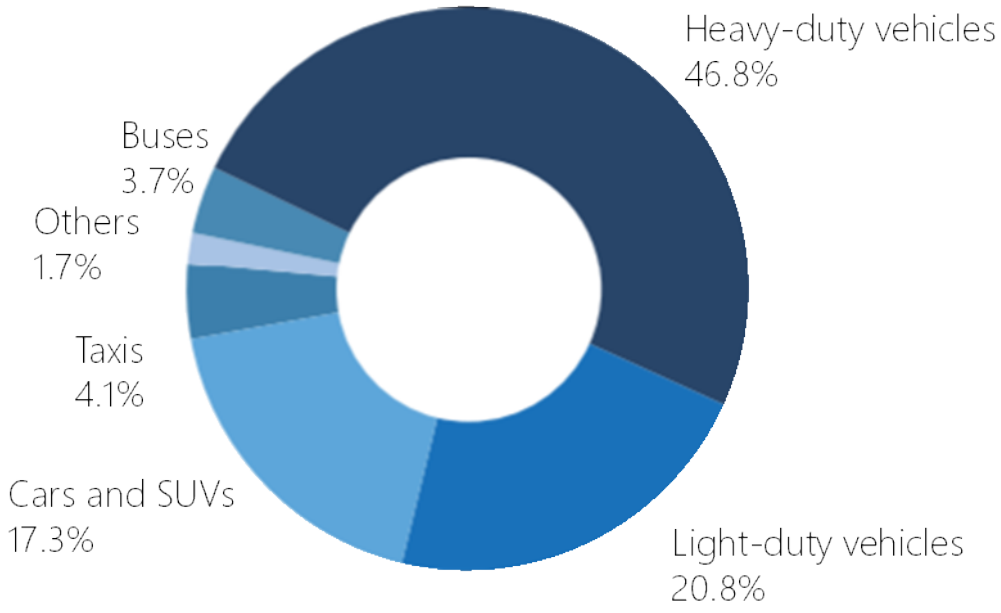
Thus, the main lessons learned involving recent pilots in the country include the need for stronger participatory processes, the requirement of additional technical assessment (and communication) of EV operation under local topography and the consideration of distributional aspects in the assessment of the social impact of a transition to e-mobility.

Fleet fuel consumption

Out of the 94 million barrels of oil equivalent (BOE) demanded in 2019 in Ecuador, 46 million were used by transport (gasoline and diesel). It is estimated that 94% of energy usage in the transport sector in 2019 was directed for road transport, nearly half of which was used by heavy duty vehicles (46.8%),

followed by light-duty vehicles (20.8%). While passenger vehicles demanded 47% of all the gasolines, heavy-duty vehicles used 74% of all the diesel.[71][71]

Figure 11. Energy consumption from the transport sector**[72]**[72]



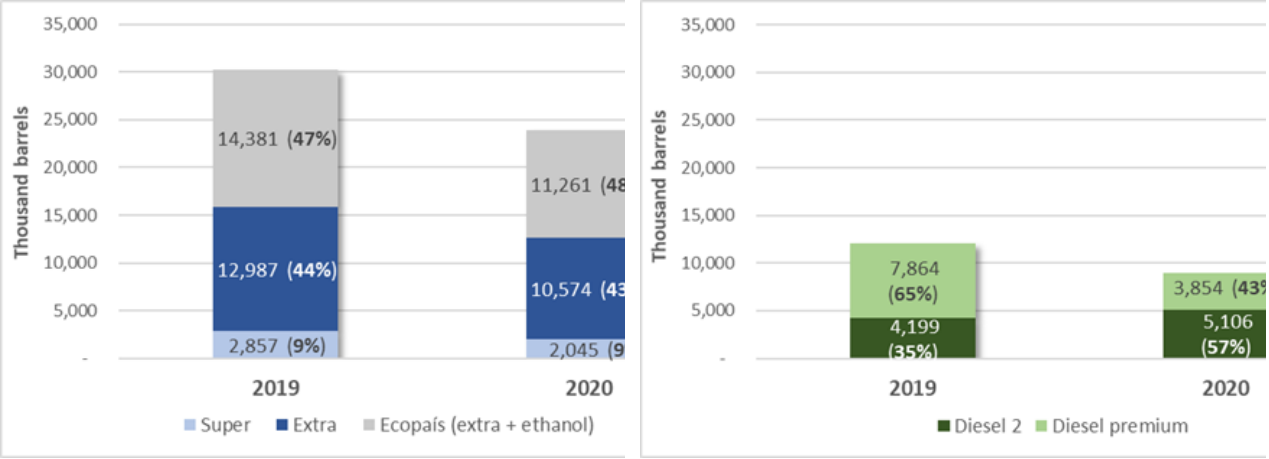
The energy source for the fleet is: 86.30% gasoline, 13.22% diesel, 0.45% hybrid, 0.02% electric and 0.01% liquefied petroleum gas (LPG)[73][73], being the higher consumption of gasoline due to individual transport (automobile, pick up, SUV and motorcycle) and of diesel due to low and heavy-duty transport. As seen from these figures, penetration of EVs in Ecuador is still at a very early stage.

Fuel quality and vehicle efficiency

As a result of insufficient domestic refining capacity to meet local demand, Ecuador is an importer of petroleum products, despite its production and exports of crude oil and petroleum liquids. In general, Ecuador exports heavy refined products, such as fuel oil, and imports lighter products, including gasoline, diesel, and liquefied petroleum gas (LPG). In 2020, national oil company and refinery Petroecuador imported 50.3 million barrels of derivatives (= USD 2,630 million) and exported 14.8 million barrels (=USD 485 million), resulting in a net deficit of USD 2,145 million[74][74]. Ecuador has three refineries: *Esmeraldas*, with the capacity to refine 110,000 barrels of oil per day, *La Libertad*, with a capacity of 45,000 and *Amazonas* which can process around 20,000 barrels per day. All of these are run by Petroecuador.

Ecuador has three types of gasoline: *extra*, *ecopa?s* (ethanol blend), and *super*, with the first two accounting for an estimated 91% of total sales.[75][75] *Diesel premium* was the main diesel sold in 2019, and a lower quality *diesel 2* (discussed below) was also commercialized; however, the cheaper *diesel 2* took the largest share of diesel sales in 2020 due to the impact of the pandemic.

Figure 12. Production of derivatives[76][76]: gasoline (left) and diesel (right)



In Ecuador, norms and standards are regulated by the Law of the Ecuadorean System of Quality (in Spanish ?*Ley del Sistema Ecuatoriano de la Calidad*?). The National Institute of Normalization (INEN) is the entity in charge of issuing standards for vehicle emissions and fuel quality. Technical regulations (RTEs) issued by INEN are mandatory, whereas norms (NTEs) and standards are voluntary unless they are made obligatory through a technical regulation. As per the Law of the Ecuadorean System of Quality, the Ministry of Production, Foreign Commerce, Investments and Fishing (in Spanish ?*Ministerio de Producci?n, Comercio Exterior, Inversiones y Pesca*?) is the entity in charge of approving RTEs and NTEs.

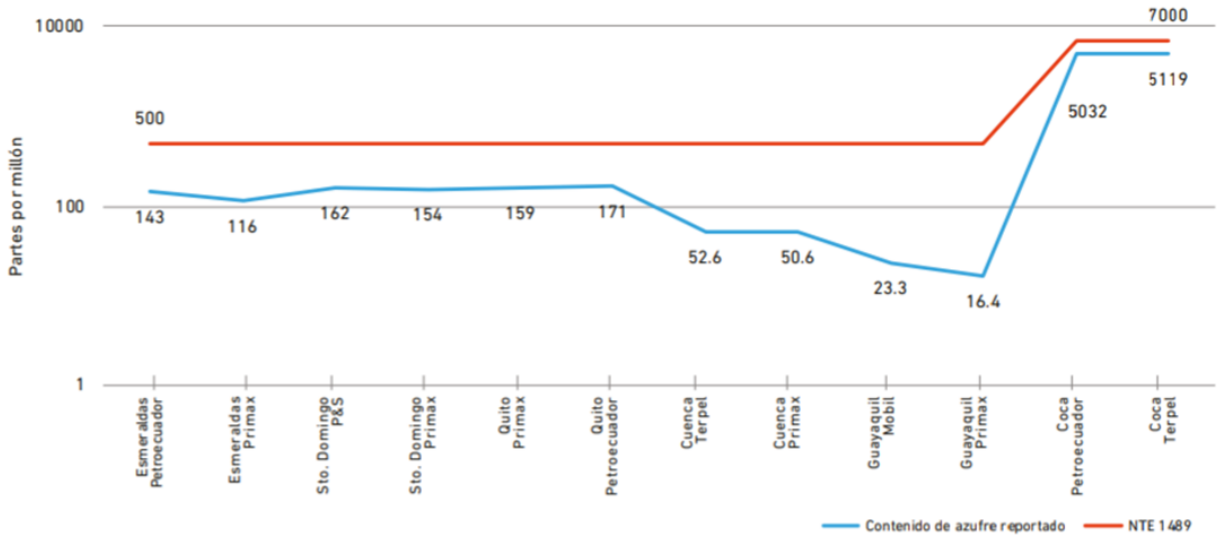
Vehicle emissions are regulated under the Technical Regulation RTE INEN 017, which made mandatory the limits established by the norms 2-204:2002 (gasoline engines) and 2-207:2002 (diesel engines). In 2017, RTE INEN 017 was modified to include limits equivalent to the Euro 3 standard for gasoline engines for vehicles imported and assembled in Ecuador, with no similar requirement for diesel engines.

While vehicles comply with Euro 3 and in some cases with Euro 4 standards, their efficiency is limited by poor fuel quality, among the lowest in the region.[77][77] As mentioned previously, Ecuador has three types of gasoline, *extra* (85 octanes), *ecopa?s* (85), and *super* (92), with the first two (i.e. low-quality) accounting for an estimated 91% of total sales.[78][78] *Diesel premium* is typically the main diesel sold (up to 500 ppm sulphur, with averages being reported between 350[79][79] and 150 ppm[80][80]); however,

in 2020 and due to the impact of the pandemic, low-quality diesel (*diesel 2*, with sulphur levels as high as 7,000 ppm) has taken the largest market share.[81][81]

Applicable fuel norms include NTE INEN 935 for gasoline, setting octane levels between 85 (for *extra* and *ecopa?s* gasolines) and 92 (*super* gasoline); and NTE INEN 1489 for diesel, which sets maximum sulphur levels to 500 ppm (with 7000 ppm allowed until December 2022 in some regions of the country ? see Figure 13 below). These norms are equivalent to the European requirements for fuels applicable during Euro 2 (1998-2000) in the case of diesel[82][82], while 91 octanes is the minimum requirement for gasoline since the Euro 3 phase[83][83] (2000 onwards). As no high-quality standards had been yet adopted in the country, in September 2020 the Government emitted Executive Decree 1158 and 1183 to improve the fuel quality in Ecuador to an equivalent to Euro 5 and allow for the importing of high-quality fuels by the private sector, creating a regulated (i.e. subsidized) and unregulated market. Moreover, a public-private partnership was announced to implement the investments needed to achieve this.[84][84] However, consumers are substituting the more expensive (i.e. unregulated) fuel with the cheaper (subsidized) one[85][85], and the contracting process for the improvement in local refining capacity is currently on hold following the change of national authorities after the presidential elections[86][86].

Figure 13. Sulphur content in diesel samples and NTE in force (March 2020 data)**[87]**[87]



Note: for the period December 2020 to December 2022, NTE 1489 authorizes the use of ?*diesel 2*? (7000 ppm) in the northern regions of Ecuadorean Amazon

Figure 14. Octane levels in *Extra* gasoline (samples taken in March 2020)[88]

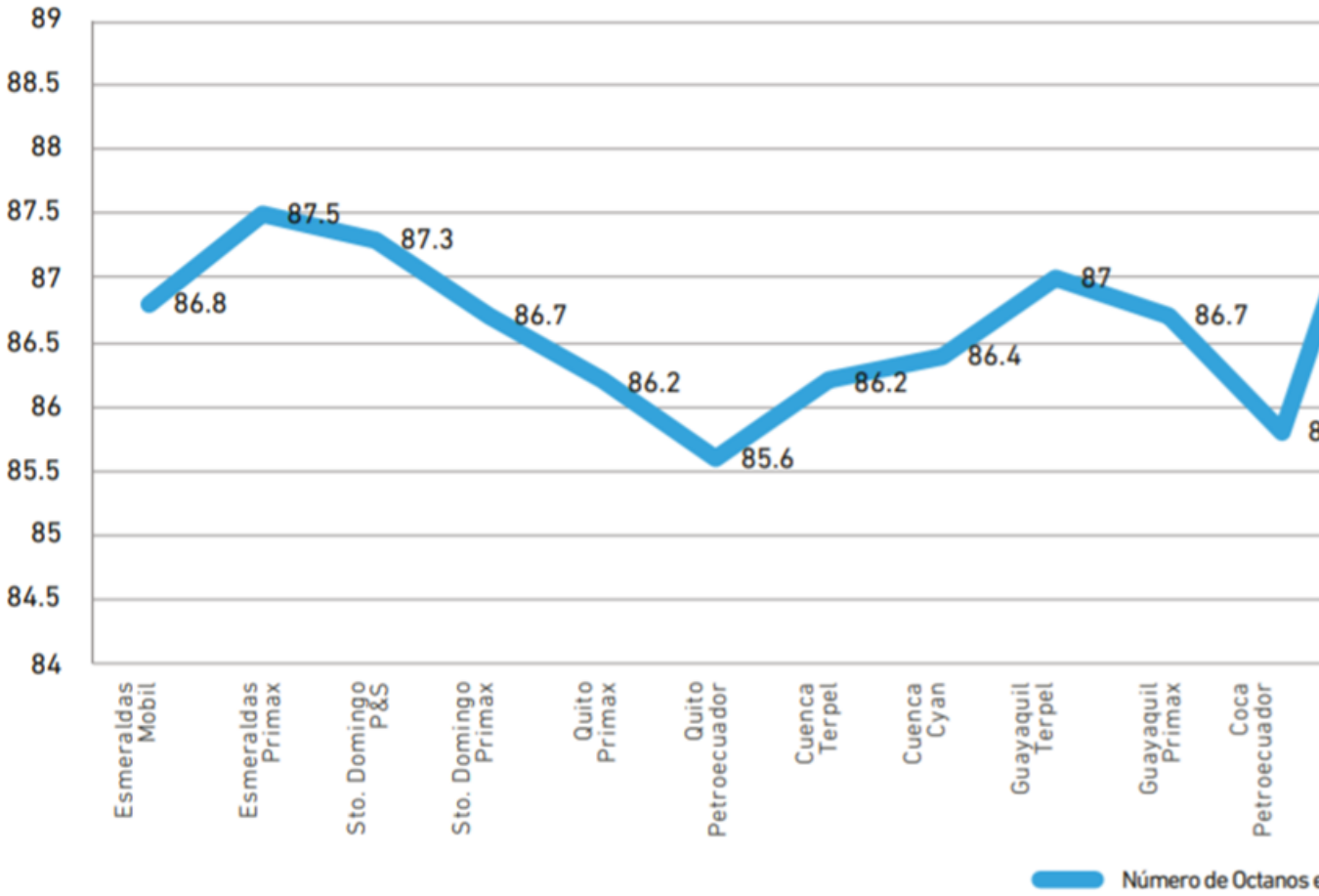
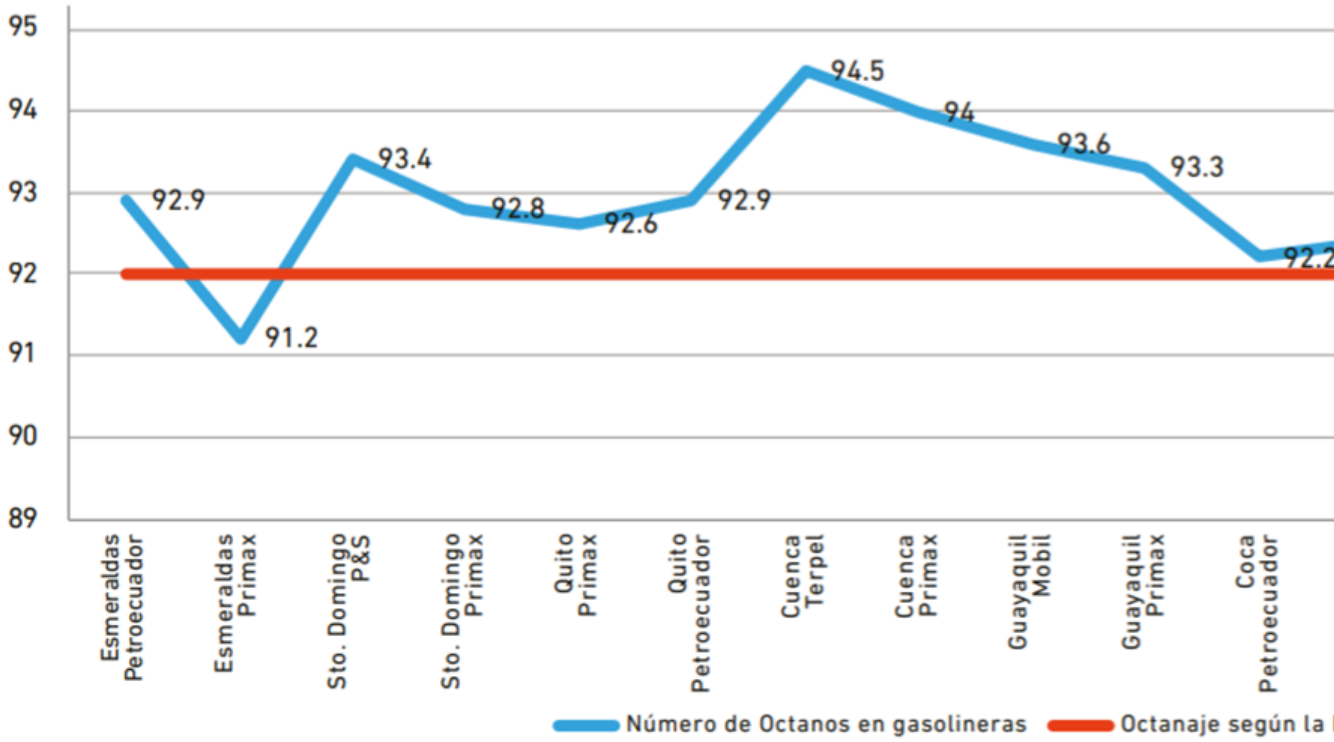


Figure 15. Octane levels in *Super* gasoline (samples taken in March 2020)[89]



Fuel prices and subsidies

As in most Latin American countries, fuel pricing in Ecuador is an extremely sensitive political issue. Ecuador has had a heavily subsidized fuel for more than 15 years. The government implemented a plan in 2019 to reduce the subsidy, which lead to a severe social crisis.[90][90] It is estimated that fuel expenses represent 25% - 30% of the total cost of ownership of the bus operation, which is the most popular type of transportation used in the country. Around 70% of these costs are subsidized by the government through the fuels? subsidy.[91][91]

As of July 2021, the only fuel that is not subsidized is the higher quality *super* gasoline, which only accounts for 9% of total gasoline sales in the country. Moreover, it is estimated that shifting to fuel qualities aligned with the Euro 5 standard could require a price increase higher than 20% compared to the price of *super* gasoline, and 77% compared to the price of fuels with the largest market share, *extra* and *ecopa?s*. [92][92] Fuel prices and subsidies are summarized in the table below. Ecuador prices are among the cheapest in the region, even when taking into account the price of *super* gasoline; this gap further stretches once it is taken into account that *extra* (i.e. 85 octanes) is the most widely used fuel in the country.

Table 4. Fuel prices 2021[93][93]

Fuel	Price (USD/gal)	Subsidy (%)
Extra	2.09	11%
Ecopa?s	2.09	18%
Super (92 octanes)	3.07	-
Diesel	1.52	39%

Table 5. Fuel prices in the region @ December 2021[94][94]

Country	USD/gal (95 octane fuel)
Peru	4.32
Colombia	2.22
Argentina	3.56
Brazil	4.46
Chile	4.59
Uruguay	6.00

Total cost of ownership

There are currently no official studies on total cost of ownership (TCO) in Ecuador. Moreover, no comprehensive bottom-up analyses that link TCO models to sectoral or even macro models have been yet developed. Hence, policies and incentives are set without a thorough understanding of how much of an impact these measures will have in the decision between an ICE and an EV. Similarly, the fiscal and distributive impact of such measures once e-mobility begins to take off are also ill understood.

Some TCO studies can be found in the academia; however, these have limitations. A 2019 study[95][95] considers a TCO gap between 25% to 31% (Table 5), depending on the inclusion of fuel and electricity subsidies (and including in all cases the tax exemptions for the purchase of an EV). This study considers the price of *extra* gasoline, which is likely to suffer significant variations once Ecuador improves fuel quality and reduces the fuel subsidies, something that is likely to reduce the TCO gap. On the other hand, the study does not consider a discount rate for future costs, which means that the TCO gap presented above is likely to be larger as EVs have higher up-front costs and lower maintenance costs. As shown in this example, studies available so far show (static) point estimates for specific market segments and apply deterministic input parameters, while in reality many of such inputs (e.g. fuel and electricity price, battery cost development, etc.) are uncertain or perceived as uncertain by the users.[96][96]

Table 6. TCO estimate for Ecuador (2019)[97][97]

	Gap

TCO @ 160,000 km	ICE (Aveo family)	EV (Nissan Leaf)	$	% ICE
with subsidies	27,661.20	36,245.90	8,584.70	31%
without fuel subsidies	30,573.20	36,245.90	5,672.70	19%
without fuel & electricity subsidies	30,753.20	38,592.53	7,839.33	25%

Public mobility

According to the National Transit, Transport and Road Safety Law, Public Transport is planned, managed, and implemented by Municipalities (GADs). It means that cities have the exclusive competence for public transport, through granting permission for the route and frequencies, after signing contracts with private companies or individuals. Intraprovince transport, in turn, falls under the competencies of the ANT.

Transport and mobility vary from city to city. Large urban centres such as Quito and Guayaquil have more developed systems, including trolley and trams, whereas smaller cities rely exclusively on buses. Ecuador?s first metro system is under construction in Quito, with commercial operation start expected for 2022.[98][98]

The traditional way to manage public transport is owner-operator (?*modelo hombre-camion?* in Spanish) in which each individual manages their own fleet and does not benefit from economies of scale. Standard buses for public transport include 12 meters-long buses which have specific arrangements in terms of safety and quality services, regulated by law. According to the National Transit Agency in Ecuador there are 303 private operators (companies and individuals) of public transport, and the total number of buses are 27,459. Of these units 74% are older than 5 years[99][99].

The public transport companies are approved by different permits according to its area of operation, as presented in the following table.

Table 7.Transport permits**[100]**[100]

Usage	Type of permit	Entity responsible for issuing permits
Private vehicle owners	Registration	Municipalities (GAD)
Private fleet owners for own usage	Authorization	National Transport Agency
Commercial (tourist operators, heavy & light load, mixed load[101][101]*, taxis)	Operation permit	National Transport Agency (intra- and interprovince, interregional) and Municipalities (intracantonal)

Public (collective and massive)	Operation contract	National Transport Agency (intra- and interprovince, interregional) and Municipalities (intracantonal)

Taxis are regulated by the local municipalities to receive a permit of operation and need to belong to a taxi company, while the driving permit is issued by the National Agency of Transit (as for all the users). A recent alternative to taxis is the online platform services as for example Uber. These platforms are used in the main/bigger cities of the country (Quito, Guayaquil, and Cuenca) but they are not legally registered as a company to perform a public transport. However, because of the comfort and security of the services many users opt regularly for this option; during the pandemic the users have increased as well as the drivers, who are looking for income options after losing their jobs in other sectors of the economy.

Other transport option is active mobility as bicycles. In small cities of Ecuador, users have their own bicycles to travel around the cities, although there are not proper bicycle roads on the streets. In bigger cities as Quito and Cuenca, a public bicycle system (bike-sharing) was developed; however, they are not having the best results. In the case of Quito, the system stopped working for almost three years due to the lack of resources and financial and institutional sustainability. While the municipality is analyzing a better system (private operation for example), the electric and normal bicycles from the old system are damaged and kept in a warehouse. Contrary, due to the pandemic the municipality built new ?emergency? bicycle roads in some streets to allow the mobility of the population.

Other innovative alternatives such as the e-scooter are not yet widely available and can only be found in limited areas within the biggest cities, such as Quito.

f. Policies and Strategies

National Development Plan 2021-2025 (?Plan Nacional de Creaci?n de Oportunidades 2021-2025?, PNCO)

At the time of preparing this proposal, the 2021-2025 National Development Plan was presented and adopted in Ecuador.[102][102] The PNCO (called ?*Plan Nacional de Creaci?n de Oportunidades 2021-2025*?, ?National Plan for the Creation of Opportunities 2021-2025?) is aligned to international commitments as laid out in the UN?s Agenda 2030 and its 17 Sustainable Development Goals, among which climate action is considered.

The PNCO establishes five strategic areas, and a total of sixteen objectives, as depicted below:

Table 8. Ecuador's National Development Plan (2021 - 2025)

Area	Objectives

Economy and job creation	1. Increase and foster, in an inclusive manner, job opportunities and improved working conditions 2. Promote an economic system with clear rules that encourages foreign trade, tourism, investments, and the modernization of the national financial system 3. Increase productivity and competitiveness in the agricultural, industrial, aquaculture, and fishing sectors, under a circular economy approach 4. Guarantee a sustainable and transparent management of public finance
Social	5. Protect families, guarantee their rights, erradicate poverty and promote social inclusion. 6. Guarantee free access to quality, integral health 7. Boost capacities in the citizenship, and promote innovative, inclusive, and quality education in all levels 8. Create new opportunities and welfare for rural areas, with emphasis in the people and nationalities
Integral security	9. Guarantee the safety of the citizens, public order and risk management 10. Guarantee national sovereignty, territorial integrity and State security
Ecologic transition	11. Preserve, restore, protect, and make sustainable use of natural resources 12. Promote sustainable development models, applying climate change adaptation and mitigation measures 13. Promote an integrated management of water resources
Institutional	14. Strengthen the State?s capacities with emphasis on the administration of justice and efficiency in control and regulation, with independence and autonomy 15. Foster public ethics, transparency and anti-corruption efforts 16. Promote regional integration, strategic insertion of the country in the world and ensuring the rights of people migrants

National Climate Change Strategy (ENCC) 2012-2025

The National Climate Change Strategy (ENCC) 2012-2025 is the management instrument that guides and dictates the actions and measures that Ecuador needs in order to face the impacts produced by climate change, including gender as a cross-cutting topic. [103][103] The strategy acts as an integrating element of the different sectors, which guides concerted, orderly, planned and concurrent action. Sectors and areas prioritized by the ENCC are: 1) food sovereignty, agriculture, livestock, aquaculture and fisheries; 2) productive and strategic sectors (e.g. energy, of which transport is the main emitter); 3) health; 4) water heritage; 5) natural heritage; 6) human settlements. Priority care groups[104][104] and risk management are defined as cross-cutting topics.

Nationally Determined Contribution

In March 2019, Ecuador presented its first NDC to the United Nations Framework Convention on Climate Change (UNFCCC). In its NDC, the country aims for a reduction of 9% of GHG emissions in

an unconditional scenario (all the strategies that can be taken without external sources of financing) and 20.9% in a conditional scenario (all the strategies that need external sources of financing), in both cases up to 2025 and without taking into account the LULUCF sector. With national decree 840 of August 2019, the NDC was stablished as a national policy from 2020 onwards.

The actions proposed for transport are described below:

- Unconditional scenario: transport is included in the mitigation actions under the energy sector. The proposed action is to foment and implement a sustainable mobility through an efficient public transport. Specific actions include the Metro of Quito (in the final stages of implementation, expected to be operative in 2022) and the Tram of Cuenca.

Conditional scenario: develop and implement a safe and sustainable transport system through Nationally Appropriate Mitigations Actions (NAMA) for duty and passengers transport (see box below).[105][105] Nationally Appropriate Actions identified for the transport sector include mitigation actions in freight transport and logistics, including through the renewal of fleets. Passenger transport mitigation measures include energy efficiency improvements (including fiscal incentives and incentives to non-motorized transport), urban planning and traffic management, and promotion of efficient driving.

National Plan Towards Decarbonization (under development)

The plan is a long-term climate change management tool, which will define the roadmap to reduce Greenhouse Gas (GHG) emissions in different sectors of the economy and promote a just, ecological and sustainable transition up to 2050. The project is led by the Ministry of the Environment, Water and Ecological Transition, with the financial administration of the Sustainable Environmental Investment Fund (FIAS), and the technical cooperation of the French Development Agency (AFD). It is being developed through a participatory process, and its aim is to identifying changes required in existing legislation and policies, as well as providing guidelines for updating the NDCs. This will be the basis of long-term development strategies.

The National Plan Towards Decarbonization (PND, formerly known as Mitigation Plan against Climate Change, PLANMICC) includes six thematic focus areas:

1. Energy transition, including a transition to sustainable mobility.

2. Transition towards sustainable farming and forestry systems.

3. Transition towards sustainable use of natural resources.

4. Transition towards a circular economy.

5. Economic and fiscal transition to support decarbonization.

6. Technologic and educational transition required, including through the mainstreaming of gender, intercultural and intergenerational aspects.

The plan is expected to be finalized in the end of 2022 / beginning of 2023.

Electricity Masterplan

The Electricity Masterplan prepared by MEyRNNER (Spanish Acronym for Ministry of Energy and Non-renewable Resources) is a 10-year grid capacity expansion plan which sets the planning framework in an integral way and considering all the sectors. It sets a working strategy for the channeling of investments that guarantee a normal electric energy supply at the national level through the development of generation, transmission, and distribution projects in the short, medium and long term, as stablished by the Organic Law of Electric Energy Public Service (2015).

The masterplan shares relevant information about the evolution, development, sustainability, and expansion of the Ecuadorian electric sector. The plan foresees the incorporation of three transport projects: the first line of Metro and cableway in Quito and the Tram in Cuenca, and it also considers the incorporation of electric vehicles. In total the plan projects a total demand of 34 MW in 2027 due to electric mobility[106][106].

At the time of preparing this project document, a 2050 National Energy Plan (?*Plan Energ?tico Nacional*?, PEN 2050) is under development by the Ministry of Energy and Non-Renewable Natural Resources funded through a loan provided by IADB. The resulting plan will provide the basis for subsequent versions of the electricity masterplan beyond 2027.

National Plan for Energy Efficiency (PLANEE) and Organic Law of Energy Efficiency (LOEE)

The National Plan for Energy Efficiency 2016 - 2035 (PLANEE) is a public policy tool, emitted in 2017 to introduce various energy efficiency measures aimed at a progressive substitution of fossil-fuel, high environmental impact power plants with low carbon technologies and renewable sources.

PLANEE is built around improvements in terms of six main pillars: 1) Legal and institutional framework, and access to information, 2) Residential, commercial and public demand, 3) Industrial consumption, 4) Transport, 5) Self-consumption of the energy sector and 6) Galapagos. The transport pillar has the main objective to reduce the energy intensity in the transport sector. To achieve this, the PLANEE plans to optimize infrastructure for the circulation of transport (i.e. resulting in improved vehicle efficiency), to replace inefficient transport technologies (energy labelling and workshops in efficient driving techniques) and fuel switch (i.e. improving fuel quality and introducing new technologies, such as hybrid and electric vehicles). Together with the partial replacement of fossil fuels with biofuels, the implementation of new technologies and the improvement of fossil fuels quality, this plan is expected to reduce the equivalent of 191.9 million BOE (out of a total of 339.6 million) until the year 2035.[107][107]

In March 2019, the National Assembly, published the Organic Law of Energy Efficiency (LOEE), which adopts PLANEE as an official and mandatory policy for the public sector and indicative for the private sector. The LOEE sets the logistics, freight and passenger transport as a priority for the introduction of efficiency measures, including through electrification. It also sets the requirement of a scrapping plan for vehicles in the transport sector at the end of their lifetime. Lastly, it establishes the requirement that, starting in 2025, all new vehicles introduced for urban transport of passengers (i.e. buses and taxis) have to be electric.

While the PLANEE and the LOEE constitute one of the most relevant policy measures for the energy sector (including the transport sub-sector), they do not include concrete strategies, roadmaps, and financial alternatives for its instrumentation.

Proposal for a National Strategy for Electric Mobility (ENME)

In March 2021 a proposal for a National Strategy for Electric Mobility for Ecuador (ENME, for its acronym in Spanish) was prepared by a team of international consultants financed by the IADB in coordination with the Ministry of Transport and Public Works and other relevant stakeholders, and with the objective to contribute to the decarbonization and sustainability of the road transport, including a detailed list of recommended & necessary actions for the transition.[108][108]

This strategy proposes three stages of development: an early growth stage from 2020 to 2025, contemplating the inclusion of 10,000 EVs; a consolidation stage between 2025 ? 2030, where 100,000 additional EVs are to be integrated; and a mainstream phase between 2030 and 2040, with the introduction of 750,000 EVs (i.e. for 2040 60-70% of the public buses will be electric, 55-60% of the taxis, 30-40% of the low duty transport and 20-25% of the light vehicles). The implementation of the mainstreaming of electric mobility can potentially reduce the CO_2 emissions by an amount of 16.5 million tCO_2e between 2020-2040.[109][109]

The proposal for a strategy includes a list of recommended actions, as summarized in the table below:

Table 9. National Electromobility Strategy Actions**[110]**[110]

Area	Identified gaps / recommended actions (examples)
Governance	Strengthening of coordination, creation of committees at the local (GAD) level, promote mechanisms to ensure continuity of coordination efforts
Public policy	Adoption of targets through an electromobility law, regulation of the Energy Efficiency Law, development of mechanisms for tariff and route concessions to promote the electromobility in the public transport.
Incentives	Setting of segment-specific incentives, incentives for charging infrastructure, elimination subsidies for fossil fuels, creation of vehicle replacement programmes.
Financial programs	Credit lines with soft conditions for fleet electrification, charging infrastructure, and individuals EVs.
Standards and technical regulations	For security, charging infrastructure, vehicle efficiency and components.
End of life programmes	Norm the extended responsibility of producers for the battery management, extend the existing norms for the distribution of electricity.
Charging infrastructure	Planning of a charging network, definition of standards for electric vehicle charging infrastructure and its components, as well as regulation models for the installation of charging infrastructure in public and private buildings at the GAD level.

Capacity building	Technical and professional programs, training for decision makers, research and development.
Communication strategies	Citizen?s awareness of the electromobility benefits, design of communication strategies for experiences and monitoring of pilot projects.
Dialogue and participation	Strengthen the communication between key actors.
Monitoring, evaluation and dissemination.	Define a scheme for monitoring, evaluations and dissemination of each activity of the strategy.

The proposal for the strategy has been socialized with public institutions identified as key actors by the Ministry of Transport and Public Works. However, it is important to mention that the targets (in particular, those up to 2025) have been unfeasible and have not been officially adopted (i.e. are not legally binding). Moreover, no specific entity exists to develop, assess, instrument and implement its numerous recommendations, which are cross-cutting in nature, involving different competencies at the national and sub-national level. Moreover, the implications at the technical (i.e. grid), environmental and socioeconomic levels of the proposed transition have not been identified nor estimated to date. While this proposal has not been officially adopted, it provides a valid list of actions that are required in the medium to long-term for the development of e-mobility. As will be shown later in this document, many of the actions to be undertaken by this GEF-7 project are resulting from the list of actions needed included in the proposal for a ENME.

National Policy for Urban Sustainable Mobility (under development)

Among its specific objectives, the following are of direct relevance for the development of e-mobility:

- Through funds provided by the EUROCLIMA+ programme[111], and with the technical assistance of AFD, the MTOP is developing a National Policy for Urban Sustainable Mobility (PNMU, from its Spanish acronym). The objective of the PNMU is to establish strategies and actions to be implemented in the different urban areas for sustainable urban mobility, including passenger and goods transport. It focuses on three pillars: i) Governance and capacity development, ii) mobility planning, financing, equity and accessibility and iii) technological changes and innovation.
- Develop public mobility policies that guarantee all people, regardless of gender, social status, age, or disability, equitable and quality access to mobilization opportunities.
- Develop the structure of the regulatory framework so that the policies developed in the PNMU can be implemented.
- Establish a roadmap for this process, which should prioritize activities and delimit a schedule, budget, and financing strategy.
- Group GADs into three categories based on their requirements, needs, characteristics and projections, based on the competency transfer process dictated by the Organic Code for Territorial Organization, Autonomy and Decentralization (COOTAD, from its Spanish acronym).
- Develop policies and programs that optimize the operation of transport and logistics of urban cargo.

●- Generate manuals for the implementation of these strategies and policies in the GADs

●- Generate general technical guidelines and basic indicators for GADs to build their local sustainable urban mobility plans.

●- Define the budget and financing strategy for the implementation of the measures.

●- Develop mechanisms and economic incentives for the implementation of sustainable mobility.

The policy is expected to be adopted (through an Executive Decree) in the first half of 2023.

g. Incentives for the promotion of Electric Mobility

So far, existing incentives for the introduction of EVs have been uncoordinated and ad-hoc, which reflects mainly in the very low number of EVs in circulation. The following table summarizes the main incentives that have been used in the country to stimulate the introduction of e-mobility:

Table 10. Incentives for the Introduction of EVs

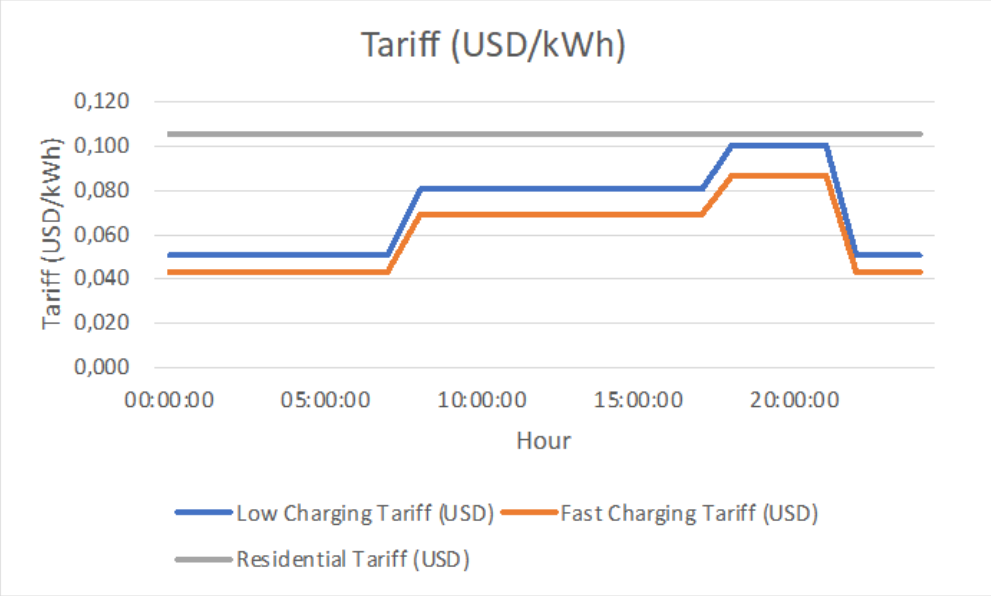
Name	Type	Year and status	Description
Zero customs tariffs for electric vehicles, batteries, and electric chargers (national)	Customs incentive (national)	2019 (standing)	Foreign Trade Committee through Resolution 016-2019
Zero taxes (VAT) for electric vehicles, batteries, and electric chargers (national)	Fiscal Tax (national)	2019 (standing)	Law for the productive sector improvement, investment attraction and improve employment and Fiscal Balance
Guayaquil Municipal incentives for deployment of electromobility	Charging, tax and financial incentives (municipality of Guayaquil only)	2020 ? 2030 (or sooner if the transport fleet is renewed with EVs earlier)	Reformatory ordinance to the ?Incentive ordinance for the electric transportation?.[112][112] Consists of USD 4,000 for taxis and USD 15,000 for buses within the municipal district for the scrapping of old vehicles and their replacement for new electric ones in transport cooperatives providing service in the municipality. Also states reductions in municipal taxes for institutions installing charging points for EVs.

Electric Buses exclusive financial product (national)	Preferential Credit (national)	2019 (standing)	National Development Bank (CFN) provides a credit of 7.5% of interest.
Reform to the Terrestrial Transport, Transit and Road Safety Law (LOTTTSV)	Various incentives for the promotion of electric mobility (national; however, requires action by the municipalities)	August 2021 (standing)	Introduces various requirements at the GAD level, including: - Creation of incentives for EVs - Exemption for EVs from vehicle restrictions - Exemption from parking fees in areas administered by the respective GADs - Preferential parking lots for EVs - Requirement of distinctive plates for EVs
Special EV tariff (requires installation of dedicated meter)	Electricity price (national)	2020 (standing)	Discount in electricity tariff for EVs (see Figure 16 below)

A nation-wide tariff scheme for electric vehicles was adopted in 2020 for any user who installs a dedicated meter for EV consumption, providing a significant discount (depending on the hour) compared to the regular (fixed) price for residential use for consumption between 351 and 500 kWh, as shown in the figure below. [113][113] However, the low adoption of EVs implies that the beneficiaries from this scheme are still marginal[114][114]; moreover, it is not clear how the different utilities throughout the country will be able to sustain these incentives (technically and financially) once e-mobility starts picking up pace.

While the incentives summarized in Table 10 are aiming in the right direction, there is still plenty of uncertainty from a general equilibrium point of view, i.e., regarding how these benefits impact the user?s perception and estimates of total cost of ownership, and in terms of the fiscal sustainability of GADs, the central government, and the utilities. Moreover, most of these incentives are recent and uncoordinated, and their cumulative effect is ill-understood due to the lack of a rigorous total cost of ownership model, as discussed previously in this section. Ultimately, as shown in the ?fleet? sub-section, the impact of these incentives in terms of EVs sold has been very small.

Figure 16. EV Charging Tariffs 2020**[115]**[115]**[116]**[116]



h. Existing financing available for EVs

Finance for (conventional) vehicles is widely generalized, with a reference interest rate around 14% - 17%. A few financial institutions have developed products aimed at clients interested in the purchase of light EVs, offering more attractive conditions, as depicted in the table below:

Table 11. Financial Options for Acquisition of EV[117]

Entity	Private Vehicles	Taxis	Buses for Public Transport (private companies)	Buses for Public Transport (municipal)	Interest Rate
National Financial Corporation (CFN)			x		7.5%
BanEcuador	x	x			12%
Pacific Bank	x				12.50% - 13.50%
Private banks	x	x			10.5% - 17%

Concerning public transportation, international cooperation is supporting credit lines for the acquisition of taxis, buses and charging infrastructure at lower interest rates; such is the case of the IADB through the National Financial Corporation (CFN), depicted in the first row of the table above.

However, electric vehicle owners point that these financial conditions and the benefits in regulations still don?t allow to overcome the bigger investment require for an electric vehicle, especially in buses, where tariffs are fixed by the government and diesel is highly subsidized. Therefore, these soft financial conditions have not yet materialized into an increase in the number of EVs.

i. Commercialization methods

Car purchases can be perceived as a big commitment, especially when it comes to new technologies. However, in Ecuador, fleet owners intending to renew their vehicles need to rely on traditional purchases. Alternative models that are widely used in other countries -such as leasing- are not currently used in Ecuador. Moreover, innovative business models such as subscription systems are entirely non-existent. Only renting (i.e. short term) is slowly gaining traction among businesses in Ecuador. It is estimated that renting companies have a fleet of 7,000 units including automobiles, trucks, SUVs, and light commercial vehicles.[118][118] None of these are electric.

A temporary lease gives businesses the time they need to fully get to know the vehicle, improving the perception towards the technology. In the case of EVs, this would provide plenty of time to help drivers dispel any worries, become accustomed to the technology, and see how accessible and easy charging can be. Moreover, a leasing model allows businesses to access vehicles for a fraction of the price of a purchase, and without increasing the debt-to-equity ratio in the companies? balances, transferring the risk of asset depreciation to the service providers. Depending on the legislation, leasing models can also offer tax incentives as they can reduce the income tax base. Some countries are even including explicit tax benefits for the lease of EVs, given their positive effect in terms of GHG emissions.

Likewise, subscription models are becoming increasingly popular in other countries in Latin America, and these innovative models are contributing towards the reduction of barriers for the uptake of electric vehicles on behalf of individual users.[119][119] [120][120]

In Ecuador, two main norms regulate leasing contracts: the Code of Commerce, and the Organic Law of Internal Tax Regimes. An additional legislation (i.e. the Terrestrial Transport, Transit and Road Safety Organic Law, LOTTTSV, from its Spanish acronym) poses additional restrictions limiting the usage of vehicles that are not directly owned by the respective businesses or individuals. Among the reasons reported for the lack of usage of this alternative acquisition method, the most common include its high administrative burden, incomplete legislation, lack of fiscal incentives[121][121], and cultural barriers.[122][122]

j. Environmental aspects

Air quality**[123]**[123]

Since 2009, Ecuador has implemented successive phases of the "Air Quality Program" (*Programa de Calidad del Aire*), which proposes the establishment of an air quality monitoring network in populations of more than 150,000 inhabitants that allows to have air quality data analyzed regularly and efficiently, as well as to define, prioritize and adjust both the policies and the air quality management measures required in the improvement of the quality of life of the population.

As in most countries in Latin America, in Ecuador problems related to outdoor air pollution exist mostly in cities. Major sources include dense urbanization along with a bulky car fleet, energy production and industrial activities. Currently, it is not possible to assess with certainty the situation related to air pollution across the country, because ground-level data is only measured in a few places. However, data for cities such as Quito and Cuenca indicate moderate air quality.

Quito is a city close to the zero parallel, located at an altitude of 2830 meters above sea level. Due to its high location, the city has less oxygen in the air, resulting in less efficient combustion. In addition, it is surrounded by volcanic mountains that prevent optimal wind circulation and high levels of sunlight favor the formation of ozone at ground level. The main source of pollution in Quito is vehicular traffic and combustion. Buses and other diesel vehicles, often old and maintenance-free, are the main contributors to air pollution, as the use of low-quality diesel emits heavy metals. Between 2008 and 2018, the average level of PM2.5 in 24 hours did not exceed the recommended national standard, although it did exceed what was recommended by the World Health Organization (WHO); in contrast, the average annual level of PM2.5 exceeded both national and WHO standards. In the city of Cuenca, the WHO guidelines for PM10 and PM2.5 were exceeded, especially in the oldtown. Additionally, ozone levels exceeded national and WHO standards. As in Quito, vehicles are the main source of air pollution in the city of Cuenca.

Waste Management

The same constitutional framework that sets the transport competences for municipalities, stablishes as an exclusive responsibility of municipalities the provision of public services of drinking water, sewage, wastewater systems, solid waste management and environmental sanitations.

The Ministry of Environment, Water and Ecologic Transition is the authority responsible for planning, regulating, and coordinating the National Decentralised Systems of Environmental management, as determined in Ecuador?s Organic Environmental Code (?*C?digo Org?nico del Ambiente*?, COA), which adheres to the principles of extended producer responsibility (EPR) in its article 233. Environmental legislation applicable to the disposal of waste is consolidated in the ?Unified text of secondary legislation for the environment? (Executive Decree 3516). As in other countries in the region, solid waste streams can be categorized as urban solid waste, special treatment waste, or hazardous waste, as shown below.

Table 12. Waste types in the Ecuadorian legislation

Type	Definition
Urban solid waste	Any solid waste (domestic, commercial, industrial) that is not defined as a special treatment waste stream or a hazardous waste.

Special treatment waste	Non-hazardous waste that requires special management due to their nature, the volume of generation and / or difficult degradation and for which a recovery, reuse and / or recycling system must be implemented in order to reduce the amount of waste generated, avoid its improper management and disposal, as well as the oversaturation of municipal landfills. Waste streams included under this category are determined through national lists issued by the environmental authority.
Hazardous waste	Waste resulting from a process of production, transformation, recycling, use or consumption and containing any substance that has corrosive, reactive, toxic, flammable, biological-infectious and/or radioactive characteristics, which represent a risk to human health and the environment, as well as any additional wastes included in the national listing of hazardous waste;

Vehicles at the end of their useful life poses unique challenges as it involves all three categories of waste. Lead-acid batteries, lubricants, gases from the air conditioning systems and other elements fall under the category of hazardous waste; other elements such as used tires and electronic equipment are listed among the wastes requiring special management. The remaining elements can be considered scrap and receive the same treatment as regular urban waste, requiring a process to recover, reuse and recycle any valuable materials, and also to avoid the saturation of landfill sites.

While specific regulations exist for some elements that are relevant for vehicles (e.g. lead-acid batteries, used tires, and electronic equipment), there is no consolidated legislation that tackles the issue in an integrated way, considering all the aspects involved in the environmentally-sound handling of end-of-life vehicles. Moreover, the introduction of EVs will bring additional challenges, such as the disposal of lithium-ion batteries.

Ad-hoc scrapping campaigns were undertaken between 2008 and 2012 to remove old vehicles from the public transport fleet, including taxis, buses, and light & heavy-duty vehicles older than 10 years. This project (?RENOVA?) was implemented by the Ministry of Transport and Public Works (MTOP), the National Transit Agency (ANT) and the National Financing Corporation (CFN). While the project contributed to the reduction of the average age of the fleet (thus reducing fuel consumption and the fiscal cost of subsidies), issues regarding the financial sustainability (i.e. credits assigned irrespective of the recipient?s credit worthiness) and the environmental integrity (i.e. vehicles not scrapped after the owner receiving the credit) were reported during interviews with the implementing entities. A similar ad-hoc campaign is being planned as part of a project funded by the IADB for the electrification of buses and taxi fleets, as a way to stimulate the transition to electric vehicles. At the time of writing this proposal, however, this project was put on hold following changes in the Ministry of Economy and Finance.

k. Baseline Projects

Projects to support the transition to electric mobility are underway or will be undertaken during the project?s lifetime, as shown in the table below. The majority of these (in terms of quantity but also in terms of funds) focus on public transportation, mainly electric buses and the required charging infrastructure. The most notable in this group is the 33 million USD project funded by the Inter-American Development Bank through the CFN to create a soft credit line for the purchase of electric buses and taxis. The second group with several projects involves policy recommendations; the most important example in this category is the proposal for a National Electric Mobility Strategy (ENME), which includes a series of cross cutting measures that would be required to accelerate the transition to

e-mobility[124][124]. As will be discussed in the project description section, most of the proposals in this CEO Endorsement Document are aligned to the recommendations in the ENME.[125][125] One single project has undertaken work on standards (namely, an AFD project that recently implemented a vehicle label, to become mandatory in 2023). Lastly, it is important to stress that, with the sole exception of an initiative under implementation by EC Solutions+, none of the existing projects focus on the private sector.

Table 13. Baseline projects

Category	Project name	Implementing agency	Description	Estimated implementation Period	Estimated Budget
Charging infrastructure	Sustainable electromobility Program	Empresa El?ctrica de Quito (EEQ, Quito Electricity Company)	Working on 11 charging infrastructure in Quito. EEQ also intends to lead a project for the deployment of inter-city charging stations with other utilities in the country	2018-2023	290,000 USD (Quito) 2,000,000 USD (Andean corridor in 2022/23)
Charging infrastructure	Charging infrastructure	BYD, Metropolitan Municipality of Transit in Guayaquil and National Government	20 charging devices to charge electric buses and taxis	2019	650,000 USD
Policy recommendations	National Plan for the decarbonization of Ecuador	MAATE with support from AFD	Creation of a roadmap for the decarbonization of various sectors in Ecuador, including transport	2021 - 2023	1,000,000 EUR

Policy recommendations	Support for the transition of the energy matrix in Ecuador II	IADB loan with the Ministry of Economy and Finance (in technical coordination with the MEyRNNR) acting as executing agency	To help Ecuador achieve its climate change objectives in the energy sector and to help strengthen its fiscal and external accounts, through policy reforms. The specific objectives of the second programmatic operation are to: (i) support the replacement of fossil fuels with electricity and enhanced energy efficiency measures; (ii) promote access to electricity and bolster conditions to increase use of renewable energy sources; and (iii) help Ecuador make progress toward its commitments for increased electricity exchanges in the region	2020 (20-year loan)	280,000,000 USD
Policy recommendations	Development of National Urban Transport Plan for sustainable transport in Ecuadorian cities through Euroclima+.	Transport and Public Works Ministry and French Development Agency (AFD)	European funds to reduce climate change in Latin-America	2020-2023	500,000 Euros

Policy recommendations	Proposal for a National Strategy of Electromobility	Hinicio (financed by: Inter-American Development Bank)	Define objectives and activities for the development of electromobility in Ecuador	2020 ? 2021 (proposal for a strategy delivered to the Government)	N/A
Policy recommendations	Advancing a regional approach to electric mobility in Latin America	GCF readiness implemented by UNEP	Create enabling conditions to promote electric mobility through the exchange of experiences at a regional level.	2019 - Present	200,000 USD
Policy recommendations	GEF Global Program for e-mobility	UNEP	Support for the development of electric mobility through a regional platform	2021 - 2025	20,118,605 USD (Global)
Policy recommendations	Global Fuel Economy Initiative	Ministry of Energy and Natural Non Renewable Resources (MEyRNNR) and UNEP	Promote a regulation to control the energy efficiency of new vehicles which enter the country.	2022	18,000 USD
Public transport	Cities Finance Facility	C40 ? GIZ	The C40 Cities Finance Facility will help Quito electrify the Ecov?a Bus Rapid Transit (BRT) corridor.	Project design completed in 2020	450,000 USD (design only; implementation not covered in this amount)
Public transport	Electric taxis implementation in Loja	BYD, Ecotaxi Cooperative	Implementation of 51 electric taxis and charging station	2017-present	1,785,000 USD
Public transport	Implementation of 20 electric buses in Guayaquil ? Saucync	Private companies	Implementation of 20 electric buses with a credit from CFN	2019-Present	7,600,000 USD (CFN loan) + 400,000 USD equity
Public transport	Conditional Credit line for Investment Projects	Inter-American Development Bank and the Ministry of Economy and Finance (MEF) through the CFN	Credit line for the replacement of combustion engine units by electric taxis and buses, giving the benefit of an additional bonus for scrap.	2022 ? 2027 (on hold)	33,000,000 USD

Public transport	Non-refundable technical cooperation	Inter-American Development Bank	These funds are destinated to go with the conditional credit line (previous row) for the technical, financial, and legal structuring of the project and its enabling conditions.	2022 ? 2027	1,000,000 USD
Public transport	Pilot Electric Bus	Government Council of Galapagos (CGREG)	Donation from the Vice-presidency of an electric bus.	2020	
Public transport	Design of a management model for the pilot bus of Galapagos	Automobile Club of Ecuador, HINICIO and Government Council of Galapagos	Develop a management model and business model for the pilot electric bus of Galapagos, with the goal of future scaling.	2020 -2021	18,000 USD
Public transport	Digitalization of transport	Municipality of Quito and EC Solutions+ Group	Optimization of the use of public transport through a digital payment method in Quito.	2023 - 2026	n.a.
Public transport, Private fleets	EC Solutions+	Municipality of Quito and EC Solutions+ Group	Implementation of low duty electric transport (locally produced) of passengers and courier for the Historical Center of Quito (decarbonization of the center) + proposal for regulation of locally produced bikes and 3 wheelers	2020 - 2024	597,000 USD

Public transport, Private fleets	ACCESS - Accelerating Access to Low Carbon Urban Mobility Solutions through Digitalization	International Climate Initiative (IKI) project implemented by UNEP	Promotes a comprehensive approach on digitalization of transport in urban areas in Argentina, Brazil, Colombia, Ecuador, Mexico and Peru	2023 ? 2026 (currently in the design and approval stage)	21,640,000 EUR (for all six countries)
Standards (vehicle efficiency)	Vehicle Label	Transport and Public Works Ministry and AFD	Design of a label for vehicles to give information about its energy efficiency, emissions, and security.	2019 ? Present (label will become mandatory in 2023)	200,000 USD

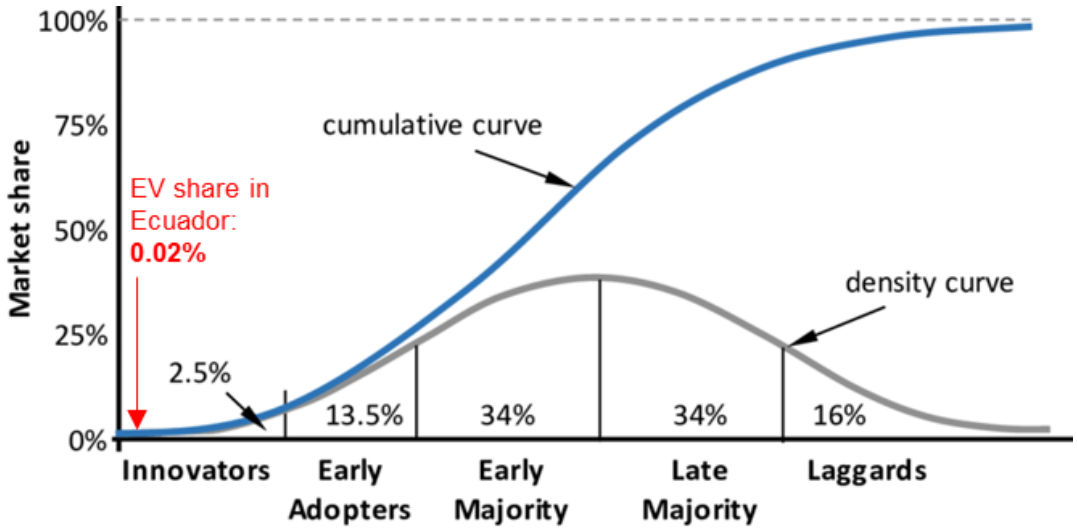
3) Proposed alternative scenario with a description of project components, outcomes, outputs and deliverables

a. Overview

The objective of this project is to accelerate the introduction of low-carbon electric mobility, thus reducing fossil fuel consumption, greenhouse gas emissions and air pollution in the transport sector of Ecuador. As highlighted in the baseline section, the country has introduced a series of measures and policies aligned with this goal; however, EVs still represent a minuscule share (**0.02%**[126][126]) of the entire vehicle fleet, as Ecuador still faces a series of barriers that slow down the uptake of electric mobility. A key challenge is to build a comprehensive enabling environment that provides the required technical, economic, commercial, social, environmental, and legal signals that are required to balance the total cost of ownership equation, which is currently leaning towards conventional combustion engines that release GHG emissions during use.

Generally speaking, this project takes e-mobility from a very early phase of adoption, creating the enabling conditions that will allow for the development and up-scaling of this technology. Following Rogers? classic work on the conceptual framework for the diffusion of innovations[127][127], new technologies go through a series of phases as they become mainstream (Figure 17). The first phase is the ?innovators phase?, which typically goes from 0 to 2.5% of the market share. As discussed in our baseline section, the EV share in Ecuador is currently 0.02% (0.43% when hybrid vehicles are considered); hence, this is the present phase of the transition for Ecuador.

Figure 17. Diffusion of innovation[128][128]



The proposed project aims to create the enabling conditions that will accelerate the transition to EVs. In particular, the project intends to do so by a) creating institutional capacity; b) leveling the total cost of ownership with existent internal combustion engine vehicles, which are currently dependent on government subsidies and low prices maintained through the use of poor-quality fuels; c) the creation or update of missing regulatory framework required for the mainstreaming of EVs, and d) focusing on the perception that the Ecuadorean public has towards e-mobility.

Table 14. Creation of enabling conditions for e-mobility thorough the proposed project

Enabling conditions required	How these requirements are tackled by the project
Creation of institutional capacity	Through the creation of a national electric mobility coordination body (output 1.1), capacity building on e-mobility (1.3) and a knowledge management system for transport and energy (1.4).
Levelling total cost of ownership with conventional vehicles	By reducing the burden of up-front costs (through the development of renting, leasing and subscription mechanisms, output 3.1), and by addressing distortions that keep fuel costs artificially low (thus reducing the potential savings from the adoption of EVs) (outputs 3.2 and 3.3).
Provision of missing regulatory framework	Mainly for charging infrastructure (output 3.4) and end-of-life disposal of vehicles and batteries (output 4.1).

Perception and public?s attitude towards the technology	Through a stakeholder engagement and communication campaign (1.2) and demonstrative pilots (i.e. outputs in component 2). Also, by ensuring that a fair transition to e-mobility takes place (outputs 3.5, but also through work with waste companies and recyclers as part of output 4.2).

Following the structure indicated by the Global Programme, the project is organized into four components:

? Component 1 supports Ecuador in the institutionalization of low carbon electric mobility by establishing an e-mobility coordination body, strengthening key capacities in technical, financial, and regulatory aspects, designing and implementing a communication and engagement campaign, and through the establishment of a Knowledge Management System that will compile, process and make available key sectoral information.

? Component 2 aims at reducing short-run barriers through a demonstrative pilot, including the design and implementation of its own monitoring mechanism.

? Component 3 focuses on the regulatory framework for EVs, aiming mainly at leveling the total cost of ownership with existent internal combustion engine vehicles through reforms in vehicle efficiency, fuel quality, charging infrastructure and the regulation of alternative commercialization methods and business models.

? Component 4 focuses on the environmental sustainability of vehicles in general and EVs in particular. It results in a framework proposal for the handling of vehicles at the end of their lifetime and the recycling and safe disposal of used lithium-ion batteries.

Each of these components will be described in the coming sections, presenting every output included under each. The description of each output presents a table providing further details on each of the resulting deliverables, including a list of relevant beneficiaries and stakeholders. A more in-depth discussion of these is available under the ?Stakeholder? section of this document.

Project activities will be undertaken by the Project Management Unit (PMU) consisting of the chief technical advisor (CTA) and a junior technical and administrative officer. The PMU will be supported by a project technical unit (PTU) consisting of a senior technical expert, a regulatory framework specialist, an economist and a gender specialist, under the overall coordination of the project?s CTA. A series of consultancies (which can bring in international experts, as needed) have been included for specific assistance and in order to supply the necessary technical inputs for each of the outputs. Further details on the project?s governance and the assignment of roles and responsibilities can be found on the section ?Institutional arrangements and coordination?, as well as on the project?s workplan (Annex K). Detailed terms of reference for staff and consultancies are available in Annex H.

b. Desired transformation and theory of change

The following table maps the barriers presented earlier in this document with the outputs that are part of the project (described in further length in the subsections below). It highlights the desired transformation that is expected to stem from the project intervention. This is the basis for the theory of change that is depicted below.

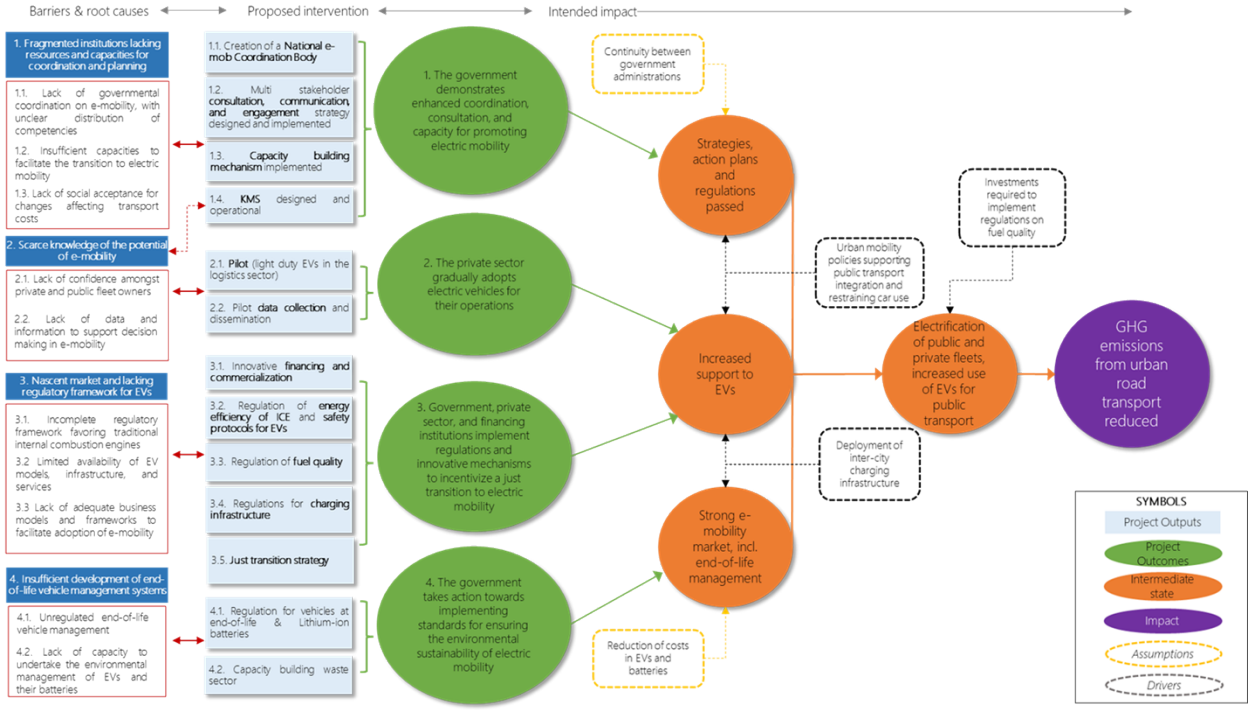
Table 15. Desired transformation resulting from the project implementation

The current context	**Desired transformation of behavior to be achieved through the project**
Fragmented institutions lacking resources and capacities for coordination and planning (barrier 1).	An inter-ministerial electric mobility coordination body is established (output 1.1), as well as its members and the definition of its roles and responsibilities. The e-mobility body has the capacities (output 1.3) and the mandate to lead and coordinate efforts towards the transition to electric mobility, advancing all the reforms that are required to create the enabling framework for the adoption of EVs in public and private fleets. Its work is supported by the actions coming from a multi-stakeholder communication and engagement strategy (output 1.2), which captures and incorporates the views from informed stakeholders (which also benefitted from the capacity building of output 1.3), thus maintaining the credibility and the relevance of this governance structure. Information required for decision making is readily available through a Knowledge Management System for transport and mobility (output 1.4).
Insufficient knowledge of the potential of e-mobility (barrier 2)	The logistic sector becomes the ?early adopter? of EVs, partially or totally replacing their internal combustion fleets ? initially through tax-deductible lease, renting and subscription contracts, but later also through conventional acquisitions. The visibility of these fleets encourages car owners in the public and private sector to also switch to EVs, especially as range anxiety is lowered following a government announcement to implement a charging infrastructure strategy (output 3.4). This transformation will be achieved mainly by component 2 (i.e. the pilot in output 2.1), as well as through the development of alternative vehicle acquisition models (output 3.1). This process is further supported through the communication and engagement campaign (output 1.2).

Nascent market and lacking regulatory framework for EVs (barrier 3)	Following the results in the project?s pilot (output 2.1 and 2.2) -and taking advantage of the increased demand coming from businesses in the logistic sector that opt for a renting or leasing contract- car dealers increase the number of electric models available in the market. The growth of the EV fleet is accompanied by regulatory improvements that level the TCO of conventional cars and EVs, reducing the relative price of low-carbon technologies (output 3.2 and 3.3). Additional regulations reduce the perception of risk and range anxiety (mainly, the standards for infrastructure structure, output 3.4). This transition is supported by a communication and engagement campaign (output 1.2), as well as by a strategy to ensure that any adverse distributional effects arising from the transition are anticipated, well understood, and mitigated (outputs 1.2 and 3.3).
Insufficient development of end-of-life vehicle management systems (barrier 4)	A specific framework for the handling of vehicles at the end of their lifetime ensures that scrapping campaigns are undertaken periodically, successfully reducing, reutilizing, and recycling the different waste streams coming from conventional and electric vehicles (inc. lithium-ion batteries). The average age of the fleet is reduced, which reflects on vehicle efficiency and further contributes to a reduction of GHG emissions and an improvement in the air quality of Ecuadorean cities. This transformational change is made possible through the outputs in component 4.

The theory of change behind this project can be summarized in Figure 18 below. The left side of the diagram starts with the barriers and the root causes, the latter of which inform the outputs included in this project. The *outcomes* resulting from these outputs depict a scenario where these barriers have been addressed and alleviated, with institutional arrangements, policies, capacities, and resources in place to gradually increase the share of electric vehicles in the fleet. The logistic sector is targeted as an early adopter of electric mobility, and the technology spreads to other sectors of the economy as well (public fleets, private car owners and public transport). Political continuity (e.g. by adopting the proposed strategy for the transition to e-mobility) and the retention of technical capacity created through the project, together with interest in adopting transparent and innovative financing mechanisms will allow for a deeper penetration of EVs.

Figure 18. Theory of change



c. Mapping barriers and root causes into the project structure

The table below shows how each barrier is tackled by at least one of the project?s outputs.

Table 16. Barriers and root causes

Barrier & root cause	Addressed by project output
1. Fragmented institutions lacking resources and capacities for coordination and planning	
- *Lack of governmental coordination on e-mobility, with unclear distribution of competencies*	1.1
- *Insufficient capacities to facilitate the transition to electric mobility*	1.3; 1.4
- *Lack of social acceptance for changes affecting transport costs*	1.2; 2.1
2. Scarce knowledge of the potential of e-mobility	
- *Lack of confidence amongst private and public fleet owners*	2.1
- *Lack of data and information to support decision making in e-mobility*	1.4; 2.2
3. Nascent market and lacking regulatory framework for EVs	
- *Incomplete regulatory framework favoring traditional internal combustion engines*	3.2
- *Limited availability of EV models, infrastructure, and services*	3.1; 3.4
- *Lack of adequate business models and frameworks to facilitate adoption of e-mobility*	3.1
4. Insufficient development of end-of-life vehicle management systems	
- *Unregulated end-of-life vehicle management*	4.1
- *Lack of capacity to undertake the environmental management of EVs and their batteries*	4.2

Each of the components in the proposed project are discussed below. The discussion includes details on the expected outcomes and outputs, as well as specific details on the deliverables included under each.

d. Component 1: Institutionalization of low-carbon electric mobility

This component aims to support the government in demonstrating enhanced coordination, consultation, and increased capacity on promoting low-carbon electric mobility in Ecuador. A national electric mobility coordination body will be established to facilitate coordination on the multitude of efforts being undertaken to promote low-carbon electric mobility across Ecuador. A multi-stakeholder consultation and engagement strategy will ensure the social and economic viability of the scale-up of low-carbon electric mobility. Furthermore, activities will be undertaken to build the capacity of local stakeholders on electric mobility, particularly those involved in urban logistics.

Regarding co-finance, the component builds on the technical and strategic studies that are to be developed by MAATE as part of the National Plan Towards Decarbonization, as well as in-kind contributions provided by the MAATE, MTOP and MEyRNNR with regards to coordination and consultation. MEF and MTOP will provide additional resources through their contributions aligned with the adoption of the National Policy for Urban Sustainable Mobility (PNMU), which will provide

the general framework that will allow for the institutionalization of e-mobility. MAATE will provide funds aligned with the National Plan Towards Decarbonization, which among other contributions will design and implement a communicational and educative strategy for the achievement of its goals, ensuring territorial awareness of Climate Change as an environmental problem from a citizen perspective, and with the productive sector of the country. Through their contribution, co-finance from MAATE will also establish a Measurement, Reporting and Verification System (MRV), which allows adequate monitoring of mitigation actions (including in the energy and transport sector). These elements will be the basis for this GEF-7 project?s own stakeholder engagement and communication strategy (output 1.2) and Knowledge Management System (output 1.4). The project?s executing agency (GIZ) will also provide co-finance to support the capacity building of local officials in the national and in the GAD level.

Outcome 1: The government demonstrates enhanced coordination, consultation, and capacity for promoting the scaling up of electric mobility in Ecuador through a just transition.

Output 1.1: A national electric mobility coordination body is created to enhance efforts of all levels of government.

Through this output, a national electric mobility coordination body (?Mesa Nacional de Movilidad El?ctrica?, MNME) will be created to centralize information, policy reform and coordinate efforts related to e-mobility projects (on-going or in the pipeline) across the country. This will consist of an organized working group that includes representatives from the main governing institutions involved with e-mobility, including (but not limited to) the Ministry of Transport and Public Works (MTOP), the Ministry of Energy and Natural Non-Renewable Resources; the Ministry of Environment, Water and Ecologic Transition (MAATE); the Ministry of Economy and Finance, the National Transit Agency (ANT); the Energy and Non-Renewable Natural Sources Regulation and Control Agency (ARCERNNR), the Ecuadorean Service for Standardization (INEN) and representatives from the municipalities. The coordination body will meet periodically to assess, discuss, concentrate, coordinate and advance all the reforms that are required to create the enabling framework for the adoption of e-mobility. It will also create and keep track of a thorough inventory of all on-going initiatives, aligning and coordinating multilateral support on the topic, identifying support needed.

To improve efficiency, the proposed approach is to conform the coordination body in parallel with the proceedings for its formalization (i.e. to undertake meetings in parallel to the creation of its statute of competence and the officialization of its legal identity within the public sector). Moreover, the body would be created either within the (existent) Climate Change Interinstitutional Committee (CICC) or in the context of the National Policy for Urban Sustainable Mobility (under development at the time of preparing this proposal). [MMRM1] This decision is currently under discussion as part of the GCF readiness project discussed earlier in the baseline section.

This output will formalize the recommendations that are being drafted as part of the GCF readiness project, currently underway but expected to be completed before the execution start of this GEF-7 project. Thus, the present GEF-7 proposal will materialize the creation of this entity and provide accompaniment throughout the three years of project execution. Note however that the coordination body will live beyond the execution of this project, ensuring the achievement of its long-term outcomes.

A list of the deliverables (including minimum indicative content and relevant stakeholders) is provided in the table below.

Output 1.1 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**

D1.1.1	5-year workplan for the National Electric Mobility Coordination Body	The initial workplan should identify roles and responsibilities of each institution in the coordination body, as well as scope of work, workplan of activities and procedures, a definition of the means of engagement for private sector and civil society (informed by the public engagement strategy to be developed by output 1.2). The workplan shall reflect the formalization process of the coordination body itself, as well as prioritized areas of work in terms of legislation, regulations, norms, and standards, assigning roles and responsibilities and a timeline for its implementation. This will include at least the regulatory reforms depicted in component 3 and 4 of this proposal. It is expected that a first draft will be discussed during year 1 of the project, with revisions in year 2 and year 3 (final version).	Institutions that will be invited: MAATE, MTOP, MEF, MEyRNNR, ANT, INEN, representatives from municipalities (e.g. AME). Other institutions may be invited during execution.

D1.1.2	Body quarterly meetings and publicly available meeting minutes uploaded to the knowledge management system (output 1.4).	Share information on: - On-going electric mobility activities - Pipeline activities across the country - Lessons learned through activities - Progress made in terms of the workplan, particularly regarding the formalization of the coordination body itself and the work undertaken in terms of legislation, regulations, norms, and standards. Meeting minutes should detail: - Meeting attendees - Topics discussed during meeting - Main conclusions - Next steps, identifying persons responsible for each task	National Electric Mobility Coordination Body

D1.1.3	Statute and competence to formalize the national electric mobility coordination body	Statute and competence should include at least: - Mandate, scope, and limitations of the body?s authority, including reporting structure - Members of the coordination body and their obligations - Internal operational structure (including any required funding) - Procedures and rules for board meetings - Procedures for the selection of new members	National Electric Mobility Coordination Body
D1.1.4	Gender action plan implementation report for Output 1.1	Report indicating progress regarding the activities, indicators and risks in the Gender Action Plan	National Electric Mobility Coordination Body, Commission on Gender and Climate Change (MAATE)

Output 1.2: A multi-stakeholder consultation, communication, and engagement strategy is made available to support the government in scaling up electric mobility through a just transition.

As discussed in the baseline section, political buy-in from the public is an essential element to enable changes in Ecuador?s transport sector. This output will look to implement a multi-stakeholder consultation, communication, and engagement strategy that facilitates the incorporation of broad public, private and civil society views into the design, implementation, monitoring and assessment of electric transport interventions. The strategy will ensure effective consultation with all relevant stakeholders, including economically vulnerable groups, and ensuring that all of the projects recommendations (especially the ones from component 3) fit along well with the public?s needs, and that the latter has a comprehensive understanding of the implications of a transition to e-mobility.

The following deliverables will be produced in the context of this output:

Output 1.2 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**

D1.2.1	Multi-stakeholder consultation, communication, and engagement strategy	The strategy should identify the following: - Relevant stakeholders from the public and private sector, with focus on vulnerable groups that could be affected by the deployment of electric mobility, including civil society groups and NGOs. The list of relevant stakeholders should at least include the ones described in this document (section ?Stakeholders?). - Design of a communication campaign, including scope, target audience, intended outcomes, key messages, appropriate medium and a workplan for its implementation - Design of a public engagement strategy, including means of engagement, identification of stakeholders (roles, stake and vulnerabilities), guidance for meetings and workshops to engage stakeholders - Specific section on gender considerations for the consultation, communication and engagement campaigns, aligned with recommendations in module 8 of the Ministry?s Commission on Gender and Climate Change (CGCC) *Toolkit on gender and climate change.*	Public and private actors (national and GAD level), multilateral agencies, representatives from the academy and civil society. For a detailed list please refer to the ?Stakeholders? section.

D1.2.2	Multi-stakeholder consultation activities as per the strategy	At least 8 consultation workshops / seminars / meetings will be held with relevant stakeholders. Consultation activities should be divided as per stakeholders? main groups: - Private sector - Government - Financial institutions - Civil society groups and NGOs - Academia - Multilateral	Public and private actors (national and GAD level), multilateral agencies, representatives from the academy and civil society. For a detailed list please refer to the ?Stakeholders? section.
D1.2.3	Report with recommendations for a long-term consultation mechanism	The report should include: - Proposed design for the consultation mechanism, including roles, responsibilities, workplan, budget and identification of possible funding - Schedule of periodic consultation meetings and workshops - Best practices on how to engage relevant stakeholders	National Electric Mobility Coordination Body

D1.2.4	Gender-sensitive communication and engagement campaign on e-mobility as per the strategy	This deliverable refers to the actual execution of the communication campaign designed within this output, consisting of at least 8 communication actions as designed in D1.2.1). A gender-sensitive communication campaign should take into account the established objectives within the gender action plan (discussed further below in the gender section of this document).	General public (mainly, public and private actors, as well as individual vehicle owners).
D1.1.4	Gender action plan implementation report for Output 1.1	Report indicating progress regarding the activities, indicators and risks in the Gender Action Plan	National Electric Mobility Coordination Body, Commission on Gender and Climate Change (MAATE)

Output 1.3: Private and public stakeholders increase awareness, capacity, and knowledge on technical, financial, and regulatory aspects of electric mobility through a capacity building mechanism and the global program on electric mobility.

As Ecuador is in very early stage in the development of e-mobility, there is a significant lack of institutional capacity for the promotion and adoption of this new technology. This output tackles this issue through the creation of a capacity building mechanism followed by specific training activities to be conducted along the duration of the proposed project.

The project will train these stakeholders through strategic partnerships with local education centres. Entities that manifested interest during the design phase include universities (e.g. Universidad Internacional del Ecuador, Escuela Superior Polit?cnica del Litoral) as well as other institutions that provide capacity building in the transport sector e.g. the National Association of Companies in the Automotive Sector (AEADE), the Automotive Club of Ecuador (ANETA), among others. The project will develop the curricula and bring in global experts, with the support of the global program, to train the personnel in charge of the curricula. By building the capacity of local trainers, the project will ensure sustainability of capacity-building efforts post project.

Specific workshops and training activities will also be conducted during the execution of the project to strengthen specific needs, mainly the electrification of private fleets, the drafting and enforcing of regulations for EVs and safety measures required to allow for a safe operation of an electric fleet. The aim of these is to support local stakeholders to develop a clear understanding of the technical, economic, financial, and regulatory requirements involved in developing a viable and well-funded

national commitment and execution plan for low-carbon electric mobility. These workshops will be designed based on findings and recommendations attained through the design phase of this project and the continuous involvement of actors resulting from Output 1.2. The local workshops will also be designed taking into account the findings, good practices, and lessons learned that are to be shared through the UNEP Global Program on Electric Mobility. While the activities in the Global Program will target a limited number of key national stakeholders to build capacity on electric mobility aspects, this output will facilitate the training of a broader and deeper group of local stakeholders, building on global program inputs.

Output 1.3 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**

D1.3.1	Design of courses and training modules based on regional and international best practices	Courses should cover the following identified needs (depending on the institution): - Vehicle service, repair, and maintenance - Infrastructure installation, repair, and maintenance - Marketing and sales of EVs - Technical aspects and feasibility of transport fleet electrification, including EV technology, safety, charging infrastructure technology and maintenance. - Financial aspects and feasibility of transport fleet electrification, including economics, socio-economic benefits, and innovative financing and commercialization methods. - Efficient driving and safety measures Training modules can take the form of manuals and/or software. The design should provide targets and recommendations to increase the participation of women.	Institution(s) that will receive training to provide capacity building (i.e. education centers signing a MoU under D1.3.2, see below for potential entities)

D1.3.2	Memorandum of Understanding signed with local academic institution(s) for the implementation of courses, training modules and provision of learning material	The MoU will cover: - Curricula of the training module (based on D1.3.1) - Capacity building needs - Number of train-the-trainer modules to be financed by the project The national e-mobility coordination body will retain the right to replicate the content developed in the training modules.	Universities and other institutions providing training in the sector (e.g. ANT). Entities that manifested interest during the PPG phase include: Universidad Internacional del Ecuador, AEADE, ANETA, Escuela Superior Polit?cnica del Litoral, among others.
D1.3.3	Train the trainer modules	Training modules to build local knowledge on the electric mobility ecosystem, as per D1.3.1.	Education centers signing a MoU under D1.3.2

D1.3.4	Workshop on transport fleet electrification feasibility: the case of light-duty vehicles	Contents will include the main aspects to understand an electrification feasibility analysis, essential to attain a basic comprehension of the pilot project?s scope: - Understanding the vehicles? operation - Identification of different available technologies and vehicle models - Cost analysis, including thresholds and break-even assessment for the electrification of fleets of different scale - Financing sources and commercialization methods. Tax implications.	Private and public fleet owners in the services and logistics sector.
D1.3.5	Workshop on good practices and lessons learned in drafting and enforcing regulations for electric vehicles and charging infrastructure	Contents will include: - Vehicle energy efficiency standards - Electric vehicle battery warranties - Chargers? standards and protocols - Electric vehicle charging protocols	ANT, INEN, ARCERNNR, MAATE (through the National Electric Mobility Coordination Body) and GAD representatives

D.1.3.6	Workshop on EV maintenance	Contents will include, inter alia: - Training in electric vehicle maintenance, - Charging infrastructure implementation - Handling of electronic elements - Safety measures and risk prevention for handling of batteries	Open to the general public and car shop owners (through AEADE)

D1.3.7	Workshop for first response emergency units on electric vehicle safety and accident intervention[129][129]	It will be divided into three workshops: - The first workshop session will be held before the start of the pilot to train Quito?s first response units as to how approach an accident site in which an electric vehicle or electric charging infrastructure is involved (on all types of electric vehicles). - The second session will be undertaken six months after the start of the pilot and will refresh the concepts presented in the first workshop, and also discuss safety issues, lessons learned or any safety-related events that have occurred during the first six months. - Finally, the third workshop will summarize good practices, experiences and lessons learned on safety management of electric vehicles, drawing on the outcomes of the pilot, and other national interventions.	Quito?s first response emergency units

D1.3.8	Report: lessons learned for Ecuador from the events of the Latin America and the Caribbean platform of the Global Programme	Project representative to participate in the events of the Latin America and the Caribbean platform of the Global Programme, including at least: - One LAC Platform / Community of Practice event - One electric mobility / electric LDV training event - One financing / marketplace event - One e-mobility replication event One report will be prepared after each event, focusing on the relevance, replicability, and lessons learned for Ecuador.	Project representative and government official to be covered by the project; private stakeholders to be invited at their own cost.
D1.3.9	Gender action plan implementation report for Output 1.3	Report indicating progress regarding the activities, indicators and risks in the Gender Action Plan	National Electric Mobility Coordination Body, Commission on Gender and Climate Change (MAATE)

Output 1.4: A gender-sensitive mobility knowledge management system housed in the Ministry of Transport and Public Works is made available for use by policy makers and key stakeholders.

This output seeks to enhance the organization and efficiency of the information and data management of public entities in Ecuador for the transport and energy sectors, a requirement that is established in the LOEE. This system will allow to systematically measure and compile attributes of a transportation system that can help to indicate: (1) the best way to improve general transportation efficiency and quality for a given region, (2) the achieved and potential benefits of a transition to electric mobility for various types of vehicles/applications, and (3) the most effective instruments and approaches for transitioning to electric mobility.[130][130] The KMS will also include a public interface where the consumer can find information on available (and planned) charging infrastructure, TCO, available incentives to buy and own an EV, existing financing lines and other benefits from the technology ? all in coordination with the communication and engagement campaign from output 1.3. Lastly, the knowledge management system (KMS) will serve as a repository for information that is relevant for research & development, as well as to inform political and business decision-making.

This output will support the development of a full record of all activities concerning the deployment of electric vehicles and will support the evaluation of progress of their deployment along with the emission abatement achieved, and the destination and disposal of both conventional and electric vehicles. The system will also be used to monitor and record the data generated by the pilots in component 2. The activity involves analyzing the current and future necessities of relevant public entities in terms of data management for these sectors. Based on these and other international practices, a software for data management will be selected for implementation. In selecting and implementing the system, activities will focus on ensuring post-project sustainability and developing a plan for broad roll-out of the system.

The deliverables for this output are described below:

Output 1.4 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**
D1.4.1	Design of the gender-sensitive knowledge management system (KMS) for the transport sector	Design to cover: - Definition of scope and information to be made available (publicly available and limited access) - Granularity required to capture gender differences - Recommendation of modality (web page / portal, intranet, etc.) - Linkages to the communication and stakeholder engagement strategy in output 1.3 - Housing within the Ministry of Transport - Initial investment required - Staff required and estimation of O&M costs - Financial sustainability post project	IT officers and representatives from the MTOP. Representative from the electric mobility Coordination Body (output 1.1). Other relevant stakeholders include officials from the Ministry of Energy and the MAATE.

D1.4.2	Inventory of data to be included in the KMS	The inventory will include: - Table with relevant data, including identification of sources and updating frequency. This shall include foundational data (e.g. fuel use, vehicle stock, kilometers traveled) and specialized data (e.g. mode of travel, access to home and public charging, gasoline prices, electricity tariffs, drive cycle profiles, geospatial data, electricity generation mix, etc.) - Definition of information flows, - Identification of required organizational mandates for accessing the information - Data collection plan, - Proposed templates, - QA/QC procedures - Identification of data gaps (i.e. data that is not collected), including a proposal for its collection (or estimation, if collection is not deemed possible / feasible).	IT officers and representatives from the MTOP. Representatives from the National Electric Mobility Coordination Body
D1.4.3	Data sharing agreement or equivalent with institutions generating required data	Data sharing agreement will include: - Detail of specific data to be shared with the specified periodicity - Non-disclosure policy to share data solely among stakeholders	IT officers and representatives from the MTOP. Representative from the National Electric Mobility Coordination Body. Among the data providers identified during the PPG phase, the following institutions may be listed: ANT, Ministry of Economy and Finance, AEADE.

D1.4.4	Knowledge management system implemented according to design	KMS implementation as per D1.4.1 and D1.4.2	IT officers and representatives from the MTOP.
D1.4.5	Workshop and usage manuals: using and updating the knowledge management system	Workshop on the use of the KMS including: - Step-by-step KMS usage procedure - Good practices on the maintenance and updating of KMS - Data formatting and standardization to upload to KMS This information should also be captured in a usage manual.	Data providers and general public. Representatives from the public and private sector; academy and civil society organizations (for a full list see the ?Stakeholders? section.
D1.4.6	Gender action plan implementation report for Output 1.4	Report indicating progress regarding the activities, indicators and risks in the Gender Action Plan	National Electric Mobility Coordination Body, Commission on Gender and Climate Change (MAATE)

e. Component 2: Short-term barrier removal through low-carbon e-mobility energy demonstrations

Outcome 2: The private sector begins to adopt electric vehicles for their operations.

This component will aim to provide evidence to local stakeholders (mainly, private decision-makers as well as public policymakers) of the technical, financial, and environmental viability of low-carbon electric mobility. The outputs in this component will mainly address non-financial barriers referred to in section 1 (namely, the lack of confidence and awareness of local actors as to the viability of low-carbon electric mobility for local conditions) by allowing last-mile logistics and service companies to pilot electric vehicles in Quito as part of their operations. A data management system will be developed to compile information generated by the tested vehicles and chargers to be accessed by all relevant stakeholders, which in turn will provide a valuable input to quantify and calibrate policy decisions that are focused on strictly financial barriers. Co-finance from local utility Empresa El?ctrica de Quito (EEQ) will provide the fast-speed charging infrastructure needed for the vehicles, while the city of Quito will provide a local depot for the preparation of a cross-docking platform (availability to be confirmed during project execution). Moreover, the data generated from the pilot will be used for research purposes for graduate and postgraduate students in the National Polytechnic School (*Escuela Polit?cnica Nacional*, EPN), a public, technical university with on-going research projects in the area of route modelling and mathematical optimization for the logistics and transport sector. EPN is also providing co-finance for this GEF-7 project. Lastly, GIZ will mobilize funds for the promotion of innovative technologies in the logistics sector.

The pilot strategically targets the logistics and services firms in Quito. The rationale and the specificities of the pilot are provided below.

Pilot rationale

The selection of the last-mile logistics sector is grounded on a series of technical and socioeconomic considerations. Firstly, the pilot strategically focuses on one of the very few sectors that has been counter-cyclical to the contraction observed in the rest of the economy during the COVID-19 pandemic: the logistics sector. According to a study by the Ecuadorian Chamber of Electronic Commerce (CECE), before the pandemic 19 out of every 100 customers bought at least once a month through digital channels. During the COVID-19 pandemic, that figure rose to 40 out of every 100 users per month. In addition, more than half of the respondents reported an increase in their purchase frequency since the COVID-19 emergency. [131][131]

Table 17. Use of e-commerce (sample size: 1,125 individuals in Ecuador, May 2020) **[132]**[132]

Frequency of electronic purchases	**Pre COVID-19**	**During COVID-19**
Several times a week	2	2
2-3 times a week	6	14
Once a week	13	26
Every 15 days	10	17
At least once a month	19	40

Some preliminary figures of the sector at the regional level show that[133][133]:

- 70% growth in physical domestic e-commerce volumes across Latin America in 2020
- 30% growth in cross-border e-commerce volumes in Latin America in 2020
- 500% growth in home delivery of groceries and medicines in 2020 in Latin America
- An estimated 50 million Latin American consumers tried e-commerce for the first time in 2020

The growth of e-commerce has had a direct correlation on logistics (and in sharp contrast with public transportation, which has been severely affected by restrictions in mobility during the pandemic[134][134]), providing an opportunity to kick-start the transition to electric mobility in a sector that is currently growing and exhibiting a large degree of dynamism.

The pilot?s design is also strategic in terms of the potential for emission reductions, as light-duty vehicles (i.e. the category of vehicles targeted by the pilot) constitute the second largest source of fossil fuel consumption in Ecuador (recall Figure 11 from the baseline section). As the fleet is currently powered almost entirely by fossil fuels, the category of vehicles targeted by this pilot is thus

responsible for the second largest source of emissions in the transport sector of Ecuador.[135][135] This is also reflected in the fact that the logistic sector is set as one of the priorities for the transport sub-sector in the Organic Law for Energy Efficiency (LOEE), discussed in the baseline section.

Working with a dynamic sector has additional advantages. As mentioned in the baseline, the previous pilots undertaken in Ecuador have exclusively involved the highly regulated public transport sector, which poses additional challenges in terms of setting a break-even tariff for its services. The rigidity of public transport rates (due mainly to their social importance) has been one of the most quoted difficulties in implementing pilots involving electric buses. [136][136]

Another strategic consideration is that the pilot?s urban setting (i.e. the city of Quito) allows reaching a larger number of potential firms and EV users in the private and public sector, creating synergies with the project?s communication campaign (output 1.2) while at the same time avoiding the need of (currently lacking) inter-urban charging infrastructure. Fleets of vehicles are unique because, unlike workplace or public charging, the owner of the fleet?s charging infrastructure is the same entity as the operator of the fleet?s EVs. This removes uncertainty surrounding the value proposition of EV/charging infrastructure investment and makes cost-benefit analyses more straightforward. Fleets possess the additional benefit of having highly scheduled and predictable usage patterns, unlike personal driving habits. This means that EV fleets are easier to plan for in terms of charging infrastructure and cost recovery.

In terms of the conceptual framework proposed by Roger (recall Figure 17 at the intro of this sub-section), the last-mile logistics sector is expected to act as the *innovator*, i.e. the catalyst of the diffusion of EV that will attract the interest from additional early adopters, taking e-mobility to the next stage of its development. The pilot?s demonstrative effect -together with the commercialization models to be created through output 3.1 and the strategy to deploy inter-city charging infrastructure, output 3.4- is expected to bring in other sectors in the economy as well as individual car users. Appetite from the private sector -both in the logistics and the car industry side- was confirmed through extensive consultation during the design phase of this project.

Pilot design

The following are the main elements that define the pilot?s design:

- The pilot will operate a minimum of four electric vans (see discussion in the bullets below) in the logistic and services sector for 12 months. The pilot will start in the project?s second year and continue until the project?s termination.

- The vans will be acquired through a renting or leasing contract with local firms. As discussed on the baseline, leasing does not take place in Ecuador due to the lack of adequate legislation, whereas renting is slowly gaining traction. However, no EVs of any kind are currently offered by renting companies in Ecuador; hence, the pilot will be the first activity to acquire electric vehicles through this modality.

- As this will constitute the first of such operation in Ecuador, at the time of preparing this proposal no market value for the lease or the renting of EVs exists. The GEF project will contribute to de-risking this first operation for the renting companies, which will bear the largest part of the commercial risk. While non-binding letters of interest from the renting companies were requested for

the purpose of this proposal (see Annex R), the actual contracting will be undertaken through a competitive process that ensures that the project is able to select the company offering the best value for money. Based on the expressions of interest received, it is expected that the funds allocated for this purpose will be able to secure a minimum of four and a maximum of six electric vans for the entire year in which the pilot will be undertaken.

- Fast charging infrastructure deployed by the local utility (Empresa El?ctrica de Quito) will be available for charging the EVs.

- The EVs under the pilot will rotate through the participating companies for a minimum of one month, during which each company will be able to have a first-hand experience with an electric van under real-life operating conditions.

- The companies that will take part of the pilot will include those that are currently using fleets for the delivery of goods and the provision of services within the city of Quito. Each company will use its own drivers. Depending on the price proposals obtained in the competitive process for the leasing of EVs, the project is expected to have between 4 and up to 6 EVs that will be used by different companies for a period between one to three months. With a duration of one full year, this implies that a total of 16 ? 72 companies will have access to a full month of an EV. The companies will be identified with the support of the UN Global Compact in Ecuador and AEADE, which provided preliminary screening meetings during the development of this proposal. The UN Global Compact in Ecuador includes more than 200 member institutions comprising companies from the public and private sectors, civil society organizations, NGOs, guilds and academia, of all sizes and origins, committed to the application of the ten principles and respect for Human Rights, Labor Standards, Environment and the Fight against Corruption. The Association of Automobile Enterprises of Ecuador (AEADE) includes 124 affiliates in the automobile sector, including importers, car dealers, spare parts sellers, service providers and financial entities. Both entities have actively contributed to the design of the pilot during the project preparation phase and will be included as part of the technical

- The municipality of Quito will provide a cross-docking facility (depending on availability) for the consolidation of goods entering the historic city centre of Quito. The municipality is currently studying the possibility of setting circulation restrictions within the historic city centre, allowing only the circulation of light 2-3 wheelers. This modality will be tested by providing a total of 6 e-bikes that would be used for door-to-door deliveries within this radius. Thus, companies testing the EVs can decide between two alternative modalities: a centralized operation (i.e. using their own depots and operative structure) and a collaborative cross-docking operation (i.e. using the municipality?s cross-docking facility and e-bikes for door-to-door delivery in the historic city centre), as depicted on Figure 19. The two modalities can take place in parallel or alternatively (e.g. if the space for a cross docking station is not available), without affecting the type of conclusions and answers to be provided by the pilot.

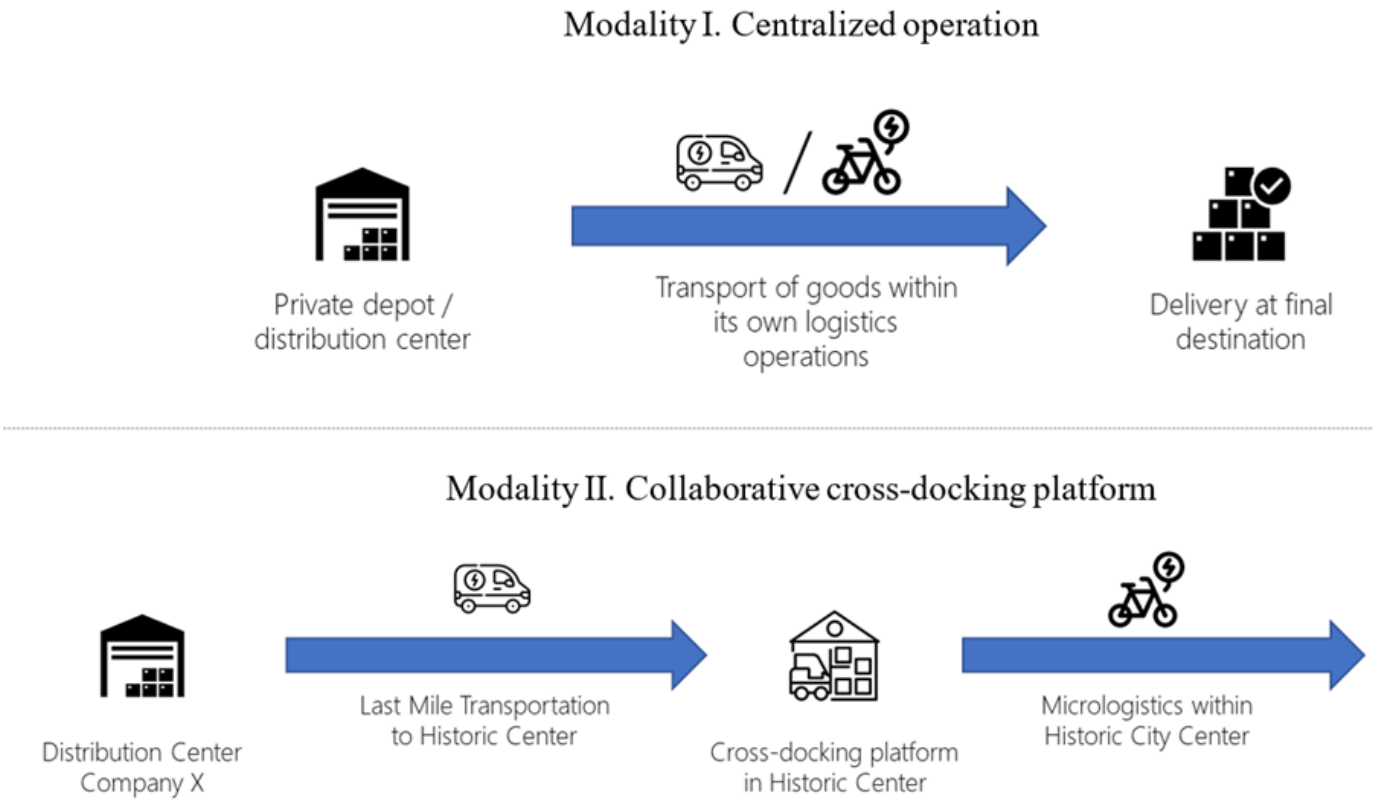
- Companies will also be encouraged to acquire their own EVs, a possibility that was discussed during the project design. Firms interested in this modality can benefit from the project team?s support during their implementation phases, either if they opt for a traditional purchase or for a leasing/renting contract through one of the firms that is expected to provide this service for the pilot?s vehicles.

- The project will implement a data recording system to monitor each vehicle?s performance under real operation. This data will be made available to support each company?s understanding of the viability of this technology and possible business models for EVs (output 3.1). Moreover, the data generated from the pilot will be used for research purposes for graduate and postgraduate students in the National Polytechnic School (*Escuela Polit?cnica Nacional*, EPN), which has active research in terms of route modelling and mathematical optimization for the logistics and transport sector.

- Likewise, the monitored information will provide valuable information for renting and leasing firms, who will also gain first-hand knowledge on the operation and maintenance costs associated with this new technology during its initial year of operation.

- All data generated by the project will be fed into the Knowledge Management System (output 1.4). Anonymous usage data will be made available for the general public and disseminated according to the communication campaign (output 1.2).

Figure 19. Modalities considered for the project pilot



Pilot ecosystem

The ecosystem resulting from the design of the project?s pilot comprises the following actors (Figure 11). It includes:

- **Renting and leasing firms** will provide the vehicles for the pilot. Leasing is not used in Ecuador and renting companies do not have electric vehicles among their fleets; hence, this would be Ecuador?s first contract of this type. The entity grouping companies providing this service was involved during the design stage of this project, and individual companies interested in participating in the pilot have provided letters of interest. The project will also develop an adequate legal framework for renting, leasing and subscription contracts through component 3. Traditional car dealers can also participate in the pilot if additional logistic companies decide to purchase vehicles directly.

- **Financial entities** are typically involved in traditional purchases (i.e. through the provision of credit for the purchase). However, banks may also be interested in alternative financing arrangements such as leasing. Lastly, banks can provide insurance services required under both types of contracts (i.e. traditional loan and renting/leasing/subscription contracts)

- **Logistic firms** will be the users of the electric vehicles. They will provide the environment under which the vehicles will operate, including the routes, cargo, and the drivers that are to conduct the units. Besides from getting access to a hands-on experience with EVs within their own operations, they will benefit from the assessment of the technical, financial, environmental, and economic information and studies that result from the project based on the processing of the monitored data compiled throughout the pilot.

- The **municipality of Quito** will also participate in the pilot, providing space for a cross-docking facility that is aimed at reducing traffic in the historic city center through the creation of a zero-emissions area. The creation of such areas is a requirement for GADs as per the latest reform of the Organic Law on Land Transport, Traffic and Road Safety (LOTTTSV ? see Table 6 in the baseline section); thus, the municipality of Quito will use this experience to develop the municipal regulations required to comply with the national law.

- Increased EV ownership presents a great opportunity to increase sales of the core product of **electricity distribution companies**. Moreover, the introduction of EVs will likely allow for the introduction of new products and services (e.g. domestic electricity generation and storage, domestic and industrial charging appliances, etc.). Empresa Electrica de Quito (EEQ) is the local utility and one of the project?s co-financers, providing access to its existing fast charging stations across the city (Figure 13), contributing to the overall efficiency of the pilot and significantly improving the charging experience for the drivers.

- The data generated from the pilot will be used for research purposes for graduate and postgraduate students in the **National Polytechnic School** (*Escuela Polit?cnica Nacional*, EPN), a public, technical university with on-going research projects in the area of route modelling and mathematical optimization for the logistics and transport sector. EPN is also providing co-finance for this GEF-7 project.

Figure 12. Pilot ecosystem

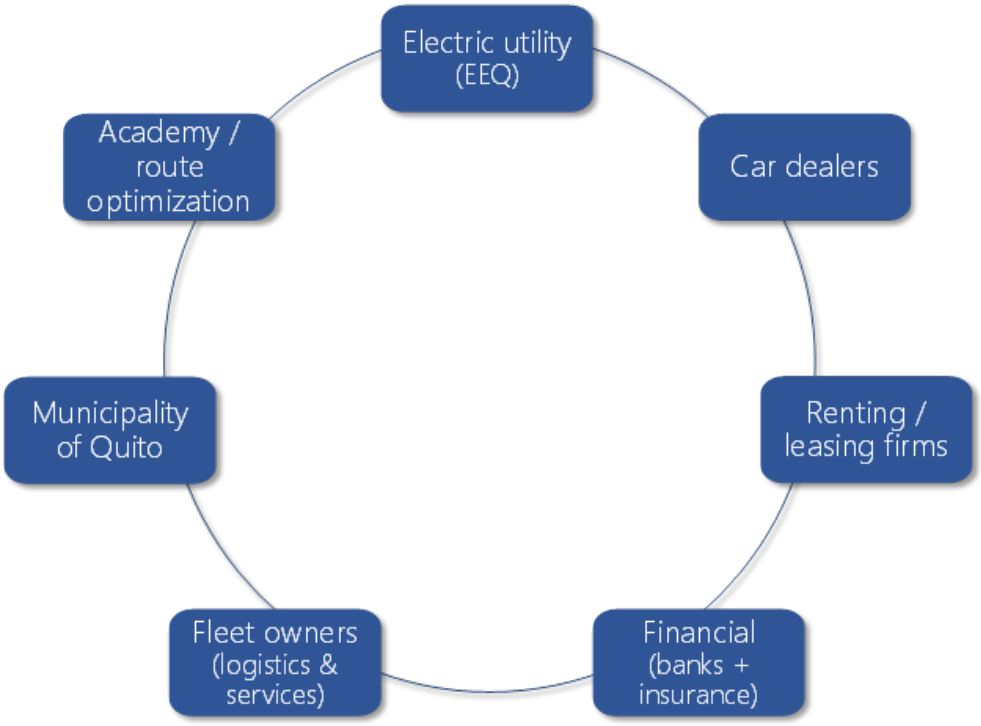
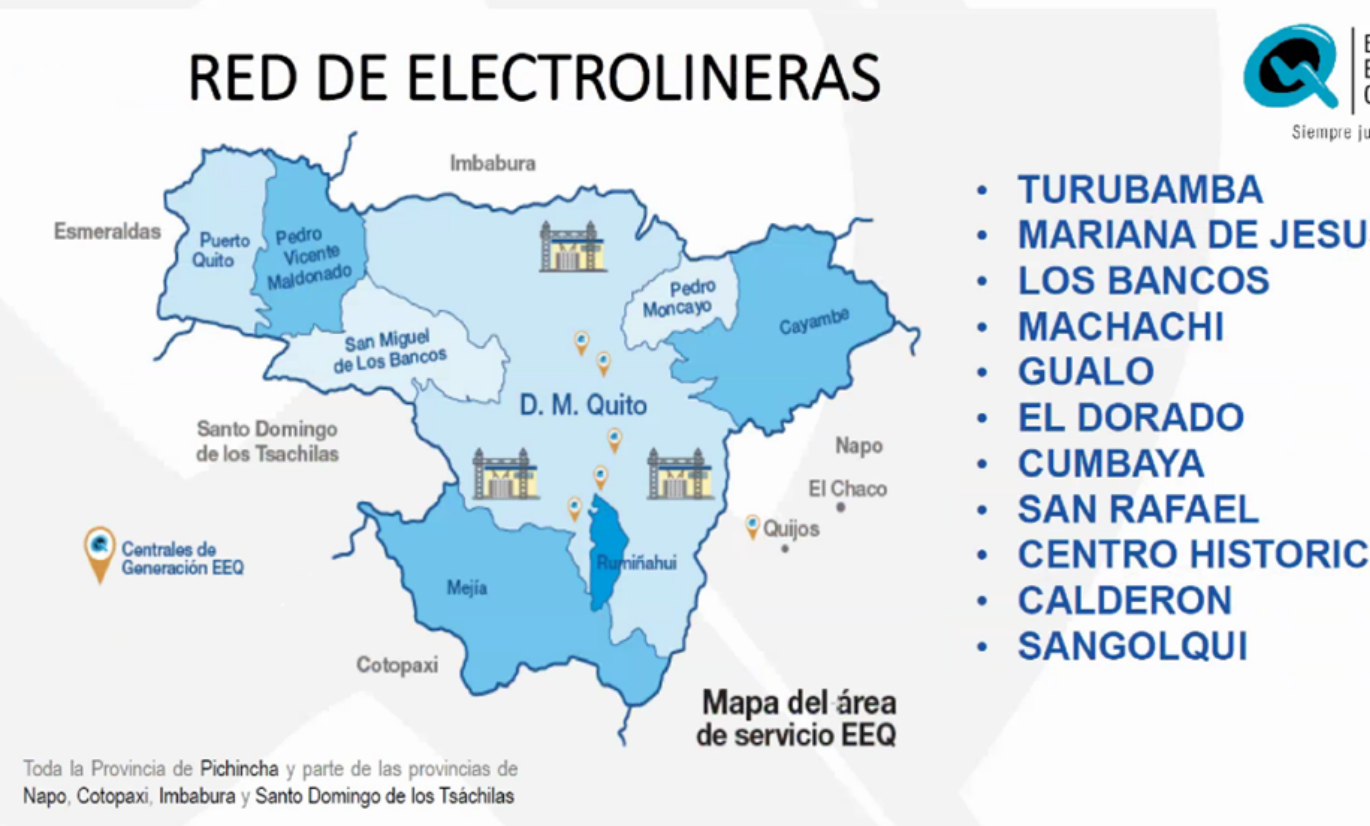


Figure 13. EEQ fast charging stations in the District Metropolitan Area[137][137]



The two specific outputs under this component are described in the following sections; the first output comprises the pilot itself, whereas output 2.2 consists of the monitoring provisions.

Output 2.1: The viability of light duty electric vehicles and associated charging infrastructure is demonstrated to local and national stakeholders in the logistics and services sectors in Quito.

As mentioned in the previous section, the pilot aims to remove barriers related to a lack of stakeholder awareness of the viability of electric vehicles for light-duty commercial operations by exposing the technology to drivers, companies, and the general public. Through these demonstrations, users and local decision-makers will develop an understanding of the economic, social, and environmental viability of electric vans and micro electric vehicles in Quito.

Output 2.1 includes the main activities in the pilot described in the previous section, starting with a workshop that reviews past pilots undertaken in Ecuador (described in the baseline section) to provide a strong foundation of lessons learned for the GEF-7 project. It also includes the preparation of a detailed pilot implementation plan that identifies potential synergies with other UNEP (and non-UNEP) on-going projects (such as EC Solutions+ and the ACCESS projects, described in the baseline and the coordination sections), the signing of agreements with the companies that will test the vehicles, and the preparation of the leasing/renting process with the firms that will provide the vehicles. In both cases, private companies were approached during the project?s design phase to participate in the design of the concept and ensure their interest in participating in the pilot. In particular, the project consultants approached the UN Global Compact Ecuador (which reunites more than 200 companies in Ecuador), the National Association of Companies in the Automotive Sector (AEADE) and CORPORENT, the association of renting firms. Each of these institutions arranged bilateral meetings between the

project?s consultants and the companies that were interested in participating in the pilot[138][138], both from the demand (i.e. logistics and services companies) and the supply side (renting companies and car dealers). In this sense, the pilot project will help bring together logistics and services companies with vehicle concessionaires and renting & leasing companies, thus kickstarting the development of new vehicle procurement models in Ecuador.

As no EVs are currently offered through renting nor leasing, the vehicles will have to be imported by the renting companies exclusively for the purpose of this pilot. As this will constitute the first of such operation in Ecuador, at the time of preparing this proposal no market value for the lease or the renting of EVs exists. The GEF project will contribute to de-risking this first operation for the renting companies, which will bear the largest part of the commercial risk. While non-binding letters of interest from the renting companies were requested for the purpose of this proposal (see Annex R), the actual contracting will be undertaken through a competitive process that ensures that the project is able to select the company offering the best value for money. Based on the expressions of interest received, it is expected that the funds allocated for this purpose will be able to secure a minimum of four and a maximum of six electric vans for the entire year in which the pilot will be undertaken.

Lastly, the preparatory phase will also include training on safety considerations for the partner companies? drivers and work on the conditioning of the consolidation depots (to be provided by the Municipality of Quito as co-finance) that will be used as collaborative cross-docking platforms for companies that deliver goods into the historic city center of Quito (Figure 19).

Regarding gender issues, drivers in the transport sector (including last-mile and micrologistics sub-sector) are mostly male. The pilot will encourage the participation of female drivers, as well as female participation in technical and management (?off-board?) roles within the pilot.

The deliverables included under output 2.1 are presented in the table below; they provide further details on the scope, target audiences, counterparts and beneficiaries from this output.

Output 2.1 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**

D2.1.1	Workshop: experiences and lessons learned from past pilots and EV experiences in Ecuador	Contents will include: - Identification of past EV pilot projects - Positive and negative results from previously implemented pilots - Determination of key causes of negative results (lack of infrastructure, insufficient planning, implementation issues, low-quality prefeasibility assessment, communication, and public engagement / expectation management, etc.) and lessons learnt	Technical staff from institutions in the National Electric Mobility Coordination Body. Car dealers, municipalities, electricity utilities.
D2.1.2	Pilot Implementation Plan	- Definition of preliminary activities, operation and safety protocols, execution plan. - Incorporation of lessons learned from previous pilots. - Identification of synergies and cooperation with other on-going initiatives (e.g. EC Solutions+, ACCESS, and others described in the baseline section)	National Electric Mobility Coordination Body; private companies participating in the pilot (logistic & services firms, car dealers and renting firms)

D2.1.3	Letter of Understanding (LoU) with companies interested in testing electric vehicles for last mile logistics	Companies interested in testing electric vehicles within their last-mile logistics operation will have to submit an expression of interest. A LoU will be signed by all interested companies which confirmed their participation in the pilot.	Private logistic companies identified with the support of the UN Global Compact Ecuador and AEADE.

D2.1.4	Service procurement documents & specifications	Include technical specifications, for the lease of a minimum of i) 4 electric vehicles compatible with the available charging infrastructure, and the purchase of ii) 6 micro/L6 electric vehicles, iii) 6 low power chargers for L6 EVs, iv) vehicle monitoring (inc. data management system and user connectivity apps). Procurement documents for the electric vans should include: - Overall vehicle dimensions, weight, and space availability to transport goods - Battery technology and energy capacity - Battery and overall vehicle warranties - Other specifications (e.g. performance reviews on different environmental and topographical conditions) Procurement documents for 6 micro/L6 electric vehicles shall specify: - Overall vehicle dimensions, weight, and space availability to transport goods - Battery technology and energy capacity - Battery and overall vehicle warranties - Other specifications (e.g. performance reviews on different environmental and	Car dealers (through AEADE) and renting/leasing companies (through Corporent).

D2.1.5	Leasing and procurement completed according to D2.1.4	Leasing/procurement of at least four electric vans and 6 micro/L6 electric vehicles.	Car dealers (through AEADE) and renting/leasing companies (through Corporent).
D2.1.6	Identification and preparation of consolidation depots completed	To include: - Required preliminary work - Maintenance plan	EC Solutions + and Municipality of Quito
D2.1.7	Training on safety, vehicle usage, data management and pilot protocols	Training sessions should address the following: - Safety considerations for the operation and usage of electric vehicles - Safety considerations for electric charger operation - Pilot test protocols - Procedures for data management on electric vehicles and charging infrastructure	Designated drivers of Evs
D2.1.8	Pilot launch	Pilot test is launched in Quito, including all relevant stakeholders.	This event will be open to the general public. Invitations and communications will be as per the multi-stakeholder consultation, communication, and engagement strategy (output 1.2)
D2.1.9	Gender action plan implementation report for Output 2.1	Report indicating progress regarding the activities, indicators and risks in the Gender Action Plan	National Electric Mobility Coordination Body, Commission on Gender and Climate Change (MAATE)

Output 2.2: Data from the pilots is collected, analysed, and disseminated to key stakeholders.

The second output in component 2 will focus on collecting operational data generated through the pilots, analyzing it, and communicating the results to national and local authorities through communication activities (output 1.2) and the Knowledge Management System (output 1.4). The vehicles purchased in Output 2.1 will be equipped with monitoring devices; the information generated by these will be uploaded to the project?s data management platforms, where it will be post-processed. The results and information will then be made available online for stakeholders to visualize and evaluate the performance of the demonstrated electric vehicles in Quito, allowing to extrapolate the results into other types of fleets.

The deliverables in this output provide further details about its scope; these are discussed in the table below:

Output 2.2 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**
D2.2.1	Pilot Monitoring Plan	The monitoring plan should take into account local / regional specificities and include: - Scope and objectives - Monitoring methodology, detailing the technical aspects of telemetry systems to be used in the vehicles - Definition of performance indicators - Data processing protocols - Before and after drivers? questionnaires	Project Steering Committee, project technical team, pilot drivers

D2.2.2	Pilot operation and performance reports	Quarterly reports and final a report. To include: - Assessment of EV performance including energy consumption, distance covered by the operation, volume of transported goods The final report will cover: - EVs techno-economic and environmental performance in the pilot, including a quantification of the reduction of GHG emissions	Project Steering Committee, National Electric Mobility Coordination Body
D2.2.3	Final workshop and presentation of results: vehicle techno-economic and environmental performance	The final workshop and presentation will cover the pilot?s results as per the final report in D2.2.2.	Private actors (logistic companies and other private sector companies through UN Global Compact Ecuador and AEADE), government officials (ANT, MTOP), private banks, leasing and renting companies, multilateral agencies
D2.2.4	Postprocessed data is online on the Knowledge Management System	Postprocessed data (such as daily distance travelled, energy consumption, charging time, volume of goods distributed, number of clients delivered, etc.) from the pilot showing performance indicators (mean daily distance travelled by the electric vehicles, mean specific consumption per kilometer, mean daily volume of goods delivered, etc.) and questionnaires? results should be uploaded to the Knowledge Management System and made available to all project stakeholders.	Private and public sector actors (AEADE, ANETA, Corporent, ANT), academy.

D2.2.5	Results and recommendations from the National Polytechnic School (EPN)	The pilot is expected to result in at least one undergraduate and one post-graduate thesis focusing on the topic of route optimization for the logistics sector in the specific context of Quito. Recommendations should cover policies and regulations (specially at the municipality level), recommendations from the private sector, and future lines of research. Likewise, the report should include an assessment in terms of potential GHG emission reductions, fuel, and cost savings.	EPN faculty (and other academic institutions), logistic and services companies, authorities from the e-mobility coordination body.
D2.2.6	Gender action plan implementation report for Output 2.2	Report indicating progress regarding the activities, indicators and risks in the Gender Action Plan	National Electric Mobility Coordination Body, Commission on Gender and Climate Change (MAATE)

f. Component 3: Preparing for scale-up and replication of low-carbon electric mobility.

Outcome 3: Key actors (government, private sector, and financing institutions) implement regulations and innovative mechanisms to incentivize the uptake of electric mobility.

This component will focus on scaling-up low-carbon electric mobility in the medium- to long-term. To do this, it will focus on various enabling conditions that are required to accelerate the transition to electric mobility. It will undertake work on various fronts: i) the commercial side, by introducing business models and an adequate legislation to allow for the development of renting, leasing and subscription to EVs (output 3.1); ii) the narrowing down of the cost differential with traditional ICE vehicles, by improving regulations in terms of vehicle efficiency and fuel quality (outputs 3.2 and 3.3); and iii) the development of charging infrastructure regulations, along with a strategy to deploy inter-city charging stations (output 3.4). Component 3 closes with an integral analysis of the socioeconomic effects that the transition to e-mobility is expected to have, resulting in a strategy for a just transition to mitigate any potentially undesired effects and the enhance the positive ones (output 3.5).

Each of the draft legislation and/or regulation resulting from this component will have to be discussed and approved by the national electric mobility coordination body (created through output 1.1), which will follow up on the relevant adoption processes required for each type of regulation. Moreover, each proposed legislation and regulation resulting from the project will be endowed with an ?adoption roadmap? that presents a thorough description of the administrative process, along with an analysis of any pre-conditions required for its adoption.

Table 18. Proposed approach for the up-scaling of e-mobility in Ecuador

Output	Focus and scope
3.1	Financial barriers, through the creation of a legal framework for **non-ownership-based business models**.
3.2	Financial, technical, and environmental barriers. Focus on standards and regulations outdated / missing for conventional and electric **vehicles**.
3.3	Financial and environmental barriers. Focus on the update of standards for **fuel quality**.
3.4	Technical barriers. Focus on the regulation of **charging infrastructure** and the development of a strategy to deploy inter-city electric charging stations.
3.5	Social barriers. Focus on achieving a **just transition** to e-mobility.

Component 3 builds upon co-financing from the Ministry of Transport and Public Works (MTOP) and the Ministry of Economy and Finance (MEF). Both institutions will fund studies and technical support as part of the development of the National Policy for Sustainable Urban Mobility (PNMU), which will play a key role in establishing guidelines for the preparation of leasing frameworks in the transport and mobility sector, and the revision of vehicle efficiency and fuel quality standards. The MEF will invest in various actions that will be key to ensure the long-term sustainability of electric mobility from the grid?s perspective, including the creation of financial mechanisms to support the uptake of e-mobility, the alignment of the electricity grid?s development with the National Mitigation Plan, and funds to support vehicle efficiency improvements in light duty vehicles. GIZ will also provide co-financing for this component, focusing on the strengthening of both supply (adjustment of credit lines and financing instruments of national development banks) and demand (e.g. support for the bankability of projects) sides of the financing of sustainable technologies in urban mobility. It will also provide technical assistance to Ecuador in meeting future energy demand with clean energy. Lastly, the local utility (Empresa El?ctrica de Quito) will implement the first inter-urban charging infrastructure along the Andean corridor, which will be the basis for the development of a nation-wide strategy (output 3.4).

Output 3.1: Business models and a policy framework for leasing, renting and subscription to electric vehicles are developed and submitted for adoption by the government, logistic companies, car dealers, financial institutions, and insurance companies

New models around e-mobility are bringing both complementarity and disruption to the mobility value chain. Existing business such as logistic companies need to find ways of integrating EVs into their business models; at the same time, e-mobility is having a disruptive effect on traditional automotive sectors and purchase methods.

The importance of the financial variables in EV adoption is widely recognized in the literature, which includes both the purchase price and operational cost (e.g. electricity cost, maintenance cost, battery renewal cost). Most studies argue that the one-time upfront cost (i.e. purchase price) of EVs is a critical barrier of adoption. EV?s purchase price is higher than the same-size petrol cars mostly due to the battery cost.

The incorporation and development of business models represent one of the major innovative trends in the automobile industry, particularly along with the new products such as EVs. Traditionally, the dominant business model in the automobile market is ownership based. In the context of EVs,

innovative non-ownership-based business models have emerged, such as subscription models and on-demand EV-sharing models for EVs. Leasing has grown in popularity ? now making up almost 27% of all new car sales in the US, while for electric vehicles, 80% are leased, according to Bloomberg New Energy Finance. [139][139] In fact, leasing of EVs is one of the preferred choices for the acquisition of this type of vehicles in the US, Europe and China.[140][140], [141][141], [142][142] Likewise, subscription models are showing considerable growth in European markets[143][143] and other countries, including in Latin America.[144][144] A discussion on the differences and similarities of these non-ownership-based models is available in Annex Q of this document.

Output 3.1 aims to support government and private sector to identify and implement leasing, renting and subscription business models to electrify their car fleets. This output will draw upon the experience gained from the project pilot, which will constitute the first leasing/renting contract of electric vehicles in Ecuador. It will also benefit from the consultation and communication actions (output 1.2), which will be essential to familiarize relevant stakeholders to these new commercialization methods and their relationship with electric vehicles. Key private sector actors to be engaged include vehicle distributors, renting and leasing companies, banks, and maintenance operators. The output will also undertake work with the logistic companies that participate in the pilot, to demonstrate how these new methods fit into their operations.

Deliverables included under this output are presented below.

Output 3.1 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**

D3.1.1	Total cost of ownership case study: light duty vehicles for service and last mile logistics	Model and report of TCO analysis over the last-mile logistics sector including: - Last-mile logistics sector operation - Application of electric technology assessment - Methodological assumptions and information used - Conventional vs electric technology TCO comparison; key variables explaining the relative TCO for EVs and conventional vehicles - Temporal framework: present, +5 years, +10 years, +20 years (aligned with the results from the just transition scenario depicted in output 3.5) - Probabilistic and sensitivity analysis[145][145] - Assessment of results and recommendations The TCO study should consider a positive discount rate for savings and expenditures occurring in the future.	Logistic companies and other private actors interested in electric mobility (through UN Global Compact Ecuador and AEADE); banks, leasing and renting companies, car dealers, government (ANT, MTOP, Ministry of Economy and Finance, MEyRNNR), universities and other institutions providing training in the sector (Universidad Internacional del Ecuador, Escuela Superior Polit?cnica del Litoral, Escuela Polit?cnica Nacional)

D3.1.2	Dossier: innovative financing and commercialization instruments for fleet electrification of the logistics sector	The report will cover at least the following elements: - Commercialization methods: renting, leasing, and traditional financing. Innovative models: car subscription & sharing models. Review of existing experiences (international, regional and national level) - Financing: implications of the TCO study for the design of financial mechanisms for the electrification of the logistics sectors? fleet - Risk management: Implications and opportunities for insurance companies - Mechanisms / recommendations to improve women access to each commercialization modality (i.e. leasing, renting, and subscription), as per the project?s Gender Action Plan. - Recommendations for Ecuador	Commercialization methods: car dealers, renting and leasing companies. Financing: CFN, Banco Pichincha, Produbanco Insurance: banks listed above + insurance companies (e.g. Zurich, AIG Metropolitana, AON)

D3.1.3	Adoption roadmap and draft proposal for the regulation of renting, leasing, and subscription of electric vehicles	The draft proposal will consist either of a revision to existing laws (including the *Code of Commerce*, the *Organic Law of Internal Tax Regime*s and the *Terrestrial Transport, Transit and Road Safety Law*) or a bill for new legislation. The proposal will cover rights and obligations of the parties, fiscal regime, requirements for users and institutions allowed to provide this service. The adoption roadmap will include a step-by-step detail of the legislative process required for the adoption (and depending on the type of instrument proposed), as well as an assessment of any pre-conditions that need to be present to ensure its approval.	Private sector stakeholders: Leasing and renting firms (through Corporent and AEADE), car dealers, financial institutions (mainly CFN, Banco Pichincha, Produbanco) Public sector stakeholders: national electric mobility coordination body, ANT, MTOP, Ministry of Economy and Finance, National Assembly.

D3.1.4	Business models for last-mile logistics (micro, small, medium firms)	The business models for both last-mile and micro-logistics should detail, *inter alia*: - Vehicle/fleet operation structure - Routes - Interaction with depots - Operating hours - Off-work requirements	Mainly: logistic companies and other private actors interested in electric mobility (through UN Global Compact Ecuador and AEADE). Other actors with an interest in these results could include car dealers, leasing and renting firms (through Corporent and AEADE), financial institutions (mainly CFN, Banco Pichincha, Produbanco) and city planners.
D3.1.5	Gender action plan implementation report for Output 3.1	Report indicating progress regarding the activities, indicators and risks in the Gender Action Plan	National Electric Mobility Coordination Body, Commission on Gender and Climate Change (MAATE)

Output 3.2: Standards and a policy framework for regulating the energy efficiency, emissions standards, and safety of conventional and electric vehicles are updated and adopted by the national electric mobility coordination body

One of the main problems faced by LATAM transport sector is the high growth rate of the fleets, along with high emission coefficients of vehicles. Furthermore, in views of the technological and modal changes appearing in the global transport sector, together with higher emission standards currently applied by developed countries, leaves countries like Ecuador unprotected to dumping of inefficient vehicles. This influx of cheap vehicles increases the cost incremental between such vehicles and new electric vehicles, leading to increased amounts of high-polluting vehicles in the country. This output aims to address this barrier by supporting the regulation, energy efficiency and emissions of electric and conventional vehicles.

This output will assist the Ecuadorean Normalization Institute (INEN) in developing a technically and socially feasible roadmap for the adoption of more stringent standards for the regulation of energy efficiency, emissions, and safety standards for conventional and electric vehicles. It will build upon the technical recommendations from the Global Fuel Efficiency Initiative project[146][146], which is expected to take place during the first semester of 2022, providing a socially viable strategy for its adoption.

The deliverables that will result from this output are presented below:

Output 3.2 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**
D3.2.1	Workplan for project team?s assistance to the MNME and INEN for the revision of conventional vehicle efficiency norms and the creation of norms for EVs	The workplan should include: - Scope of conventional vehicle efficiency norms to be assessed - Scope of EV efficiency norms to be created - Workplan of activities and procedures to address the above, including literature review on international efficiency standards for both conventional and electric vehicles	Primarily INEN technicians; also technical staff at MEyRNNR and ANT.
D3.2.2	Report: regional and international good practices and options for regulating the energy efficiency and emissions of electric and conventional vehicles	Report addressing good practices including: - Implementation of international and regional regulations within the local context of the country - Identify different available options to regulate energy efficiency of both conventional and electric vehicles - Identify the most relevant international standards to regulate emissions of conventional vehicles - Recommendations and good practices for the transition and deployment of new norms	Primarily INEN technicians; also technical staff at MEyRNNR and ANT.

D3.2.3	Workshop: recommendations for the revision of conventional vehicle efficiency norms and the creation of safety norms for electric vehicles	Workshop developed as per D3.2.2, including: - Current scenario of regulations in the country - Adaptation of international efficiency norms into the local context	Primarily INEN technicians; also technical staff at MEyRNNR, ANT and the Ministry of Production, Foreign Commerce, Investments and Fishing (approving entity of norms proposed by INEN). Invite relevant stakeholders identified through the Multi-stakeholder consultation, communication, and engagement strategy (output 1.2), e.g. entities grouping the transport sector, (AEADE), civil society, academia, and others.
D3.2.4	Adoption roadmap and draft revisions of INEN NTE norms 935 (gasoline engines) and 1489 (diesel engines)	Aim of the revision is to enhancing energy efficiency and reduce emissions of conventional vehicles. Proposal based on Euro V standards or higher. The adoption roadmap should link progress in the adoption of these norms with improvements in fuel quality. The adoption roadmap will include a step-by-step itinerary for the revision process, as well as an assessment of any pre-conditions required to ensure its approval.	National electric mobility coordination body. Other stakeholders include INEN technicians; also technical staff at MEyRNNR, ANT and the Ministry of Production, Foreign Commerce, Investments and Fishing (approving entity of norms proposed by INEN).

D3.2.5	Adoption roadmap and draft proposal for safety standards required for electric vehicles	Draft proposal based on D3.2.2 and D3.2.3. Objective of this norm (NTE) is that EVs entering the country (or manufactured locally) are endowed with minimum safety requirements in terms of components as well as during normal operation, maintenance and repairing. Examples / references may include ISO 8713 (Electrically propelled road vehicles ? Vocabulary), ISO 6469 (Safety specifications ? Part 1: Rechargeable energy storage system (RESS)), SAE J2344 (Guidelines for Electric Vehicle Safety), among others.	National electric mobility coordination body. Other stakeholders include INEN technicians; also technical staff at MEyRNNR, ANT and the Ministry of Production, Foreign Commerce, Investments and Fishing (approving entity of norms proposed by INEN).

Output 3.3: Standards and a policy framework for regulating fuel quality are updated and adopted by the national electric mobility coordination body

As discussed in the baseline section, sulphur content in fuels traded in Ecuador range from 143 to 5119 ppm. The use of high sulphur content fuels, especially in diesel vehicles, has strong correlation with the emission of toxic air pollutants. As developing countries move to low sulphur fuels, the excess availability of high sulphur fuel in the global market may result in a reduction in its price, making it difficult for developing countries to transition to low sulphur fuels and sustainable technologies such as electric vehicles. These low-quality fuels result in low fuel prices, providing a barrier to reducing the cost incremental between internal combustion engine vehicles and electric ones. The introduction of higher quality and more expensive fuels will not only result in a considerable reduction of local pollutant emissions, but also (and most importantly) help reduce the economic gap between conventional and electric vehicles, promoting the uptake of the latter. However, doing so will require significant investments in terms of refining capacity and/or the liberalization of fuel imports, with a subsequent impact on prices.

This output will assist the Ecuadorean Normalization Institute (INEN) in developing a technically and socially feasible roadmap for the adoption of more stringent fuel quality standards, including a proposal on how to finance the transition (e.g. taxes on less-efficient vehicles) and a thorough assessment (and mitigation measures) of all the implications in terms of income distribution. As in the previous output, these activities will also build upon the technical recommendations provided by the Global Fuel Efficiency Initiative project, which is expected to take place during the first semester of 2022, providing a socially viable roadmap for its adoption.

Deliverables included under this output:

Output 3.3 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**
D3.3.1	Workplan for project team?s assistance to the MNME and INEN for the adoption of revised fuel quality standards	The workplan should organize the project team?s assistance to INEN, including: - Scope of assistance needed (standards, coordination with existing refinement capacities, fiscal and distributional impacts of adoption (and mitigation measures), transition between current and future standards and norms) - Alignment with recommendations from the proposal issued by the GFEI - List of activities and timelines aligned with the scope	Primarily INEN technicians; also technical staff at ARCERNNR, MEyRNNR and the Ministry of Production, Foreign Commerce, Investments. Technicians and representatives from Petroecuador. Private sector representatives (like AEADE) and civil organizations
D3.3.2	Report: regional and international good practices and options for regulating fuel quality	Report including: - Fiscal approach for high-quality fuels - Application and deployment of Euro standards - Experiences and case studies in the LAC region	Primarily INEN technicians; also technical staff at ARCERNNR, MEyRNNR and the Ministry of Production, Foreign Commerce, Investments. Technicians and representatives from Petroecuador. Private sector representatives (like AEADE) and civil organizations. Also to be invited: staff from the GFEI
D3.3.3	Workshop to discuss options for regulating fuel quality to achieve climate commitments through a just transition	This deliverable will present the results from the previous report to a larger audience, in alignment with the multi-stakeholder consultation, communication, and engagement strategy (output 1.2).	Ministry of Economy and Finance; Ministry of Production, Foreign Commerce, Investments; National Electric Mobility Coordination Body. Private sector and civil society representatives

D3.3.4	Adoption roadmap and draft standards and a policy framework for regulating fuel quality, including fuel imported to the country.	Draft revision to NTE INEN 935 (gasoline) and NTE INEN 1489 (diesel), including a proposed roadmap for its adoption and a detailed description of the transition phase. The adoption roadmap will include a step-by-step itinerary for the revision process, as well as an assessment of any pre-conditions required to ensure its approval.	National electric mobility coordination body. Other stakeholders include INEN technicians; also technical staff at ARCERNNR, MEyRNNR and the Ministry of Production, Foreign Commerce, Investments. Technicians and representatives from Petroecuador. National Electric Mobility Coordination Body
D3.3.5	Gender action plan implementation report for Output 3.3	Report indicating progress regarding the activities, indicators and risks in the Gender Action Plan	National Electric Mobility Coordination Body, Commission on Gender and Climate Change (MAATE)

Output 3.4: Regulations for the installation of public and private electric vehicle charging infrastructure are drafted and adopted by the national electric mobility coordination body

Experience in European countries shows that the availability of charging infrastructure is as important as direct vehicle purchase incentives when promoting the uptake of electric vehicles. Therefore, establishing safety and operational regulations and standards for vehicle charging infrastructure is crucial. This output includes work on three areas[147]:

i) the first part focuses on the technical requirements for the charging infrastructure itself. Information and knowledge generated in output 1.2 and through the pilots in outputs 2.1 and 2.2 will be used to establish national electric vehicle charging infrastructure standards and regulations. It will detail elements including grid connection requirements, charging infrastructure communication protocols, interoperability requirements, and output current requirements (deliverables D3.4.1 - 3.4.4).

ii) the second is related to the installation of charging infrastructure from the municipal point of view: with an increasingly large share of the population living in cities, solutions need to ensure the availability of dedicated parking spaces for EV charging in apartment complexes, as well as in public and commercial building complexes (D3.4.5)

iii) the last part of this output focuses on inter-city charging stations, an element that is decisive in the buyers? choice at the time of purchasing a vehicle. However, this is also typically the hardest (and most expensive) challenge in mainstreaming e-mobility. The variety of potential stakeholders, project partners, and desired recharging services leads to many possibilities for ownership, investment, and operation of public inter-city charging infrastructure. Moreover, high initial investments for the installation of a DC fast charging station, coupled with a low number of EVs at the early phases of the transition to e-mobility imply that some sort of subsidy will be required in the initial years of the

system. The last deliverable in this section will address these issues through a strategy for the deployment of an inter-city network of charging stations (D3.4.6).

Specific details of the deliverables in this output are provided below:

Output 3.4 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**
D3.4.1	Workplan for project team?s assistance to the MNME and INEN for the adoption of standards for vehicle charging infrastructure	The workplan should include: - Scope of revised standards for electric vehicle charging infrastructure to be adopted - List of activities and procedures for the adoption - Considerations for the importation of suitable EV charging infrastructure and the use of local components and manufacturers	Primarily INEN technicians; also technical staff at ARCERNNR, MEyRNNR and the Ministry of Production, Foreign Commerce, Investments. Technicians and representatives from distribution companies (e.g. Empresa El?ctrica de Quito). Private sector representatives (like AEADE)

D3.4.2	Report: regional and international good practices and options for the installation of private and public electric vehicle charging infrastructure	Report on good practices in the adoption of standards for charging infrastructure including: - Charging infrastructure interoperability requirements including: - Types of connector standards - Communication protocols - Infrastructure safety standards and other general standards (ISO/IEC/SAE standards) - Vehicle to grid standards - Standards and requirements for the installation of charging infrastructure at both public and private locations - Commercial aspects of the system / business models	Primarily INEN technicians; also technical staff at ARCERNNR, MEyRNNR and the Ministry of Production, Foreign Commerce, Investments. Technicians and representatives from distribution companies (e.g. Empresa El?ctrica de Quito). Private sector representatives (like AEADE)
D3.4.3	Workshop to discuss options for standards for vehicle charging infrastructure	Workshop to be developed as per D3.4.1 and D3.4.2.	Primarily INEN technicians; also technical staff at ARCERNNR, MEyRNNR and the Ministry of Production, Foreign Commerce, Investments. Technicians and representatives from distribution companies (e.g. Empresa El?ctrica de Quito). Private sector representatives (like AEADE); civil society.

D3.4.4	Adoption roadmap and draft standards (NTE) for electric vehicle charging infrastructure and its components	Proposed RTE to include standardization of charging protocols and connectors. This will revise and update draft RTE INEN 162 (drafted in 2017 but never adopted). The adoption roadmap will include a step-by-step itinerary for the revision process, as well as an assessment of any pre-conditions required to ensure its approval.	National electric mobility coordination body. Other stakeholders include INEN technicians; also technical staff at ARCERNNR, MEyRNNR and the Ministry of Production, Foreign Commerce, Investments. Technicians and representatives from distribution companies (e.g. Empresa El?ctrica de Quito). Private sector representatives (like AEADE)
D3.4.5	Adoption roadmap and regulation models for installation of charging infrastructure in public and private buildings at the GAD level	Model regulation for GADs regarding the installation of charging infrastructure in the parking lots of housing buildings, public institutions and others (eg: Hospitals, Airports, Shopping Centers, etc.). Proposal should be aligned to ARCERNNR regulations. The adoption roadmap for this deliverable will include a detailed assessment of the typical approval process at the GAD level, providing a minimum of two examples for representative cities agreed with the Project Management and Technical Units. It will also include an assessment of any pre-conditions required to ensure its approval.	National electric mobility coordination body. Other stakeholders include GAD representatives (e.g. AME, i.e. Association of Municipalities of Ecuador); also technical staff at ARCERNNR, MEyRNNR. Technicians and representatives from distribution companies.

D3.4.6	Strategy and business models for the deployment and operation of charging infrastructure in Ecuador	This deliverable will present a detailed strategy and roadmap for the deployment of charging infrastructure. It will include: - Proposal and application of a methodology for the prioritization of inter-city corridors where charging infrastructure is required - Optimum size - Proposal for a unified billing system and interoperability - Estimated cost of implementing the strategy - Business model for each stage of development: 5, 10, 15, 20 years. Proposal for the required subsidy required in the initial years, and financing strategy.	National electric mobility coordination body. Other stakeholders include the Ministry of Economy and Finance; Ministry of Production, Foreign Commerce, Investments. Private sector and civil society representatives. National Planning Council[148][148]

Output 3.5: A just transition strategy for the up-scaling of e-mobility is drafted and adopted by the national electric mobility coordination body

Sustainable economic growth is associated with an increase in access to and use of clean energy, and concepts such as energy justice have been developed and increasingly used in the context of the energy transition. [149][149] The interlinkages between energy transition, energy poverty (how energy demand of vulnerable groups is met) and energy inequality (how access to energy is distributed) from a developing country perspective are of particular concern, as it is often the poorest that end up paying a disproportionate share of their income for energy. An analogous argument can be made for the transition to a cleaner transport and mobility system, defining **transport poverty** as the way in which access to transport is distributed and **transport inequality**, as how transport and mobility demands are met.

The successful establishment of electric mobility as a viable competitor to conventional mobility depends not only on technical, but also on social acceptance and equity considerations, as demonstrated by the severe crisis following a failed attempt at lifting fuel subsidies in 2019.[150][150] Thus, this output was conceived to provide a tool for the identification and quantitative estimation of social, technical,

fiscal, and environmental impacts that could potentially arise during the transition to e-mobility, along with adequate mitigation measures, where necessary. It includes evaluations on:

- the technical feasibility of the transition to e-mobility from the point of view of the national interconnected system, including the generation, transmission, and distribution sub-systems. This will also include a deliverable on potential pathways for the development of Ecuador?s electricity generation mix that ensure that the electrification of the Ecuadorean fleet results in a net reduction of GHG emissions (environmental breakeven analysis);

- the fiscal impact (at the national and GAD level) of the energy transition, including those resulting from changes in fossil fuels and EV subsidies and other types of incentives;

- the social impact, mainly in terms of transport poverty, transport inequality, and income distribution;

A final deliverable integrates all these considerations into a strategy for the up-scaling of e-mobility in Ecuador; the complete list of deliverables under this output is presented below.

Output 3.5 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**

D3.5.1	Report: financing the transition to e-mobility: scenarios, alternative policies, fiscal impact, and sources of finance	The report should include: - Existing fiscal and non-fiscal incentives to leverage the transition to e-mobility - Assessment of policies to support the transition to e-mobility - Detailed financial model describing and quantifying scenarios for the transition to e-mobility, including fiscal impact (through the linkage with fuel quality and EV subsidies and revenues) at the national level. Assess likely impact of the adoption of the revised fuel quality standards on local production, fuel imports, investments required for refinement upgrades, projection of cost of fuels, downstream impact of fuel prices into the different sectors of the economy - Assessment on the fiscal impact of policies and incentives at the GAD level - Identification of existing / potential financing options and investment bundles to develop e-mobility	National Electric Mobility Coordination Body (in particular, MTOP, ANT, Ministry of Economy and Finance, representatives from GADs).

3.5.2	Report: Technical feasibility of the EV transition	The report should address the technical feasibility of each of the three phases defined by the proposed ENME[151] from the point of view of the generation, transmission and distribution capacity of the Ecuadorean grid. Identify required updates in the Electricity Masterplan to include the goals in the proposed strategy.	National Electric Mobility Coordination Body (in particular, MEyRNNR and MAATE) and ARCERNNR
3.5.3	Report: distributional and equity aspects of the transition to electric mobility ? assessment and recommendations for a just transition	The report should address the impact of the transition to e-mobility within the following: - Identify the most relevant sectors of the economy and quantify distributional impacts (e.g. burden of transport expenditures per decile of income, differentiated by gender, and in indigenous people) in the baseline and in the e-mobility transition scenariosDevelop recommendations and a costed strategy (identifying sources of funding) to mitigate the impact in the most vulnerable sectors	Civil society and general public (as identified in the Multi-stakeholder consultation, communication, and engagement strategy). A list of these institutions can be found in the ?Stakeholders? section of this document.

3.5.4	Long-term environmental breakeven analysis	The long-term environmental breakeven analysis[152][152] should cover the period 2025 ? 2050, and: - Identify critical thresholds (i.e. ?environmental breakeven?) for the share of different combinations of renewables, below which the electrification of the Ecuadorean fleet would result in a net increase of GHG emissions. - Provide recommendations and mitigation measures to avoid reaching these thresholds. - Identify projects (and capacity gaps) in the Electricity Masterplan that should be prioritized to ensure that the grid follows a sustainable pathway in terms of achieving net GHG reductions from e-mobility - Estimate the impact in the price of electricity and potential distributional effects.	National Electric Mobility Coordination Body (in particular, MEyRNNR and MAATE)

3.5.5	Just transition strategy for the up-scaling of e-mobility	This report integrates all the results from this output, resulting in a concrete strategy for a just transition to e-mobility. The strategy should also include a section on gender, where the impact (positive or negative) on existing gender gaps must be assessed. Negative impacts will require clear mitigation measures.	Ministry of Economy and Finance, National Electric Mobility Coordination Body, private sector and civil society representatives
D3.5.6	Gender action plan implementation report for Output 3.5	Report indicating progress regarding the activities, indicators and risks in the Gender Action Plan	National Electric Mobility Coordination Body, Commission on Gender and Climate Change (MAATE)

g. Component 4: Promotion of long-term environmental sustainability of low-carbon electric mobility

The final component in this project focuses establishing policies, standards, and regulations to ensure the long-term environmental sustainability of low-carbon electric mobility in Ecuador. It aims to achieve this developing legislation (output 4.1) and capacity building (output 4.2) for end-of-life conventional and electric vehicles. Note however that the scope will also include sustainability improvements for conventional vehicles as well, reducing the average age of the fleet and improving its efficiency.

Component 4 will build upon co-financing provided by the Ministry of Environment, Water and Ecologic Transition (MAATE) through the technical work for the preparation of the National Plan Towards Decarbonization, as well as on co-financing provided by the Ministry of Transport and Public Works (MTOP) through the technical support as part of the development of the National Policy for Sustainable Urban Mobility (PNMU). Both will provide the general framework for the implementation of end-of-life legislation for conventional and electric vehicles.

Outcome 4: The national government takes action towards implementing standards for ensuring the environmental sustainability of electric mobility.

Output 4.1: A proposal for regulating the re-use, recycling and disposal of electric and conventional vehicles is drafted and adopted by the national electric mobility coordination body

To ensure the long-term environmental sustainability of the uptake of electric mobility, this output will support the development of standards and a policy framework for regulating the end-of-life disposal of both conventional and electric vehicles. As discussed in the baseline section, specific regulations exist for some elements that are relevant for vehicles (e.g. lead-acid batteries, used tires, and electronic equipment); however, there is no consolidated legislation that tackles the issue in an integrated way, considering all the aspects involved in the environmentally-sound handling of end-of-life vehicles. Moreover, the introduction of EVs will bring additional challenges, such as the disposal of lithium-ion

batteries. This output will propose two brand-new resolutions that will be nested within the ?Unified text on secondary legislation for the environment? (Executive Decree 3516), i.e. an integrated resolution for vehicles in the end of their useful life, and a specific resolution for the disposal of used batteries.

This output will propose an integrated model of vehicle scrapping (a requirement laid out in the LOEE), which in addition to guaranteeing that the vehicle ceases to exist as such, seeks to: i) ensure the proper management of hazardous waste (lead-acid batteries, lubricants, gases from the air conditioning systems) and waste requiring special handling (e.g. electrical and electronic equipment, tires) generated during the process, ii) maximize the recovery of the different materials that constituted it (not limited to ferrous scrap), iii) classify these materials by type of waste according to their physicochemical characteristics in such a way that their specialized management is facilitated in a way adjusted to the regulations and good environmental practices available, promoting their incorporation into new production processes; and (iv) minimize the volume of unusable waste going to landfills.

The proposed legislation under this output will include incentives to develop local and connect to regional markets for vehicle recycling and disposal. This is required firstly to enhance the long-term environmental sustainability of the disposal of end-of-life of vehicles in general. Secondly, standards are required for all vehicles to ensure that there is a level playing field for electric vehicles with conventional ones, avoiding additional costs being added to the cost of electric vehicles to cover for end-of-life management. If regulation were enforced for the disposal of electric vehicles but not conventional vehicles it would hinder the deployment of the new technology, as importers and car owners would not want to deal with the added responsibilities and costs of owning an electric vehicle. Consultation on the draft standards will be facilitated through output 1.2.

The content of the deliverables resulting from this output are presented in the table below.

Output 4.1 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**
D4.1.1	Workplan for the project team?s assistance to the MNME and MAATE for the adoption of a regulation for disposal of end-of-life electric and conventional vehicles	The workplan should include: - Scope of assistance needed (type of regulation required, listing of waste streams covered by existing legislation, potential for recycling, potential reduction in GHG emissions resulting from the reduction of the fleet?s age, technical requirements for separation facilities, distinction in processes for conventional and electric vehicle end-of-life disposal, etc.) - Scope of activities needed for the implementation of end-of-life disposal regulations	MAATE* representatives, ANT. Other stakeholders include CFN and IADB (working on a scrapping project for buses and taxis). * adopting ministry in charge of issuing the Ministerial Resolution, ?Acuerdo Ministerial?.

D4.1.2	Report: International good practices for the regulation of end-of-life of electric and conventional vehicles	Report on good practices including: - General context of international regulations - Detail on different regulatory options available at an international level, for vehicles in general and for specific recyclable components in particular. For EVs, international and regional experiences in the disposal of ion-lithium batteries. - Practical considerations for the application under the national and regional context	MAATE representatives, ANT. Other stakeholders include CFN and IADB (working on a scrapping project for buses and taxis).
D4.1.3	Workshop to discuss options for regulating the end-of-life vehicle disposal for electric and conventional vehicles	Workshop should address: - Discussion on good practices of end-of-life disposal of conventional and electric vehicles as per D4.1.2 - Existing local end-of-life disposal options and adaptation of international practices to the local context - Lessons learned from the RENOVA project - Technical and regulatory requirements for the application of international best practices - Presentation of the proposal for end-of-life disposal of vehicles and batteries - Infrastructure challenges (and investments required) for recycling of lithium-ion batteries and considerations for the export of spent batteries for overseas recycling	MAATE representatives, ANT. Waste recyclers associations (e.g. *Red Nacional de Recicladores del Ecuador*), representatives from scrapping facilities (ANDEC and ADELCA), land-fill owners. Private sector and civil society representatives. Other stakeholders include CFN and IADB (working on a scrapping project for buses and taxis).

D4.1.4	Adoption roadmap and draft Ministry Resolution regulating the end-of-life vehicle disposal for electric and conventional vehicles	The draft resolution will cover, *inter alia*, the following topics: - Classification of auto-parts (regular solid waste, non-hazardous waste requiring special management, hazardous waste) - Technical requirements for the reception and storage of vehicles - Extraction and handling of hazardous waste - Requirements for disassemble areas - Temporary storage of waste - Scrapping and final disposal - A section on the integration, formalization, and capacity building of recyclers (with special emphasis on women) - Enforcement mechanisms	MAATE* representatives, ANT. * adopting ministry in charge of issuing the Ministerial Resolution, ?Acuerdo Ministerial?.
D4.1.5	Adoption roadmap and draft Ministry Resolution regulating the end-of-life disposal and recycling of batteries from EVs	The draft resolution will cover the following: - Classification of batteries in accordance with D.4.1.4 - Classification of batteries according to battery technology/type (Li-ion, LFP, etc.) - Technical requirements for the reception and storage of EV batteries - Disassemble of batteries and extraction of reusable components and hazardous waste - Requirements for disassemble areas - Temporary storage of waste - Scrapping and final disposal - Requirements for the export of spent batteries for overseas recycling - Enforcement mechanisms	National electric mobility coordination body. Other stakeholders include MAATE representatives, ANT.

D4.1.6	Gender action plan implementation report for Output 4.1	Report indicating progress regarding the activities, indicators and risks in the Gender Action Plan	National Electric Mobility Coordination Body, Commission on Gender and Climate Change (MAATE)

Output 4.2: Waste companies are trained in reusing, recycling, and disposing used vehicles (both conventional and electric) and electric vehicle batteries.

Training and building local capacity in the management of hazardous and non-hazardous waste is essential for ensuring a long-term environmentally sustainable transition to a low-emission transport sector. This output will support key stakeholders to enhance their capacity by facilitating training on the reuse, recycle and disposal of vehicle components, both conventional and electric. These stakeholders will include non-governmental organizations (NGOs), private recycling companies and government entities that are involved in the reuse, recycle and disposal chain of different types of waste, auto-related companies, and renewable energy installation companies.

The deliverables resulting from this output are discussed in the table below.

Output 4.2 ? list of deliverables and minimum indicative content			
Code	**Title**	**Minimum indicative content**	**Target audience / beneficiaries / recipient / counterpart**
D4.2.1	Workshops on vehicle (conventional and electric) recycling, disposal, and electric battery reuse	Topics including: - General aspects of end-of-life vehicle disposal (conventional and electric). - Vehicle used battery management and battery reuse. - Hazardous waste management. - Lithium-ion recycling technology.	Waste recyclers associations (e.g. Red Nacional de Recicladores del Ecuador), representatives from scrapping facilities (ANDEC and ADELCA), land-fill owners, representatives from the MAATE

D4.2.2	Workshop on development of circular economy business models for batteries and components in electric vehicles	Workshop to discuss and develop convenient business models that include end-of-life management and disposal of batteries and electric vehicle components as per D4.2.1. - The workshop will cover end-of-life vehicle (ELV) management on vehicle components for all vehicle types and second-life battery use, including cost benefit analysis and business models for private sector Material prepared for this workshop will also be made available in the project?s KMS (output 1.4).	Waste recyclers associations (e.g. Red Nacional de Recicladores del Ecuador, Union de Gestores de Residuos y Desechos de Ecuador), representatives from scrapping facilities (ANDEC and ADELCA), land-fill owners, representatives from the MAATE
D4.2.3	Gender action plan implementation report for Output 4.2	Report indicating progress regarding the activities, indicators and risks in the Gender Action Plan	National Electric Mobility Coordination Body, Commission on Gender and Climate Change (MAATE)

4) Alignment with GEF Focal Area and/or Impact Program strategies

This programme is aligned with Objective 1 of the Climate Change Focal Area to ?Promote innovation and technology transfer for sustainable energy break-throughs?, through CCM1-2 - Promote innovation and technology transfer for sustainable energy breakthroughs for electric drive technologies and electric mobility.

5) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing

GEF funds will play a key role in supporting Ecuador to sustainably overcome the barriers described in this document. Overall, the project is covering the incremental costs of barrier removal activities. The

GEF funds will facilitate, mobilise, and complement activities and investments envisaged by the project partners (MAATE, MTOP, MEyRNNR, CFN, EEQ, and the Municipality of Quito) as well as actors from the private sector (including firms in the logistics sector, car dealers and renting/leasing companies).

Currently, electric vehicles comprise a minuscule share of the yearly car sales (<0.11%). This is due to a series of barriers that are either having a direct impact on the relative price of ICE and EVs (e.g. the subsidies to fossil fuels, the poor quality of the fuel available), or affecting the perceived risks of the technology (e.g. anxiety range due to the lack of intercity charging infrastructure, incomplete technical framework for EVs, etc.). This and other barriers as well as identified root causes will not be adequately addressed without the proposed GEF project.

The outputs included in this project comprise barrier removal activities that would not occur in the baseline scenario, i.e. activities that are not attractive or feasible to private and public actors. These include the development of an adequate policy and regulation frameworks (including the creation of commercial instruments and financial reforms to incentivise EVs and facilitate permanent end-of-life management), thus tackling the current cost and risk gap between EVs and regular ICE vehicles. The project has been designed to focus directly on a key sub-sector of the economy that is expected to have a demonstrative effect and facilitate up-scaling, which in turn will accelerate the transition to electric mobility as discussed in the project?s theory of change (Figure 18).

In addition, the project is supported by the global programme and its programmatic approach. The regional coverage is seeking to bundle demand in the region, thus allowing to confront these barriers in a cost-effective way. In particular:

- Tools are produced at global level, disseminated through regional support and investment platforms and adapted to the needs in the country at the country level ? thus return on investment for development of tools and methodologies is maximized
- Investment risk for demand side ? bundling demand for e-vehicles for demonstration in a certain region can lead to lower vehicle prices
- Technology risk for supply side ? through adequate training of vehicle operators, importers and dealers and exchange between numerous projects, the industry is less likely to face misuse of technology.

Regarding co-finance, the project will build upon the work that is to be undertaken on key fronts for the development of e-mobility:

- Component 1 builds on a key contribution financed through funds from the Ministry of Economy and Finance (MEF) and the Ministry of Transport and Public Works (MTOP), namely, the National Policy for Urban Sustainable Mobility (PNMU). The PNMU will be the ground policy governing the mandate for a transition to e-mobility and into more sustainable transportation means in Ecuadorean cities. Likewise, this component also builds upon the technical and strategic studies that are to be developed by MAATE as part of the National Plan Towards Decarbonization (PND), as well as in-kind contributions provided by the MAATE, MTOP and the Ministry of Energy and Non-Renewable Resources (MEyRNNR) with regards to coordination and consultation. The PND will provide concrete actions at the sectoral level, including support to Nationally Appropriate Mitigation Actions in transport and energy. It will also design and implement a communicational and educative strategy for the achievement of its goals, ensuring territorial awareness of Climate Change as an environmental problem from a citizen perspective, and with the productive sector of the country.

Lastly, the PND will establish a Measurement, Reporting and Verification System (MRV), which allows adequate monitoring of its implementation. These elements will be the basis for this GEF-7 project?s own stakeholder engagement and communication strategy (output 1.2) and Knowledge Management System (output 1.4).

- Component 2 uses fast-speed charging infrastructure provided as co-finance from local utility Empresa El?ctrica de Quito (EEQ). The pilot will also be supported by a research team from the Escuela Polit?cnica Nacional (EPN), a public, technical university with on-going research projects in the area of route modelling and mathematical optimization for the logistics and transport sector. GIZ also provides support in the implementation of the pilot, aiming at the use of innovative instruments and technology that demonstrate the viability of the up-scaling of e-mobility.

- Component 3 builds upon co-financing from MTOP and MEF. These ministries will fund studies and technical support as part of the development of the National Policy for Sustainable Urban Mobility (PNMU), which will play a key role in establishing guidelines for the preparation of leasing frameworks in the transport and mobility sector, and the revision of vehicle efficiency and fuel quality standards. The MEF will also invest in various actions that will be key to ensure the long-term sustainability of electric mobility from the grid?s perspective, including an Integral Energy Plan that is articulated with the National Mitigation Plan. This will ensure that the country?s energy matrix follows a path that is compatible with the transition to renewables and towards e-mobility; as well as support in the reduction of emissions from light-duty vehicles, both from the regulatory but also from a financial point of view. GIZ will also provide co-financing for this component, focusing on the strengthening of both supply (adjustment of credit lines and financing instruments of national development banks) and demand (e.g. support for the bankability of projects) sides of the financing of sustainable technologies in urban mobility. It will also provide technical assistance to Ecuador in meeting future energy demand with clean energy. Lastly, EEQ will invest in developing the first inter-urban charging stations, serving as basis for the development of a strategy in component 3 (output 3.4).

- Component 4 will build upon co-financing provided by the Ministry of Environment, Water and Ecologic Transition (MAATE) through the technical work for the preparation of the National Plan Towards Decarbonization, as well as on co-financing provided by the Ministry of Transport and Public Works (MTOP) through the technical support as part of the development of the National Policy for Sustainable Urban Mobility (PNMU). Both will provide the general framework for the implementation of end-of-life legislation for conventional and electric vehicles.

6) Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF)

GHG emission mitigation has been estimated by the UNEP Sustainable Mobility (SMU) Unit using its GHG emission reduction calculation model. Full details are provided in Annex L. Based on official historical data of gross domestic product (GDP) and population statistics an approximate hypothesis has been established for future annual GDP and population growth.

The model estimates light-duty passenger and freight vehicles (LDV) based on GDP per capita, with an elasticity of 1 until GDP per capita reaches USD 20,000, 0.7 until the GDP per capita reaches USD 30,000 and 0.3 afterwards.

In the baseline model, alternative vehicles technologies sales (hybrid electric vehicles (HEV), plug-in hybrid (PHEV), and battery electric vehicle, (BEV)) in comparison with LDV ICE sales are not considered to enter massively (>15,000 sales) to the country before 2027. The electric mobility scenario considers that the introduction of electric vehicles (EVs) will begin upon the introduction of the LDVs that will take part of the project pilot in 2023; while the actual number of EVs will depend on

the result of the competitive process that will be undertaken for the selection of the renting / leasing company, a total of 4 vehicles have been considered for this calculation for conservativeness. Due to the development of the electric mobility policy framework, the adaptation of electric mobility business models, and replication projects, the country will project to have 52 thousand electric vehicles in 2030. Direct GHG emission reductions are considered only for the (10 years) of these vehicles provided by the project. An average LDV electric energy consumption of 5 kWh/km has been considered. As electricity in Ecuador is mostly generated from hydroelectric plants (92% approx.), an average emission factor for electricity generation of 0.26 kg CO_2/kWh in 2020 has been included.

As a result of this GEF-7 project, the country expects to increase the participation of electric LDV from 0.6% in 2025 to 18% in 2035. The emissions avoided by these vehicles are used for computing the indirect benefits of the project. Other indirect emission reductions are due to the impact of the policies developed by the project in other types of vehicles (e.g. public transport), which are expected to result in more efficient vehicles and a faster adoption of electric vehicles in line with the Energy Efficiency National Policy (PLANEE) and law (LOEE).

As an output of the LDV pilot, the project expects to have a reduction of 219 tons of CO_2.The expected emission mitigation from policy (secondary direct) is 452,059 tCO_2. The emission reductions from replication and scale-up projects (indirect emissions) are 1,808,500 tCO_2. Both, the secondary direct and indirect emissions reductions are estimated for a 15-year period after the beginning of the project (2037). A causality factor of 40% is used to quantify the amount of the benefits obtained as a result of the project execution and its influences. This means that outputs of the project will contribute to the country overcoming the economic, technology and social barriers for the adoption of electric mobility. The project GHG emission reductions and energy saving impacts are summarized in the table below.

Table 19. GHG reductions and energy savings resulting from the project (2022 ? 2037)

Project information ? Project duration: 3 years. Starting in 07/2022 and ending in 06/2025 ? Time frame for indirect effects: 15 years. Starting in 2022 and ending in 2037 (effects produced by policy developed during the project and coming scale-up and replication projects) ? Causality factor: 40 %	
Total direct emission mitigation, tCO_2	**452,279**
Direct emission mitigation from demonstration, tCO_2 LDVs (considering end of life of vehicle as 10 years)	219
Secondary direct emission mitigation from policy, tCO_2 LDVs (considering end of life of vehicle as 10 years)	452,059
Total indirect emission mitigation from replication, tCO_2 **Causality factor - Level III (60%)**	**1,808,500**
Total project related emissions reductions, tCO_2	**2,260,779**
Total energy savings from direct emissions, MJ	**5,229,476,065**
Energy savings from direct emission mitigation from demonstration, MJ (LDVs, considering end of life of vehicle as 10 years)	2,534,735
Energy savings from secondary direct emission mitigation from policy, MJ (LDVs, considering end of life of vehicle as 10 years)	5,226,941,330
Total energy savings from indirect emission mitigation from replication, MJ **Causality factor - Level III (60%)**	**20,910,807,002**
Total project related energy savings, MJ	**26,140,283,067**

7) Innovativeness, sustainability and potential for scaling up

h. Innovativeness

The project introduces innovations on various levels:

- **Technical**. Electric mobility is still incipient in Ecuador, with only a handful of vehicles operating and limited knowledge and awareness among stakeholders and users. The project will not only introduce electric vehicles for users of last-mile and micro-logistics systems to use and test, but will also seek to understand, bottom-up, the entire operation ecosystem and propose recommendations for local scale-up. In line with this, the project will seek to understand the current state and future requirements of the city?s networks to support the expansion of the electric fleet.
- **Business innovativeness**. Through output 3.1, an entire commercial framework that includes fiscal benefits to EVs will be introduced. In the business-as-usual scenario, the only way to acquire a vehicle is through a traditional purchase. The project will develop a framework for commercial methods that are more friendly towards the introduction of new technology, such as leasing, renting and subscription models. These will introduce potential new business structures for the management of private (and public) fleets, as well as other innovations such as fleet management services or battery leasing. Furthermore, the pilot seeks to enable the use of modern connectivity platforms, all of which open new business development opportunities. Finally, the development of circular economy business models for the reuse of vehicle components and battery systems will enable opportunities areas such as in energy storage and grid auxiliary services.
- **Environmental**. In terms of environmental innovativeness, the project provides a unique opportunity to modernize the waste management sector and incorporate a diverse part of the private sector, to be eventually expanded to other products, such as electronic appliances. If successful, it will provide guidance to other countries heavily dependent on imports of manufactured products and to integrate re-use and recycling chains associated to the expansion of e-mobility. Incorporating circular economy business models into the private sector will facilitate innovation in environmental management of this electric mobility.

●**Social**. The project will aim at improving the last-mile and micro logistics system in the historic centre of Quito, by introducing electric vehicles into the system and improving its quality, safety and efficiency. The pilot is aligned with on-going initiatives that seek to reduce the number of vehicles in the city centre without sacrificing functionality. This will have a positive impact in the city and set the ground for the replication in other cities in Ecuador and the region.

●**Governance**. The project will require strong cooperation from government departments in charge of transportation, energy, climate change, and waste management, and open to the participation of private stakeholders and the civil society. In the Ecuadorian context, it will provide an opportunity to strengthen synergies within the government. This type of cross-cutting coordination will represent an important innovation in terms of Ecuador?s traditional institutional arrangements.

i. Sustainability

This project was conceived to drastically reduce GHG emissions in the transport sector of Ecuador. From a greenhouse gas emission-mitigation perspective, the environmental sustainability of the project is strongly related to the ability of creating a growing market for electric vehicles. As mentioned in section 2, Ecuador?s energy system is highly dominated by renewable sources; because of this, Ecuador has a substantially low average carbon emission per MWh generated and replacing a conventional vehicle with an electric one results in a substantial reduction of GHG emissions. Furthermore, policies developed throughout the project related to vehicle emission standards and fuel quality will further contribute to a reduction of local pollutants along with an improvement of air quality.

From a waste management perspective, the project actively contributes to addressing the currently unsustainable patterns in end-of-life vehicle disposal management, so that the expansion of electric vehicles is undertaken within a context in which they do not become the source of additional environmental hazards. The project undertakes an integrated approach, not limiting itself only to electric vehicles, as otherwise this would create an additional barrier to the latter compared to conventional vehicles.

As for the endurance of the outcomes beyond the duration of the GEF project, several elements in the project design have been included to ensure this feature:

●The creation of a national coordination body (output 1.1) will help coordinate and connect projects, determine synergies amongst them, identify unattended requirements and/or barriers and establish an overall comprehensive approach. This will help maximize the impact in both private and public investments and activities.

●The multi-stakeholder consultation strategy (output 1.2) will help steer the transition to electric mobility, ensuring the political buy-in for the project and identifying social aspects of the deployment, thus guaranteeing that the expansion of EVs in the country does not have negative impacts on

vulnerable groups in the community. The project puts a strong emphasis on understanding the social implications that the transition to electric mobility will have, specially in terms of income distribution. These considerations have informed the design of outputs 1.2 and 3.3.

- The capacity building mechanism (output 1.3) which focuses on building the capacity of local institutions and its trainers will ensure that capacity, knowledge and experience is maintained in the country, irrespective of the trajectory of individual professionals and beyond the duration of the proposed project.
- Demonstrations (outputs 2.1 and 2.2) and the development of business models (outputs 3.1) will empower the more dynamic car dealers and importers to include a growing number of electric vehicles in their commercial offer, facilitating access to the technology to users better positioned to benefit of electric vehicles (high annual mileage, foreseeable daily mobility needs, or medium-to-large size fleets).
- Policy reforms related to vehicle emission standards and fuel quality (outputs 3.2 and 3.3) will disincentive the import of obsolete highly contaminant vehicles allowing for clean tech to be more competitive.
- Policy reforms related to electric vehicle charging infrastructure (output 3.4) will support the development of infrastructure that can support the growing demand for electric vehicles and its associated charging stations, thus ensuring that market development goes beyond vehicle development to also include its supporting ecosystem.
- By creating a regulation (and a mechanism) for the disposal of end-of-life vehicles (output 4.1), the project will reduce the dependency on ad-hoc scrapping campaigns, identifying the funding to ensure it?s long-term sustainability.

j. Potential for scaling-up

The project was explicitly designed to facilitate the scaling-up of its outcomes, mainly through the following elements:

- Managers of private last-mile and micro-logistic fleets can be expected to become keenly interested in including electric vehicles into their fleets, due to barrier removal provided by the project, e.g. through the creation of alternative methods to access EVs at a lower up-front cost (leasing, renting and subscription models), the increased availability of electric vehicles in the country, and further

technological de-risking through capacity building. Without the requirement of a large up-front investment, businesses will be able to access vehicles for a fraction of the price of a purchase, and without increasing the debt-to-equity ratio in their balances, transferring the risk of asset depreciation to the service providers. This should help reduce the risk of early adopters and promote the development of the electric vehicle market in Ecuador, which should in turn result in a faster technology scale-up, also though currently existing financing mechanisms.

- The logistics? sector exemplary role in demonstrating the feasibility of the electrification of its fleet will raise awareness, expectations, and increase the public?s demand for cleaner vehicles in the rest of the economy ? including other private activities and the public sector.
- Furthermore, incorporating civil society and other pertinent stakeholders in the project and specially in the different capacity building activities will help forward the discussion towards a more inclusive last-mile and micro-logistics system but also identify business opportunities that spin off the development of a new ecosystem. In addition to the pilot projects, which will help build confidence on the capabilities of the technology, the creation of alternative methods for the acquisition of electric vehicles will improve the general business environment that includes car dealers, leasing and renting companies, financing institutions, insurance companies and service providers. The growth of the latter will help consolidate investments and promote the scaling-up of the entire sector.
- The data collected throughout the pilot project will allow the development of business models to support existing companies (car dealers, maintenance workshops, waste management companies, last-mile and micro-logistic fleet operators) and new entrepreneurs to competitively operate in this emerging market and benefit from its associated business opportunities.

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[1] Ministerio de Energ?a y Recursos Naturales No Renovables. *Balance energ?tico nacional 2019* (2020).

[2] Wu, X., Nethery, R., Sabath, B., Braun, D., Dominici, F. *Exposure to air pollution and COVID-19 mortality in the United States: A nationwide cross-sectional study*, 2020 National Institutes of Health. DOI: 10.1101/2020.04.05.20054502

[3] Ministerio de Energ?a y Recursos Naturales No Renovables. *Plan maestro de electricidad.* (2019)

[4] Ministerio de Energ?a y Recursos Naturales No Renovables. *Balance energ?tico nacional 2019* (2020)

[5] ARCERNNR. *Pliego tarifario del servicio p?blico de energ?a el?ctrica* (2020)

[6] Discussed below under ?policies and strategies? of the baseline section.

[7] This process is discussed in more detail under ?administrative organization of Ecuador? in the baseline section.

[8] A good example of this is the implementation of the Technical Vehicle Inspection (RTV - Revision T?cnica Vehicular), a mandatory pre-requisite for annual license renovation since 2012. Despite being compulsory, it took over 8 years for national implementation and required three extensions for its application.

[9] These experiences (and lessons learnt from them) are presented in the subsection ?Pilot projects involving electric mobility? of the baseline.

[10] The decentralization process of Ecuador is further discussed under ?administrative organization of Ecuador? in the baseline section.

[11] The Guardian. *Ecuador paralyzed by national strike as Moreno refuses to step down* (2019). Available here.

[12] These issues are presented and discussed under sub-sections ?Vehicle efficiency and fuel quality? and ?Fuel prices and subsidies? in the baseline part of this document.

[13] Orbaiz & Cosentino. *Barriers and Recommendations for Clean Transportation in Quito* (2018).

[14] La Hora. *En los taxis el?ctricos no todo es felicidad* (2020). Available here.

[15] Plan V. *Los carros el?ctricos en Gal?pagos: ?un proyecto fallido?* (2019). Available here.

[16] The baseline section shows data that is scattered through different sources and that required significant efforts in terms of compiling. Other important information is either unavailable or only available upon request.

[17] El Comercio. *Comit? t?cnico plantear? nueva norma sobre calidad de gasolinas* (2021). Available here.

[18] This is further discussed under ?Vehicle efficiency and fuel quality? and ?Fuel prices and subsidies? in the baseline section of this document.

[19] El Comercio. *Comit? t?cnico plantear? nueva norma sobre calidad de gasolinas* (2021). Available here.

[20] ARCERNNR (direct communication with the consulting team)

[21] El Tel?grafo. *Dos urbes concentran las gasolineras m?s rentables* (2021). Available here.

[22] BCG. *Will Car Subscriptions Revolutionize Auto Sales?* (2021). Available here.

[23] Credit lines are presented and discussed under ?Existing financing available for EVs? in the baseline section of this document.

[24] Emol.com (Chile). *La ruta de Chile hacia la electromovilidad: estrategias del leasing operativo para lograrlo exitosamente* (2021). Available here.

[25] Estad?o (Brazil). *Locadoras e startups come?am a oferecer ve?culos el?tricos* (2021). Available here.

[26] Transporte.mx (Mexico). *Arrendamiento tipo Leasing para autos el?ctricos* (2021). Available here.

[27] AEADE, *Automotive Sector in Figures* (2021).

[28] Environmental and Water Ministry of Ecuador. *Third National Communication of Ecuador from Climate Change.* Quito (2017).

[29] Environmental and Water Ministry of Ecuador. *Third National Communication of Ecuador from Climate Change* (2017)

[30] Ministerio de Energ?a y Recursos Naturales No Renovables. *Balance energ?tico nacional 2019* (2020).

[31] For example, between 2009 and 2016, the proportion of homes owning a motorized vehicle increased from 22.16% to 31.88%. Source: Centro Ecuatoriano de Eficiencia de Recursos*, Estudio de l?nea de base para veh?culos automotores en Ecuador* (2021), p.15.

Ministerio de Energ?a y Recursos Naturales No Renovables. *Balance energ?tico nacional 2019* (2020). p. 31.

[33] Ministerio de Energ?a y Recursos Naturales No Renovables. *Balance energ?tico nacional 2019* (2020).

[34] Source: Environmental and Water Ministry of Ecuador. *Third National Communication of Ecuador from Climate Change* (2019)

[35] INEC, *Proyecciones poblacionales* (2020). Available here.

[36] Additional/residual competencies were progressively allocated by the Council of National Competencies to the GADs between 2007 ? 2017.

[37] Tello Toral, K.; Lucio V?squez, A., *Decentralizaci?n en Ecuador ?un proceso inconcluso?* Rev. CAP Jur?dica Central N?4 (2019).

[38]Ministerio de Energ?a y Recursos Naturales No Renovables. *Balance energ?tico nacional 2019* (2020) p.27

[39] Ministerio de Energ?a y Recursos Naturales No Renovables. *Balance energ?tico nacional 2019* (2020).

[40] ARCERNNR. *Pliego tarifario del servicio p?blico de energ?a el?ctrica* (2020).

[41] IIGE. *National Energy Balance 2019.* Geologial and Energy Research Institute ? IIGE (2019).

[42] CTFE. *CO_2 Emission Factor of the Interconnected National System of Ecuador. 2019 Report* (2019).

[43] MEER. *Electricity Master Plan.* Ministry of Energy and Natural Non Renovable Sources (2019).

[44] MEER. *Electricity Master Plan.* Ministry of Energy and Natural Non Renovable Sources (2019).

[45] Carvajal, P.; Li, F.; Soria, R.; Cronin, J.; Anandarajah, G.; Mulugetta, Y. *Large hydropower, decarbonisation and climate change uncertainty: Modelling power sector pathways for Ecuador* (2019). *Energy Strategy Reviews* 23 pp. 86-99

[46] IIGE. *National Energy Balance 2019.* Geologial and Energy Research Institute ? IIGE (2019).

[47] MEER. Electricity Master Plan. Ministry of Energy and Natural Non Renovable Sources (2019).

[48] Carvajal, P.; Li, F.; Soria, R.; Cronin, J.; Anandarajah, G.; Mulugetta, Y. *Large hydropower, decarbonisation and climate change uncertainty: Modelling power sector pathways for Ecuador* (2019). *Energy Strategy Reviews* 23 pp. 86-99

[49] Source: IIGE. *National Energy Balance*. ?Non-conventional? renewable energies include wind, solar and renewable biomass (2019)

[50] MEER. *Electricity Master Plan* (2018).

[51] ARCERNNR, correspondence with the project consultants

[52] ARCERNNR. *Pliego tarifario del servicio p?blico de energ?a el?ctrica. Per?odo: enero - diciembre 2021* (2020). Available here.

[53] Discussed below under ?policies and strategies? of the baseline section.

[54] Hinicio. *Estrategia Nacional de Movilidad El?ctrica*. Interamerican Development Bank (2021), pp. 25-28.

[55] AEADE, *Bolet?n sector automotor en cifras* (2021)

[56] National Institute of Statistics and Census - INEC (2019).

[57] AEADE. *Anuario 2019* (2020).

[58] Comit? de Comercio Exterior, *Resoluci?n 51 ? Disposiciones para importaciones de veh?culos, piezas* (last. reformed in 2016).

[59] AEADE, *Bolet?n sector automotor en cifras* (2021)

[60] El Comercio. *El uso de automotores el?ctricos es m?nimo en Quito* (2021). Available here.

[61] AEADE. *Anuario 2020* (2021)

[62] AEADE. *Anuario 2020* (2021)

[63] VARUS, *La red nacional de electrolineras en Ecuador* (2022). Available here.

[64] Hinicio. *Estrategia Nacional de Movilidad El?ctrica de Ecuador*. Interamerican Development Bank (2021)

[65] El Tel?grafo. *Dos urbes concentran las gasolineras m?s rentables* (2021). Available here.

[66] AEADE, *Mapa de puntos de carga para veh?culos el?ctricos* (2021). Available here

[67] INEN, *Proyecto de Reglamento T?cnico Ecuatoriano PRTE INEN ?Accesorios de carga el?ctricos?* (2017)

[68] As a protected area, Galapagos Islands require special permits for the introduction and usage of vehicles.

[69] El Universo, *Bus el?ctrico entrar? en fase de prueba para posible incorporaci?n de m?s unidades en cooperativa de transporte en Guayaquil*, October 15th 2021, available here.

[70] More details on this project are available in the ?baseline projects? sub-section.

[71] Hinicio. *Estrategia Nacional de Movilidad El?ctrica de Ecuador*. Interamerican Development Bank (2021)

[72] IGE. *National Energy Balance 2019*. Geologial and Energy Research Institute ? IIGE (2020) p.31

[73] National Institute of Statistics and Census - INEC. *Annuary of Transport Statistics* (2019)

[74] EP Petroecuador, *Informe estad?stico enero ? diciembre de 2020* (2021)

[75] El Comercio. *Comit? t?cnico plantear? nueva norma sobre calidad de gasolinas* (2021). Available here.

[76] EP Petroecuador, *Informe estad?stico enero ? diciembre de 2020* (2021)

[77] El Comercio. *Comit? t?cnico plantear? nueva norma sobre calidad de gasolinas* (2021). Available here.

[78] El Comercio. *Comit? t?cnico plantear? nueva norma sobre calidad de gasolinas* (2021). Available here.

[79] El Universo. *Calidad del di?sel var?a seg?n la ciudad en la que se comercializa* (2020). Available here.

[80] Empresa P?plica Petroecuador. *EP Petroecuador comercializa Di?sel Premium con contenido de azufre de 150 partes por mill?n* (2020). Available here.

[81] El Universo. *Calidad del di?sel var?a seg?n la ciudad en la que se comercializa* (2020). Available here.

[82] The council of the European communities. *Council Directive 93/12/EEC of 23 March 1993 relating to the sulphur content of certain liquid fuels* (1993). Available here.

[83] EUR-Lex. *Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC* (1998). Available here.

[84] El Universo. *Energ?a presenta portafolio de inversiones por $ 9.800 millones para Monteverde, refiner?a de Esmeraldas y nuevas rondas petroleras* (2021). Available here.

[85] Primicias Ecuador, *Importaci?n de combustibles: no es atractivo competir con el Estado* (January 28 2021). Available here.

[86] Primicias. *Licitaci?n para delegar operaci?n de Refiner?a de Esmeraldas en pausa.* (2021). Available here.

[87] AEADE. *Annuary 2020. Quito*. Ecuadorian Association of Automobile Enterprises (2021).

[88] AEADE. *Annuary 2020. Quito*. Ecuadorian Association of Automobile Enterprises (2021).

[89] AEADE. *Annuary 2020. Quito*. Ecuadorian Association of Automobile Enterprises (2021).

[90] BBC. *Ecuador repeals law ending fuel subsidies in deal to stop protests* (2019). Available here.

[91] Orbaiz & Cosentino. 2018. Barriers and Recommendations for Clean Transportation in Quito.

[92] El Comercio. *Comit? t?cnico plantear? nueva norma sobre calidad de gasolinas* (2021). Available here.

[93] EP Pretroecuador (2021) & El Comercio (2021)

[94] GlobalPetrolPrices.com, *Gasoline prices, US Gallon, 27-Dec-2021* (2021). Available here.

[95] Bastidas Auquilla, B. W., *Estudio de estrategias para la inserci?n de veh?culos el?ctricos tipo taxi en la ciudad de Quito* (2019). Master thesis, available here.

[96] Wu, G.; Inderbitzin, A.; Bening, C.; *Total cost of ownership of electric vehicles compared to conventional vehicles: a probabilistic analysis and projection across market segments* (2015). Energy Policy 80 pp. 196?214

[97] Bastidas Auquilla, B. W., *Estudio de estrategias para la inserci?n de veh?culos el?ctricos tipo taxi en la ciudad de Quito* (2019). Master thesis, available here.

[98] El Comercio. *Operaci?n del Metro de Quito ahora se prev? para junio del 2022* (2021). Available here.

[99] INEC. *Annuary of Transport Statistics*. National Institute of Statistics and Census (2019).

[100] Source: MTOP. *Transport Competences Presentation* (2021)

[101] Mixed load: transport of persons and/or cargo, not for public transportation

[102] Secretar?a Nacional de Planificaci?n, *Plan de Creaci?n de Oportunidades 2021-2025* (2021). Available here.

[103] Ministerio del Ambiente, *Estrategia Nacional de Cambio Clim?tico 2012 ? 2025* (2012).

[104] Priority care groups are defined in the Constitution of Ecuador (art. 35), and include seniors, children, pregnant women, people with disabilities, people with severe or complex diseases, population at risk, victims of domestic or sexual violence and of natural or anthropogenic disasters, as well as people with low levels of income and limited coverage of basic services.

[105] Ministry of Environment, Water, and Ecologic Transition. *First NDC* (2019).

[106] MEER. *Electricity Master Plan* (2018).

[107] MEER. *National Energy Efficiency Plan 2016 - 2035*. Quito (2017).

[108] Hinicio. *Estrategia Nacional de Movilidad El?ctrica de Ecuador*. Interamerican Development Bank (2021)

[109] Ibid.

[110] Ibid.

[111] EUROCLIMA+ is a program aimed at 18 Latin American countries to support them in the implementation of their Nationally Determined Contribution (NDC) and, more broadly, for the development and preparation of climate change mitigation and adaptation measures. The EUROCLIMA+ programme is implemented by 5 cooperation agencies: the French Development Agency (AFD), the German Cooperation Agency (GIZ), the Spanish Cooperation Agency (AECID), Expertise France, and the International and Ibero-American Foundation for Administration and Public Policies (FIIAPP).

[112] Corte Constitucional del Ecuador, *Registro Oficial*, N? 462 (March 24 2020), pp. 5-16

[113] ARCONEL. *Tariffs for the Distribution Companies of Electricity*. Agency for Regulation and Control of Electricity Ecuador (2020).

[114] ARCERNNR. *Electric Mobility Questions*. Regulation and Control Agency of Energy and Non-Renewable Resources (2021).

[115] Source: ARCONEL. *Tariffs for the Distribution Companies of Electricity* (2020)

[116] Except Saturday and Sunday from the 08.00 to 18.00 the tariffs are: 0.050 USD/kWh (low charge) and 0.043 USD/kWh (rapid charge ? medium voltage)

[117] Source: El Universo. *Nuevas l?neas de cr?dito para movilidad el?ctrica se expondr?n este martes* (April 29th 2019). Available here.

[118] El Universo, *M?s de 400 empresas en Ecuador recurren al renting para usar flotas en sus operaciones* (June 27th 2021). Available here.

[119] Estad?o. *Locadoras e startups come?am a oferecer ve?culos el?tricos* (2021). Available here.

[120] Greenbiz.com. *Could car subscriptions be the next big thing for EVs?* (2021). Available here.

[121] For example, the legislation in force only allows deducting lease expenses from the income tax-base in cases where the lease is set to match the expected life of the asset. This creates an incentive towards the actual purchase of assets, the depreciation of which can be deducted yearly from the income tax base.

[122] Montesdeoca Molina, B.; Almeida Vintimilla, C; *El Leasing financiero: Una herramienta jur?dica y econ?mica subutilizada en Ecuador* (2020). USFQ Law Review, Vol 7, N?1, pp. 55-79. doi:10.18272/ulr.v7i1.1730

[123] Adapted from: UNICEF Ecuador, *El aire que respiramos: los efectos de la contaminaci?n del aire y del cambio clim?tico en la salud de la ni?ez en el Ecuador* (2020).

[124] As explained in the ?policies and strategies? subsection of the baseline, the ENME is not an official strategy adopted by the country (instead, it?s a proposal prepared by private consultants financed by the IADB). It is nonetheless a reference document indicating potential pathways for the transition to e-mobility.

[125] A lengthier discussion on synergies and coordination between baseline and project outputs is available under the ?Institutional Arrangement and Coordination? section.

[126] As discussed under the ?Transport sector? sub-section in the baseline.

[127] Rogers, E. *Diffusion of Innovation*, 5th edition, 2003. The Free Press.

[128] Adapted from Rogers, E. *Diffusion of Innovation*, 5th edition, 2003. The Free Press.

[129] The energy storage systems in EVs require specific considerations in the event of car accident. Extinguishing fires in EVs can take longer due to thermal runway risk in the batteries; it also may require larger amounts of water. While a fire that is caused by an EV is not necessarily more dangerous than one affecting a conventional vehicle, it must be treated differently due to the chemical reactions involved.

[130] USAID, *Building blocks of electric vehicle deployment- A guide for developing countries*, 2021

[131] AEADE. *Anuario 2020* (2021)

[132] AEADE. *Anuario 2020* (2021)

[133] Americas Market Inteligence, *Cinco oportunidades del sector de log?stica en am?rica latina para 2021* (April 2021). Available here.

[134] The reader may refer to the COVID-19 risk section further below. In particular, compare the information in this section with the decrease in public mobility as captured by Figure 30.

[135] As discussed under ?Fleet fuel consumption? in the baseline section, light-duty vehicles used in logistics and services represent the second largest source of transport emissions, only after heavy-duty vehicles.

[136] El Universo, *Bus el?ctrico entrar? en fase de prueba para posible incorporaci?n de m?s unidades en cooperativa de transporte en Guayaquil*, October 15th 2021, available here.

[137] Empresa El?ctrica de Quito correspondence with the project consultants.

[138] More details are available in the stakeholder section; the stakeholder report provides information on the companies that participated in the discussions with the project team.

[139] Bloomberg New Energy Finance, *Why most electric cars are leased, not owned* (2018). Article available here.

Green Car Reports, *Why everyone leases electric cars rather than buying (and maybe you should too)* (2018). Article available here.

[140] Bloomberg New Energy Finance, *Why most electric cars are leased, not owned* (2018). Article available here.

Green Car Reports, *Why everyone leases electric cars rather than buying (and maybe you should too)* (2018). Article available here.

[141] de Brey, B., Gardien, L., Hiep, E. *Smart Charging Needs, Wants and Demands, Charging Experiences and Opinions of EV Drivers* (2021). World Electr. Veh. J. 12, 168. https://doi.org/10.3390/wevj12040168

[142] Huang, Y., Qian, L. Soopramanien, D., Tyfield, D. *Buy, lease or share? Consumer preferences for innovative business models in the market for electric vehicles* (2021). Technological forecasting and social change. DOI: 10.1016/j.techfore.2021.120639

[143] Boston Consulting Group, *Will Car Subscriptions Revolutionize Auto Sales?* (2021) Available here.

[144] Estad?o, suplemento mobilidade, *Ao menos 11 marcas j? oferecem carro por assinatura pelo Brasil* (2021). Available here.

[145] See for example: Wu, G.; Inderbitzin, A.; Bening, C.; *Total cost of ownership of electric vehicles compared to conventional vehicles: a probabilistic analysis and projection across market segments* (2015). Energy Policy 80 pp. 196?214

[146] Discussed in the baseline section.

[147] A fourth area would be the impact of the charging infrastructure in terms of the grid?s generation and distribution capacity; however, this is already being covered in an upcoming study under development by the ARCERNNR.

[148] This council is in charge of approving the National Development Plan. It includes representatives from different levels of government, foresees citizen participation, and is chaired by the President of the Republic.

[149] Pellegrini-Masini, G., Even Egner, L., Kl?ckner, C., L?fstr?m, E., *Sustainable Energy Policies and Equality: Is There a Nexus? Inferences From the Analysis of EU Statistical and Survey Data* (2021). Front. Sustain. Cities, 01, https://doi.org/10.3389/frsc.2021.663000

[150] BBC, *Ecuador protests: state of emergency declared as fuel subsidies end* (4 October 2019). Available here.

[151] Discussed under ?Policies and Strategies? of the baseline section

[152] Please refer to:

- Marmiroli, B.; Messagie, M.; Dotelli, G.; and Van Mierlo, J.. 2018 *Electricity Generation in LCA of Electric Vehicles: A Review* Journal of Applied Sciences 8, 1384; doi:10.3390/app8081384

- Carvajal, P.; Li, F.; Soria, R.; Cronin, J.; Anandarajah, G.; Mulugetta, Y., 2019 *Large hydropower, decarbonisation and climate change uncertainty: Modelling power sector pathways for Ecuador*. *Energy Strategy Reviews* 23 pp. 86-99

[MMRM1]Entiendo que se est? avanzando por el lado del CICC, pero si esto todav?a no est? 100% definido o si pudiera cambiar, lo dejar?a abierto en este documento, por las dudas

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

Ecuador is located in the north-western region of South America, limited by the Pacific Ocean to the west, Colombia to the north, and Peru to the southeast. The demonstration project will take place in the capital city of Quito.

Figure 22. Ecuador map

Table 20. Pilot city coordinates

Demonstration sites	***Latitude***	***Longitude***
Quito	-0.225219	-78.5248

1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

The current project is hosted under the ?Global Programme to Support Countries with the Shift to Electric Mobility?, led by UNEP.

The Global Programme is based on the following four components:

? Component 1: Global thematic working groups and knowledge materials

? Component 2: Support and Investment Platforms

? Component 3: Country project implementation

? Component 4: Tracking progress, monitoring and dissemination

The Global Programme has put in place the monitoring framework below to track progress both globally and at the level of the country child projects. 12 indicators have been designed for this purpose: 6 relying on global level information (highlighted in blue) and 6 relying on country level information (highlighted in green).

Table 21. Global e-mobility programme monitoring framework

Global level monitoring			Country level monitoring									
Objective level indicators												
Indicator A: Direct and Indirect Greenhouse Gas Emissions Mitigated (metric tons of CO_2) mitigated												
Indicator B: Direct and Indirect enegy savings (MJ)												
Indicator C: Number of direct beneficiaries												
Component 1 **Global thematic working groups and knowledge materials**			**Component 2** **Support and Investment Platforms**			**Component 3** **Country project implementation (Child Projects)**			**Component 4** **Tracking progress, monitoring and dissemination**		
Outcome 1 Knowledge products are generated to support policy making and investment decision-making through four global thematic working groups			**Outcome 2** Conditions are created for market expansion and investment in electric mobility through support and investment platforms			**Outcome 3** Conditions are created at country and city level for the introduction of electric mobility demonstration projects, and wider up take of electric mobility			**Outcome 4** Projects and electric mobility markets are tracked, and key developments, best practices and other lessons learned are shared to promote wider uptake of electric mobility.		
Indicator 1.1 # of knowledge products developed by the four thematic working groups and used by the Support and Investment platforms in their training and outreach activities			Indicator 2.1 # of countries using services and knowledge products offered by the Support and Investment Platform			Indicator 3.1 # of countries with an improved institutional framework and a strategy to promote the uptake of low-carbon electric mobility			Indicator 4.1 # of countries generating and sharing best practices and other lessons learned on low-carbon electric mobility with the global programme		
Baseline: 0	Mid-point target: 10	End point target: at least 25	Baseline: 0	Mid-point target: At least 25% of the GEF-approved Country Child Projects	End-point target: At least 85% of the GEF-approved Country Child Projects	Baseline: 0	Mid-point target: -	End-point target: At least 85% of the GEF-approved Country Child Projects	Baseline: 0	Mid-point target: -	End-point target: At least 85% of the GEF-approved Country Child Projects
			Indicator 2.2 # of US$ leveraged to scale-up low-carbon electric mobility through the support and investment platforms			Indicator 3.2 # of countries with nationally generated evidence of the technical, financial and/or environmental benefits of low-carbon electric mobility			Indicator 4.2 # of e-mobility knowledge products refined based on evidence coming from the country projects		
			Baseline: US$ 0	Mid-point target: -	End point target: US$ 140 million	Baseline: 0	Mid-point target: -	End-point target: At least 85% of the GEF-approved Country Child Projects	Baseline: 0	Mid-point target: -	End point target: at least 8
			Indicator 2.3 # number of e-mobility scale-up and / or replication concepts facilitated as a result of the match-making			Indicator 3.3 # of countries that have improved preparedness to accelerate market transformation towards low-carbon electric mobility			Indicator 4.3 # of non-e-mobility programme countries committing to actively promote the uptake of low-carbon e-mobility		
			Baseline: 0	Mid-point target: 2	End point target: At least 10	Baseline: 0	Mid-point target: -	End-point target: At least 85% of the GEF-approved Country Child Projects	Baseline: 0	Mid-point target: -	End point target: 10
			Indicator 2.4 # of financial institutions / development banks (national/regional) that have been engaged through the Global Programme and are actively supporting e-mobility projects			Indicator 3.4 # of countries with measures in place to ensure the long-term environmental sustainability of low-carbon electric mobility					
			Baseline: 4 (ADB, EBRD, DBSA, World Bank)	Mid-point target:	End point target: 12 (+8)	Baseline: 0	Mid-point target: -	End-point target: At least 85% of the GEF-approved Country Child Projects			

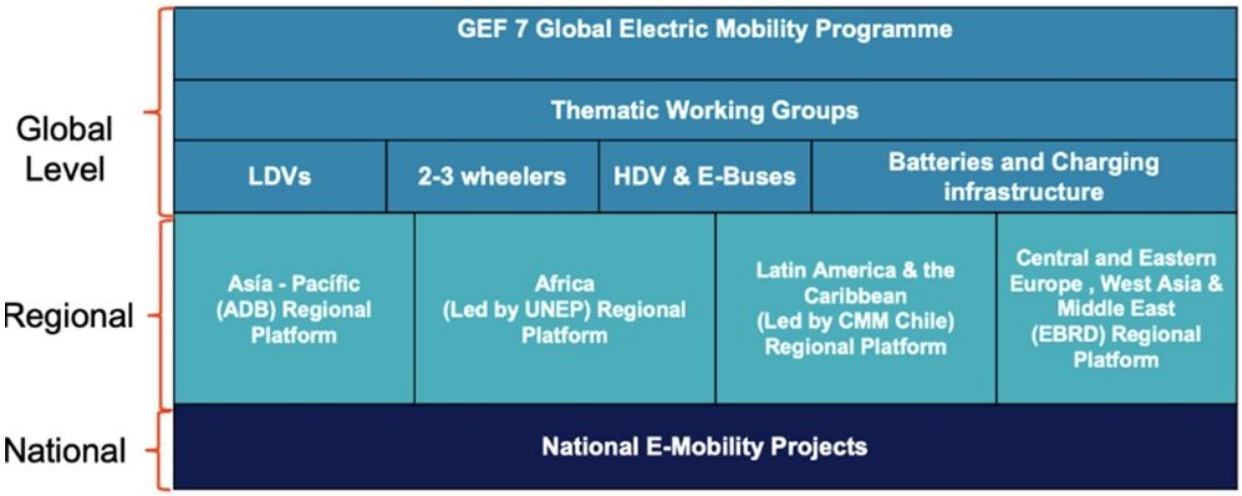
The global project will report against this framework on an annual basis, using (1) the global level data from the Global Thematic Working Groups and from the Support and Investment Platforms, and (2) country level data provided by each country project during their annual Project Implementation Review (PIR) process.

For this purpose and whenever applicable, the global level indicators highlighted in green are translated into a country-level indicator in the Project Results Framework located in Annex A of the present CEO Endorsement Document. During project implementation, the Executing Agency will report against the indicators of the country Project Results Framework (Annex A) on an annual basis, during the PIR process, in addition to the usual GEF Core Indicators (mentioned at the top of the table above).

At the global level, a steering committee led by the United Nations Environment Programme will coordinate and monitor the implementation and the outputs of the GEF 7 Electric Mobility Programme. On technical gaps, four thematic working groups at the global level will support the rapid introduction of electric mobility in GEF recipient countries. These working groups will generate universal

knowledge products that contain best practices, factsheets, interactive tools and guidance, as well as experiences from countries that have advanced their e-mobility market. The working groups will be integrated by representatives from the global programme regional platforms, GEF-7 countries, IEA, vehicle manufacturers, utilities, researchers and the civil society. The governance structure is presented in the figure below.

Figure 23. Global, regional and national projects



Governance structure between the global programme, the national e-mobility projects, and the regional Support and Investment Platform:

The coordination between the global program, the steering committee, the thematic working groups, and the national projects will be facilitated by the regional Support and Investment Platform. The role of the regional platform is to provide customized technical assistance to ensure the success of the country projects. Moreover, knowledge products developed by the working groups will be adapted and disseminated by the regional platform according to the regional and national context, specific needs and languages.

The 4 Support and Investment Platform will interact with and support participating countries in the region to link with each other through the following activities:

? The creation of a community of practice for the GEF 7 regional countries;

? Facilitation of knowledge transfer between countries, and regions, especially those with common characteristics like SIDS;

? The creation of thematic groups in light-duty vehicles (LDVs), 2-3 wheelers, and buses at regional level;

? A marketplace between countries, technology providers and financial institutions;

? Help desk for technical assistance to GEF 7 countries;

? Personalized assistance from international experts in electric mobility;

? Generation of training sessions and workshops.

The national child projects will generate a learning curve on electric mobility that can be transferred to other countries within and outside of the region through the global programme. As a first contact point, the regional Support and Investment Platform will facilitate the flow of learnt lessons from child projects, such as: data and demonstration results, working business models, operational know-how, working financial instruments, and working policies and regulations. At the global level, the scenarios proposed to share country knowledge and experiences on electric mobility are the thematic working groups, while at the regional level the countries will participate in the community of practice, the thematic regional groups, the marketplace, trainings and workshops

2. Stakeholders

Please provide the Stakeholder Engagement Plan or equivalent assessment.

Stakeholder consultation during the project preparation grant phase

Approach

A core group was established to discuss project design, consisting of representatives from the Ministry of Environment, Water and Ecologic Transition (MAATE), the Ministry of Transport and Public Works (MTOP) and the Ministry of Energy and Natural Non-Renewable Resources (MEyRNNR). Regular meetings were undertaken together with consultants from UNEP.

A stakeholder consultation workshop was organized on 13/10/2020 to present the main elements from the concept note; this was followed by workshops on co-finance. As project designed progressed, bilateral meetings were organized between the PPG team and identified stakeholders.

Stakeholder consultation workshop

Representatives from 65 institutions (including public, private and CSO organizations) were invited to attend a workshop on October 13th, 2020. A total of 52 attendants from 32 institutions participated in the 3-hour event, which was undertaken virtually due to the COVID-19 pandemic.

Table 33. Attending institutions to the stakeholder consultation workshop

Sector	Entity
Academy / Cooperation / CSO	IADB

	UNDP
	Escuela Polit?cnica Nacional (EPN)
	Escuela Superior Polit?cnica del Litoral (ESPOL)
	GIZ
	Banco de Desarrollo del Ecuador, BDE B.P.
	European Union Delegation in Ecuador
	Corporaci?n Nacional de Finanzas Populares y Solidarias
	C?mara de Industrias y Producci?n
	Agencia Francesa de Desarrollo (AFD)
	UNEP
	UN WOMEN
Private sector	AEADE
	Motores Diesel Andinos
	Corporaci?n MARESA
	MODASA
	Nissan
	CCICEV
	Autolider Ecuador S.A.S.
	German Motors S.A.
	Motores diesel Andinos S.A.
	Autolider
	General Motors del Ecuador
	ECUAWAGEN S.A.
	Automotores y Anexos S.A
	Audi Ecuador
	Hinicio
Public sector	MEyRNNR
	MTOP
	MAATE
	ARCERNNR
	Association of Municipalities of Ecuador (AME)
	Gobierno Aut?nomo Descentralizado Municipalidad de Ambato (GADMA)

Figure 34. Workshop advertisement

The scope of the workshop included:

- Present the project concept to local stakeholders
- Collect inputs for the identification of barriers, which in turn will serve to identify possible solutions. This first workshop focuses on the project?s problem tree.
- Identify synergies with actions of civil society, academia, and the private sector
- Identify stakeholders to participate and contribute to the project

The attendants were distributed among three groups coordinated by the organizers and focusing on the different elements in the problem tree identified at the concept stage; additional issues were identified as a result of this meeting. The resulting problem tree is the one presented in this project document (see Figure 1 in the project description section).

Co-finance workshops

Two additional workshops were held with potential co-financers:

Table 34. Co-finance workshops

Event	Institutions attending
Friday August 20th, 2021	MAATE, MTOP, MEyRNNR, EC Solutions+, AFD, GIZ, EEQ
Friday August 27th, 2021	MAATE, MTOP, MEyRNNR, EC Solutions+, Kia Ecuador, IADB, BYD, Moderna Alimentos S.A., Municipality of Quito, Arca Ecuador (Coca-Cola), AEADE

The scope of the meetings include:

- Total amount of co-financing needed to support the project and relationship with project?s budget. It is explained that the project counts with its own budget provided by the GEF, and that the amount of co-financing should be around 5 times that of the project?s budget.

- A comment is made regarding all other initiatives on electric mobility that have already been carried out to date. It is explained that all previous activities on electric mobility are being considered within a baseline scenario in the project?s documents.

- It is highlighted that all funds destined to activities before the start of the GEF project cannot be considered as co-financing. To be eligible for co-financing, funds should be planned within the same time as that of the GEF project.

- Reporting requirements on co-financing are explained.

As mentioned, the scope of these meetings was to explain the concept of co-financing and identify and engage with potential co-financers. GIZ would later become the designated Executing Agency, whereas Empresa El?ctrica de Quito (EEQ) is one of the main co-financers and key partners for the development of this project. Other institutions will participate during the project execution, although they are not explicitly included as co-financers for the project.

Bilateral meetings

More than 30 bilateral meetings with various stakeholders from the private sector, public sector and Civil Society Organizations (CSOs) allowed to validate the alignment of proposed components and activities of the project log frame with national priorities both in the public as in the private sector. These are summarized in the table below:

Table 35. Main bilateral meetings

Institution	Summary and main results

Empresa El?ctrica De Quito (EEQ) (first meeting: JULY 27TH, 2021; multiple follow-up meetings afterwards) UNEP consultants Ana Davila Martin Rodriguez Marat Pedro Orbaiz Empresa El?ctrica de Quito Milton Balseca Fernando Maldonado Mar?a Fernanda Valencia New authorities after August 4th 2021 Dr. Paulo Pe?a Toro (general manager) Arq. Jorge Ponce Daniel Segura Mgs. M?nica Alarc?n	Meeting objective: Understand EEQ?s e-mobility projects Identify potential synergies Summary and main results: An overview of the GEF project is provided to the EEQ representatives, explaining the four components of the project. EEQ representatives explain the current e-mobility project that is being carried out by the company. An important component of the project relies in the deployment of charging infrastructure for the company?s EV fleet (to be received in 2022), and also to offer public charging infrastructure to the general public. The UN team gives an overview of the pilot that will be developed during the project execution. They address possibility of making use of the charging infrastructure being installed by EEQ for the pilot project. EEQ representatives agree upon the possibility of supporting the GEF project by providing access to the charging infrastructure being deployed by the company to be used during the pilot project. Subsequent meetings focus on EEQ?s plans in terms of charging infrastructure (urban and inter-urban) Project is aligned to jointly work on inter-urban charging infrastructure. EEQ is offered a position in the project?s Steering Committee due to its strategic relevance and to capitalize EEQ?s knowledge and expertise in e-mobility. EEQ issues a co-finance letter for the project

EC Solutions Plus project (first meeting: July 28th, 2021; multiple follow-up meetings afterwards) MAATE Fabian Moncayo Pa?l Melo Andrea Bed?n MEyRNNR Luis Manzano Patricia Recalde MTOP Santiago Garc?a Nelson Garc?a UNEP consultants Ana Davila Martin Rodriguez Marat Pedro Orbaiz EC Solutions Plus Mar?a Rosa Mu?oz Grace Lopez	Meeting objective: Explain the concept of co-financing to relevant stakeholders Identify and engage with potential co-financers Summary and main results: ? Fabian Moncayo gives the opening words, followed up by the presentation of all the attendees. 12:35-12:45 pm ? Martin presents an overview of the project Support the shift towards low-carbon electric mobility in Ecuador. 12:45-13:00 pm ? Pedro explains the concept of co-financing and provides an overview of the expected scope of participation. 13:00-13:30pm ? Feedback and questions about the project are addressed: -

CFN and Pichincha Bank (initial meeting on Tuesday September 9th, 2021; subsequent meetings held in November of 2021) UNEP Mart?n Rodriguez Marat Ana D?vila Pedro Orbaiz MAATE - Andrea Bedon Corporaci?n Financiera Nacional (CFN) - David Chasi Banco Pichincha David Alexander Grey Castillo Carla Yolanda Duena Cifuentes	Meeting objective: Identify financial instruments available for EVs in Ecuador. Discuss barriers in previous projects Summary and main results: Martin presents the project Support the shift towards low-carbon electric mobility in Ecuador and provides an overview of the global program. Feedback and questions about current activities on e-mobility are addressed: - Pichincha Bank representative comments that the bank started issuing a green bond in 2019 for a total sum of US$ 150MM. These funds obtained through this bond were destined to promote clean mobility, among other sustainable endeavors. Hybrid electric vehicles were the type of low emission vehicles that were mostly financed through these funds, whilst just a few battery-electric vehicles were financed at all. - From this, it was highlighted that a key barrier to the deployment of electric mobility in Ecuador is the lack of an electric vehicle market rather the lack of financing. Charging infrastructure is still not prepared for supplying large numbers of electric vehicles. In this line, the promotion of electric mobility through fiscal and regulatory incentives should be supported by the deployment of charging infrastructure. - It is highlighted that the GEF project will address all these issues through institutionalization activities to support the ministries in the development of policies that will seek the promotion of electric mobility in the country. - CFN representative comments about the recent funding of 20 electric vehicles for a total sum of US$ 7.6MM. Additionally, there is a potential market for electric mobility in Ecuador driven by a great interest in the technology. However, there is still a lack of knowledge and awareness in this regard. - Furthermore, it is highlighted that the product distribution segment shows the biggest potential for electric mobility applications in Ecuador according to internal studies. In this line, CFN provides financing only to companies and not for individuals to acquire vehicles. - It is highlighted that the GEF project will develop a pilot project that will be focused in last-mile logistics. In this line, CFN could be a potential source of financing to scale up the pilot in the future. - The concept of co-financing is presented to CFN and Pichincha Bank representatives. It is explained that co-financing is done through activities that are aligned with the GEF project. - Of particular interest for the GEF team is a 33MM loan from the IADB (channeled through CFN) that is meant to support taxis, buses, and have a scrapping component for the replacement of old ICE vehicles with EVs. However, in subsequent meetings it was informed that this project was put on hold by the Ministry of Economy and Finance.

Association Of Automotive Companies Of Ecuador (AEADE) Initial meeting held on Wednesday, September 22nd, 2021, with several meetings held afterwards. AEADE arranged meetings with Netlife (internet service company interested in replacing vehicles in their fleet from ICEs to EVs) and car dealers interested in the provision of EVs. AEADE: Genaro Balde?n Juan Jos? Abad UNEP Martin Rodriguez Marat Ana D?vila Ministerio de Ambiente, Agua y Transici?n Ecol?gica Andrea Bed?n Paul Melo Fabian Moncayo Nelson Garc?a (MTOP)	Meeting objective: - Identify possible synergies between AEADE and the GEF project regarding financing mechanisms for electric vehicles Summary and main results: Mart?n gives a brief presentation of the GEF project and highlights the main characteristics of the pilot project. It is explained that the pilot project will seek to acquire electric vehicles through different mechanisms other than buying, such as leasing or renting. A discussion is held around the best financing mechanisms for electric vehicles within the framework of the GEF project: The AEADE representative explains that today the renting mechanism is the most promising for acquiring electric vehicles. The regulatory framework has recently been updated and presents more flexible requirements for car renting. It is highlighted that the renting mechanism might be the best suited for the GEF pilot project.

AFD (Thursday, September 23rd, 2021) UNEP Martin Rodriguez Marat Ana D?vila AFD: - Camilo Breurec - Jean Philippe	Meeting objective: - Coordinate with the AFD team about project objectives, explore synergies Summary and main results: Martin provides an overview of the project and its main components. It is explained that the project?s documents will report all the e-mobility activities that are taking place in the country to show the alignment of the project with the country?s priorities. Camilo mentions the projects that are currently taking place in the country: o National policy of urban mobility project. Will seek to support the ministry of transport to develop a policy on sustainable transportation o Normative on guided transportation (Trains, teleferics, etc.) Also, the possible synergies between the GCF project and the GEF project Possible co-financing support is discussed -
UN Global Compact (initial meeting on Monday, October 4th, 2021; multiple follow-up meetings took place afterwards). UNEP Martin Rodriguez Marat Ana D?vila Pacto Global Red Ecuador Mariana Tufi?o Sophia Jarrin Moncayo	Meeting objective: - Coordinate with the the Global Compact team about project objectives and activities Summary and main results: Martin gives an overview of the project?s structure and objective. The concept of co-financing is explained the Global Compact team. Sophia explains that the objective of Global Compact is to promote actions and initiatives from companies of the private sector. Global Compact brings together many companies that work on the logistics sector and will help identify those that could be interested in taking part of the project. It is commented that the private sector shows interest in e-mobility projects. However, the economic viability of acquiring such technology is still their main concern. This project could help tackle those concerns through the generation of data to eventually evaluate the performance of a whole fleet. UN Global Compact is established as a key stakeholder that will be facilitate contact with service companies and firms in the last-mile logistics subsector that are interested in participating in the project pilot. Mariana and Sophia provided valuable comments for the design of the project?s pilot.

Global Fuel Efficiency Team (GFEI) initial meeting held on Thursday, October 14th, 2021; various follow-up meetings organized subsequently. Attendees: UNEP Martin Rodriguez Marat Ana D?vila Luis Felipe Quirama Veronica Ruiz-Stannah GFEI ? Centro de movilidad sostenible Lourdes Becerra Sebastian Galarza Suarez MAATE Paul Melo Andrea Bed?n	Meeting objective: - Coordinate with the GFEI team about project objectives and activities Summary and main results: Lourdes gives a brief introduction about the Global Fuel Economy Initiative (GFEI) Luis Felipe introduces the GEF project and the global UNEP program Sebasti?n introduces the GFEI Ministry representatives give a brief overview about the local projects related to e-mobility It is highlighted the importance of introducing regulations for the improvement of fuel quality, and stricter emission standards; specially to level relative total cost of ownership between ICE and EVs. GFEI will provide recommendations on policies; however, the GFEI project is shorter in its duration. The GEF-7 project is expected to provide support for the implementation of the recommendations from the GFEI project, as well as to understand all the income distribution consequences and to establish a politically feasible, long-term roadmap for its adoption.
KIA (initial meeting on Wednesday, November 10th, 2021; two follow-up meetings afterwards)	Meeting objective: - Present project objectives and activities, explore synergies Summary and main results: - KIA manifested interest in the project?s activities and offered support during its implementation. While does not currently have electric vans that could participate in the pilot, the firm is interested in the development of e-mobility in general.

CorpoRent. Initial meeting held on Thursday, November 11th, 2021; multiple follow-up meetings took place afterwards. **Attendees:** UNEP Martin Rodriguez Marat Ana D?vila CORPORENT: Mauricio Pe?a Francisco Matheus Jessica Arias (Rent) Esteban Granizo Huerta (Consorcio Pichincha S.A. CONDELPI) Miguel Espinoza (MAREAUTO) AEADE/ANT Jessica Arias Andr?s Teran	Meeting objective: i. Introduce the project to CORPORENT representatives ii. Understand renting/leasing models? status in Ecuador iii. Understand CORPORENT?s view on leasing and renting models for e-mobility deployment Summary and main results: Martin introduces the project, explaining the 4 main components, and a brief description of the pilot project and its main objectives. Mauricio gives an overview of the renting model in Ecuador. The latter provides a convenient solution to the constant fleet renewal that companies require. It is mentioned that the ANT has increased the maximum vehicle age from 5 to 10 years for renting services, a crucial aspect that impacts positively in the renting model. However, many aspects remain unclear or undefined in terms of the regulatory framework. It is highlighted that the leasing model in Ecuador has not been used as the legislation was never updated since its original introduction. Renting is absorbing leasing (i.e. through ?long term renting?). It is commented that renting is much more attractive than leasing to users. However, there are still concerns about the electric technology, namely its durability, charging requirements, and the initial investment. However, renting?s main advantage is that provides the user with the possibility of reducing the initial investment required to access the vehicle. Firms in CORPORENT were invited to present letters of interest for the provision of EVs for the project pilot. These letters are available in Annex R of this project document.
Ministry Of Economy And Finance (December 2021)	Meeting objective: Present project objectives and activities, explore synergies. Explore financial and fiscal aspects of e-mobility Summary and main results: Ministry of Economy and Finance to be included in the project?s Technical Committee.

Municipality Of Quito (December 2021) UNEP Martin Rodriguez Marat Ana D?vila Maria Rosa Mu?oz (EC Solutions+) Municipality of Quito Arq. Ricardo Pozo Henry Vilaruta Mateo D?vila	Meeting objective: Present project objectives and activities, explore synergies Summary and main results: Municipality of Quito to be included in the project?s technical Committee due to its strategic relevance, mainly due to its on-going efforts in terms of e-mobility and as the host for the project?s pilot. The Municipality of Quito is working on the regulation of incentives mandated by the reforms to the Terrestrial Transport, Transit and Road Safety Law (LOTTTSV, see Table 10 in this document); interest in gaining knowledge for this purpose through the pilot.
Escuela Polit?cnica Nacional (December 2021) UNEP Martin Rodriguez Marat Ana D?vila Maria Rosa Mu?oz (EC Solutions+) EPN - Alexandra Alvarado - Luis Miguel Torres - Daniel Eduardo Fierro	Meeting objective: Present project objectives and activities, explore synergies Summary and main results: During this meeting, potential collaboration between the project and the EPN were discussed, in particular regarding the building of local capacity. EPN to provide co-finance for the project (faculty support, access to labs); project pilot will be accessible to EPN students interested in doing research at the graduate/post-graduate level.

GIZ (multiple meetings starting in November 2021) MAATE Paul Melo Andrea Bed?n Fabi?n Moncayo UNEP Martin Rodriguez Marat Ana D?vila GIZ Adri?n Ortega Calle Mar?a Victoria Chiriboga Dorothea Kallenberger Christoph Mairesse	Meeting objective: Present project objectives and activities, explore synergies. Assess potential role of GIZ as project execution agency. Summary and main results: GIZ was selected by the MAATE as the project executing agency following a selection process whereby expressions of interest were requested from local institutions with active presence in Ecuador. The project was discussed thoroughly with the GIZ as the selected EA and potential co-financer.

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement.

The Stakeholder Engagement Plan (SEP) for the execution phase builds upon the interviews and workshops conducted during project preparation. The project will aim at maintaining fluid and two-way dialogue with the relevant national and local government institutions and agencies, the private sector, and civil society for national activities, as well as with local and international NGOs, the international community and other participating countries at the global programme level.

Public consultation will follow relevant national guidelines and the GEF Guidelines, which require that all GEF-funded projects meet best international practice and specifically the requirements for stakeholder engagement and public consultations. In addition, consultation is the focus of a specific project output (output 1.2), with the output dedicated to the development and implementation of a stakeholder consultation strategy. The project stakeholder engagement activities will be robust, and disclosure on information will be made in order to promote better awareness and understanding of its strategies, policies and operations. During disclosure, the project will: (1) Identify people or communities that are or could be affected by the project as well as other interested parties; (2) ensure that such stakeholders are appropriately engaged on environmental and social issues that could potentially affect them, through a process of information disclosure and meaningful consultation; and (3) maintain a constructive relationship with stakeholders on an on-going basis through meaningful engagement during project implementation. The stakeholder consultations will be an on-going process taking place during the project life and will ensure that stakeholders are informed about environmental and social consequences of the project implementation and ensure the opportunity for feedback.

Given that the deployment of electric mobility in Quito requires efforts from different government bodies, at both a regional and national level, ministries and the involvement of different private sectors, companies and community sectors, Output 1.2 focuses on the implementation of a multi-stakeholder consultation strategy. Likewise, the project also has a strong focus on the early identification and mitigation of any potentially adverse distributional impacts that may arise from any of the stages of the transition to electric mobility. The strategy will allow all actors to have an equal voice and express their concerns and uncertainties as well as engage in the different proposed activities throughout the project. It will seek to address barriers mentioned in section 1 especially with regards to raising awareness, creating buy-in, increasing coordination, and ensuring the development and implementation of socially acceptable solutions.

Identification of stakeholders for engagement and methods of communication

To ensure inclusive participation and consultation, the following stakeholders have been identified for consultation. The list includes the identified social groups that are associated with the project in different ways: those directly or indirectly engaged in the outcomes of project implementation; those directly or indirectly participating in the project, and those with a capacity to influence and decide on project implementation and outcomes. The key actors for electromobility in Ecuador are presented in the following table:

Table 22. Key Actors

Institution	Type of Organization	Responsibilities / Activity	Relevance to the project
Ministry of Environment, Water and Ecologic Transition (MAATE)	Public	Guarantee the quality, conservation and sustainability of natural resources, through the effective exercise of stewardship, planning, regulation, control, coordination and environmental and water resource management, through the participation of public, private, community organizations and the citizenship.	Regulator entity on environmental issues. Ministry leading the proposed project.

Ministry of Transport and Public Works (MTOP)	Public	As the governing entity of the National Multimodal Transportation System, it formulates, implements and evaluates policies, regulations, plans, programs and projects that guarantee a safe and competitive transportation network, minimizing environmental impact and contributing to the social and economic development of the Country.	Regulation transport entity in Ecuador. Partner ministry, to take part in the project?s Steering Committee. It will host the project?s KMS.
Ministry of Energy and Natural Non-Renewable Sources (MEyRNNR)	Public	Promote the development and sustainable use of energy and mining resources, with social and environmental responsibility, through the formulation, execution, monitoring and evaluation of public policies.	Regulation entity on energy issues, for example, electrical network for chargers and projections. Partner ministry, to take part in the project?s Steering Committee.
Ministry of Economy and Finances (MEF)	Public	Design and execute economic policies that allow achieving sustainability, growth, and social equity to promote the economic and social development of the country	Ministry in charge of ensuring fiscal sustainability of any measures or programmes implemented by the government, including potential legislation to promote electric mobility.
Ecuadorian Normalization Service (INEN)	Public	Official Normalization and Standardization Institution in Ecuador.	Entity in charge of issuing (mandatory) Technical regulations (RTEs) and (voluntary) norms (NTEs). To receive support from the project in updating vehicle efficiency, fuel quality and EV safety and charging standards.
National Assembly of Ecuador	Public	Legislative power in Ecuador.	Of relevance for new/revised legislation to be proposed by the project (e.g. legislation on leasing)

Agency for the Regulation and Control of Energy and natural Non-Renewable Sources (ARCERNNR)	Public	Technical-administrative entity in charge of regulating, controlling, inspecting, and auditing the activities of Non-Renewable Energy and Natural Resources.	Regulates the entire electricity sector ? from generation to distribution. Sets requirements for electric charging stations and rules for energy distribution companies (including energy price).
Ecuadorian Municipalitites Association (AME)	Public	Municipalities promote the construction of a decentralized and autonomous local management model, based on articulated planning and participatory management of the territory, through the exercise of institutional representation, quality technical assistance and coordination with other levels of government.	Information on the different projects and strategies for mobility that are being carried out by the different municipalities of the Country. Important mainly in the context of the definition of regulation models for installation of charging infrastructure in public and private buildings (i.e. municipal competency), as per output 3.4.
National Transit Agency	Public	Planning, regulation and control of road transport, traffic and road safety, promoting equitable accessibility, sustainable mobility, in accordance with the policies issues by the MTOP.	Information source for the Knowledge Management System. Target beneficiary for the project?s capacity building activities.
Development banks (Interamerican Development Bank, World Bank, among other institutions involved in the promotion of e-mobility in Ecuador)	Multilateral	Country support in various development issues, including e-mobility.	Entities with planned projects in electric mobility, mainly involving public transport (taxis and buses). Projects listed in the baseline section.

CFN	Bank	Public Development Bank. Promotes the sustainable development of the country's productive sectors, providing financial instruments that contribute to the generation of employment, entrepreneurship and innovation.	CFN was the financing entity of the plan RENOVA (scrapping programme for taxis and buses). The GEF-7 project will build upon this model to design end-of-life regulations for all types of vehicles.
German Technical Cooperation (GIZ)	NGO	Protection of the environment and natural resources, promotion of governance, democracy and participation.	Chosen as Executing Agency after a selection process lead by the MAATE. Will provide project co-financing for components 1-3 of the project.
International Cooperation, including French Development Agency (AFD), Kreditanstalt f?r Wiederaufbau (KfW), Development Bank of Latin America (CAF), UNDP, among others.	NGO	Provides financial support and technical cooperation for sustainable development initiatives.	Involved in e-mobility projects in the region. Relevant for coordination and sharing lessons learned, as well as for the scaling up of the proposed GEF project through future initiatives.
Municipality of Quito	Public	Municipal authority of Quito	Interested in developing e-mobility. Host of the city where this project?s pilot will be undertaken.
Ministry of Production, External Commerce and Fisheries	Public	Promote the strategic insertion of Ecuador in world trade through productive development, the improvement of integral competitiveness, the development of value chains and investments.	Ministry governing the Ecuadorean Service for Standardization (INEN).
Quito Electric Company	Private	Supply of clean energy and low cost to energize the Metropolitan District of Quito.	Ongoing project for the development of charging infrastructure. To provide access to its charging stations for the pilot (co-finance)

Association of Automobile Enterprises of Ecuador (AEADE)	Private	Groups all the main actors in the automotive sector, from car dealers to banks and insurance companies. Boost automotive business competitiveness; and promote safe, socially, and environmentally sustainable mobility.	Key partner representing all the main firms in the automotive sector, including financing entities. Key partner for reaching out to logistic and service companies interested in participating in the pilot. Also an important source of information from the private sector (of relevance for the Knowledge Management System)
Corporent (chamber of renting companies)	Private	Groups renting companies in Ecuador	Chamber is active in the promotion of renting (aligned with output 3.1)
Other banks and financial institutions (Banco Pichincha / Condelpi, Banco del Pac?fico, Produbanco, Banco Guayaquil, Banco Internacional, Banco Bolivariano, Amerafin, Credimetrica, Originarsa, Portcoll, as well as others not included in this list)	Banks	Finance institutions playing key roles in the automotive sector (providing funds but also alternative financing mechanisms, insurance services, etc.).	Banks are expected to provide key financing to support the transition to a more sustainable mobility system, either through traditional financing of EVs or through the increased adoption of products that are to be developed by the project (leasing, renting, subscription). The project will contact the institutions that are already active in the automotive sector, mainly through AEADE and Corporent. Entities not directly affiliated to these organizations will also be engaged during project execution in line with the multi-stakeholder consultation, communication and engagement strategy (output 1.2).
BYD	Private	Global BYD division dedicated to the sale of electric vehicles, solar panels and energy storage systems.	Currently, the main provider of electric buses in Ecuador. Strong interest in developing electric mobility, active in the development of past projects.
KIA	Private	Sales of electric and conventional vehicles	KIA is another strong actor investing in the development of e-mobility. The will provide co-financing for the project, contributing to the communication campaign (output 1.2) as well as the through the installation of charging infrastructure.

UN Global Compact Ecuador	NGO	Groups a large number of private sector firms and NGOs.	Key partner for reaching out to logistic and service companies interested in participating in the pilot, as well as financial institutions interested in participating in the development of renting, leasing and subscription models.
Ministry of Public Health	Public	Exercise the leadership, regulation, planning, coordination, control and management of Ecuadorian Public Health.	Report the health impacts and benefits of the project.
Galapagos Governmental Council (CGREG)	Public	Responsible for the administration, planning, land use, citizen security, resource management and organization of activities carried out in the province of Galapagos.	Previous projects on electromobility. Interest for pilot project.
Ecuadorian Association of Sustainable mobility (ASEMOS)	NGO	Promote and disseminate the research, education and the development of sustainable mobility.	Knowledge of different aspects of sustainable mobility. Civil society vision.
Energy Latin-American Organization (OLADE)	NGO	Contribute to the integration, sustainable development and energy security of the region, advising and promoting cooperation and coordination among its Member Countries.	Coordination with the development of renewable energies.
Technology Transfer Center for Training and Research in Vehicle Emissions Control (CCICEV)	Private	Assess the conformity of vehicles, their systems or components through inspection or testing activities.	Information and vision of the academy.

Gender Commission of the MAATE	Public	Body within the MAATE for the mainstreaming of a gender-approach	Provide leadership in terms of gender. Revised the project Gender Action Plan (presented further below in the gender section of this document); will provide support and overall leadership in terms of gender during the project?s execution.
UN Women	NGO	Work on the following axes: leadership and political participation, economic empowerment, ending violence against women and girls, intergovernmental support and coordination with the United Nations system.	Vision and inclusion of women in transportation issues.
Municipality of Guayaquil	Public	Seek the local common good and within it in a primordial way the attention to the basic needs of the canton, the urban area and its rural parishes; by determining policies for the fulfillment of the purposes of each branch of its administration.	Projects in electric public transport. To provide lessons learned from existing projects in e-mobility.
Municipality of Cuenca	Public	Promote tax compliance by facilitating it, strengthening tax awareness and generating risk; through the management of integrated processes, the intensive use of technology and with a committed, unified and competent human team that provides excellent services.	Interested in sustainable and electric mobility. To provide lessons learned from existing projects in e-mobility.
Company of Passengers of Quito	Public	Operation and management of the public passenger transport service in the Metropolitan District of Quito and provide specialized technical advice to public or private, national or foreign institutions in the field of transport.	Although this GEF-7 project does not involve public transportation, this may be a relevant stakeholder as it may be impacted by standards and regulations proposed by it.

Saucinc	Private	Urban transport of passengers in Guayaquil.	Implemented project with electric buses. To provide lessons learned from existing projects in e-mobility.
Ecotaxis Cooperative (Loja)	Private	Transport of passengers in electric taxis.	Implemented taxi e-mobility project, may provide lessons learnt.
Bank Association of Ecuador (Asobanca)	Private	Represent the legitimate interests of the Private Banks of Ecuador and promote an ideal environment for their development.	Information on the products and strategies of private banks regarding EV.
Automobile Club of Ecuador (ANETA)	NGO	Work in the development of a safe and sustainable road culture.	Education and training in electric mobility. Potential for cooperation in terms of capacity building.
World Wildlife Fund (WWF)	NGO	Provide technical support to the Ecuadorian government institutions related to the care of the environment, for the conservation of the country?s natural heritage, in search of sustainable development and the good life of local communities.	Interested in projects for the support of sustainable mobility. May require coordination.
Pedestrian Association of Quito	NGO	Look up for dignity and respect for pedestrian traffic, sustainable, equitable and supportive mobility.	Civil society point of view.
Biciacci?n	NGO	Promote the use of bicycles as a mode of urban and daily transport through the rational use of our energy resources, recover urban public spaces as places for coexistence, solidarity, tolerance and generate a culture of respect for other forms of mobilization in the country.	Civil society point of view.

Translatinos	Private	Passengers transport in the urban area of Quito.	Point of view of the private public transport companies. Interest in shifting to EV.

Select what role civil society will play in the project:

Consulted only; Yes

Member of Advisory Body; Contractor; Yes

Co-financier;

Member of project steering committee or equivalent decision-making body;

Executor or co-executor;

Other (Please explain)

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

Gender analysis

General context

Ecuador is making significant progress in the mainstreaming of a gender approach in its public policies, a requirement that is set out in the Constitution. Executive Decree No. 1733 (2009) established the National Council for Gender Equality with the mission of designing a public institutional structure to ensure equality between women and men. Along this line, its objectives include gender mainstreaming at the public policy level, including planning instruments at the macro level, making binding and mandatory recommendations and proposals that seek to transform cultural patterns embedded in the public sector and in society at large regarding gender roles and stereotypes. Other institutions of relevance are the Council for Citizen Participation and Social Control (CPCCS), the National Council for Gender Equality (CNIG) and, at the GAD level, the Cantonal Councils for the Protection of Rights.

In parallel to this, a number of national agendas, plans and legal instruments anchored in the constitutional principle of equality and equity have been set in place.

While these efforts have shown very encouraging results, gender inequalities remain one of the structural challenges in Ecuador?s socioeconomic system. According to UNDP?s Gender Inequality Index (GII)[1], Ecuador ranks 86th out of 189 countries (2019). As can be seen in Table 3 below: despite working more, women are also relatively more affected by underemployment and poverty.

Table 23. Gender indicators**[2]**

Indicator	Women	Men
Income poverty (2015)	19.35%	18.72%
Underemployment over employed population	60.40%	49.10%
Total number of hours worked in a week	77:39	59:57

In terms of decision making, political representation of women has been increasing steadily since the eighties, with a 40.1% share of legislative seats in 2013, as opposed to 6.1% in 1996[3], with percentages decreasing when shifting inwards towards the GAD level. The salary gap at a national level has decreased from 21.9% to 18.4% (2012 to 2017 data).[4] Therefore -and despite the improvements- continuing efforts are still required to materialize equal access to rights and benefits.

Women and mobility

In Ecuador, most people use public transport to get from their home to work, educational establishment, etc. Women have a higher rate of use of public transport (47.6% use public transport, compared to 43% of men) and they also commute in a higher proportion on foot (32.9% of women compared to 28.6% of men).[5] Moreover, among men, the possession of a vehicle is more frequent (72% of men compared to 28% of women) and they are the ones who use the private vehicle the most individually or jointly.

Freedom of movement for women does not only depend on the design of the supply of means of transport. Although Ecuadorian women travel mainly by foot or on public transport, one of the reasons that may discourage women from walking long distances or not using public transport is the insecurity they perceive in these places (robberies, thefts, and different forms of harassment and violence). This is a fundamental factor for their personal development and autonomy, as well as for the equal use of services and enjoyment of leisure.

According to INEC (2011)[6], public transport is the place where the Ecuadorian population feels most insecure, closely followed by the streets. Among the different crimes that occur regularly on the street or in public transport nationwide, the most important are those related to acts of harassment and sexual violence, occurring almost exclusively to women and girls. As reported in a survey conducted by UN Women in Quito in 2012, 75% of women had been verbally assaulted in public spaces, and 70% had

suffered physical assaults and harassment. The National Survey of Family Relations and Gender Violence against women of the INEC (2011) reveals that 6 out of 10 women suffer gender violence.

The Ministry of Transport and Public Works is currently working on a national policy for urban sustainable mobility, which includes the gender perspective of mobility. A few local municipalities have created initiatives to eradicate violence to women in public transport. This is the case of Quito[7], where a 2012 ordinance provides concepts, budget, protocols and specific arrangements inside the Municipality to eradicate violence towards women in the city. In this context, the city has implemented campaigns such as ?Free-Harassment Streets? (2012), ?Tell me?[8] (2014), ?Stop harassment? (2017), all of which were financed by the Municipality of Quito.

Women as a workforce within the transport sector

In Ecuador, the percentage of women who work in large and medium-sized transport companies is 21.9% of the total number of workers. [9] These values ??are like those observed across the globe, whether they are developed or developing countries. Women represent only 22% of transport personnel in Europe, for example, and in the Asia-Pacific region their share is less than 20%.[10]

Opportunities

The jobs mentioned in the previous section are in the majority of cases those related only to the personnel ?on board? means of transport ? instead of having a broader concept of mobility, which enormously enlarges the range of jobs related to the sector: changes in mobility strategy and related technologies offer new attractive jobs targeted at improving public transport, mobility management and in the logistics sector. New jobs include establishing mobility centers and promoting customer-friendly intermodal mobility systems. A review of professions that are directly or indirectly linked to transport is needed, including exploration of how they are likely to change or disappear, which new or revised jobs may emerge, and which education and (re)training programs and tools are required to facilitate the transition. Appropriate communication of the different possible job scenarios offered by the future mobility sector will increase the attractiveness for young girls, extending the range of required competences from engineering to social science, from information technology to management, from planning to co-ordination of policies, all basic knowledge to achieve a modern transport system and mobility for all.

Governance aiming at inclusive and sustainable transport system requires new thinking and new skill sets and this in turn requires new messages from the top. The presence of women at the decision-making level will contribute to this change. There is an urgent need to collect not only quantitative but also qualitative data with finer granularity to better understand gender issues and women?s roles and concerns in the transport sector. But it is also indispensable to develop appropriate capacities in analyzing data and transform outcomes into concrete mainstreaming measures. More women employed in transportation fields present opportunities for dialogue on issues women experience in the sector, and thereby can help facilitate development and adoption of solutions that are both inclusive and

socially sustainable, including relevant innovative business models for the benefit also of the financially weakest users.[11]

The introduction of EV technologies can be seen as transformative, serving as an opportunity to implement changes, so that EVs improve the mobility conditions of women (implementing vehicles in mobility services used by women), increase their participation in new coordination and decision-making processes, and facilitate a more balanced access to transportation jobs (targeting driving, maintenance and fleet management training on women during project activities). By involving women effectively in project design and implementation, and ensuring that interventions are gender sensitive, the project may support the introduction of increased economic opportunities for women in the transport and electricity sectors and support a just-transition of the workforce from employment in existing high-emission sectors to low-emission ones.

-

Gender Action Plan

Overview

The GEF Policy on Gender Equality requires that any planned gender-responsive measures to address differences, as well as identify impacts, risks, and opportunities, are provided through a Gender Action Plan or equivalent. A Gender Action Plan (?GAP?) is the roadmap for gender activities that a project or institution has adopted for itself for the purpose of redressing existing gender inequalities in a systematic way. The gender action plan is a bridge between gender analysis and implementation, and it is a tool to help translate and make visible findings of the gender analysis in program/project implementation and evaluation.[12]

Governance aspects

The government of Ecuador has continuously emphasized the importance and connection between gender and climate change, mainly by including gender considerations in their NDC. Documents available have extensively analyzed and evaluated previous efforts and possible future pathways for Ecuador in the topic of Gender and Climate Change (see e.g. the Third National Communication, the Concept Note on the Gender Action Plan and Climate Change for Nationally Determined Contributions (NDC), or the ?Design, Validation and Systematization of the Methodology for the Construction and Implementation of the NDCs of Ecuador Including the Gender Approach?). The MAATE has advocated for the mainstreaming of gender in their projects, as well as incentivizing gender analyses and proposing a gender action plan in line with the enhanced Lima Work Programme on gender.

As of 2018, the Undersecretariat of Climate Change of the Ministry of the Environment, Water and Ecological Transition formed the Commission on Gender and Climate Change (CGCC). This technical instance aims to promote the inclusion of the gender perspective in policies, measures and initiatives

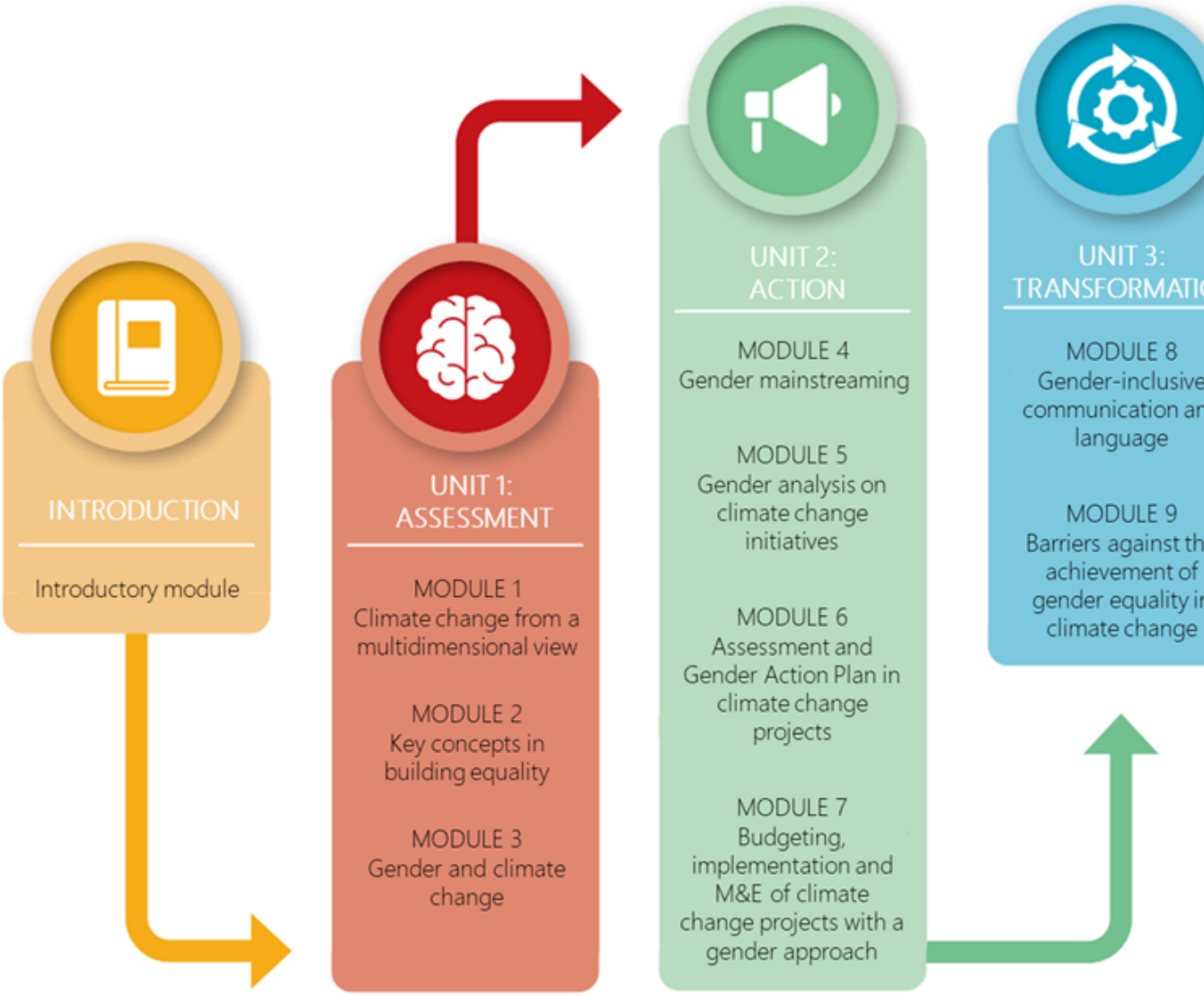
related to climate and to monitor actions that mainstream the gender approach in its programs, plans and projects, including the Nationally Determined Contribution (NDC), the National Plan for Adaptation to Climate Change (PNA), the National Climate Change Mitigation Plan, among others. The Commission on Gender and Climate Change also seeks to promote inter-institutional work with external actors such as the National Council for Gender Equality (CNIG) and civil society organizations; articulate the work with the gender specialists of the projects under the Undersecretariat of Climate Change; and review and validate products generated within the framework of gender and climate change projects by the Undersecretariat of Climate Change.

Along these lines, the activities of the CGCC focus on the following actions: leveraging financing that allows the inclusion of a gender approach; contribute to the formulation of the Gender and Climate Change Action Plan; improve the systematic integration of gender considerations into climate policies and actions, with an incremental incorporation of other gender identities; promote the generation of tools to identify the differentiated impacts of climate change and gender-related gaps; and, promote gender and climate change analysis in accordance with the guidelines issued by the specialized bodies in the field.

Approach for the preparation of this Gender Action Plan

The gender analysis and the gender action plan for this project was prepared following the ?*Toolkit on gender and climate change*?, a series of tools developed by the CGCC of the Ministry of Environment, Water and Ecological Transition with support from the United Nations Development Program (UNDP). In particular, the GAP for this project was prepared following the guidelines in Unit 2 of the toolkit. The project?s GAP assesses and sets actions for each of the project?s output from a gender perspective. The plan is presented in the figure below.

Figure 24. Summary of the content in the Gender and climate change toolkit**[13]**



Roles & responsibilities during project execution

Through the duration of the GEF project, a gender specialist will be the main responsible for the implementation of the Gender Action Plan, which is also reflected in the project?s workplan as specific deliverables (Annex K). On the implementation of the GAP, he/she will report both to the project?s CTA, the Steering Committee as well as the Ministry?s Commission on Gender and Climate Change. The CGCC will provide overall supervision and leadership in all matters related to the GAP.

Table 24. Gender Action Plan

Output	Gender Objectives	Gender-related risks	Measures	When	Indicators / Goals	Expected Results
Output 1.1: A national electric mobility coordination body is created for enhancing integration between all levels of government	Promote gender equality from the top management	Lack of legitimacy of the project (potential adverse communication effect) and lacking diversity of views in its comprehensive implementation	The national electromobility coordination body will be mixed.	Y1 (i.e. during the conformation of the coordination body)	Percentage [%] of women in the national electro-mobility coordination body, national body Goal: at least 30% are women While no baseline is available (the coordination body does not yet exist), the goal for this indicator can be considered ambitious as the share of women who work in large and medium-sized transport companies is currently 21.9%.[14]	Representation of women increases for topics related to transport, mobility, and the transition to EVs. The inclusion of activities and measures of gender equality becomes a common factor within the electro-mobility agenda of the different national ministries. The results and advances in the area are shared within the coordination body.

Output	Gender Objectives	Gender-related risks	Measures	When	Indicators / Goals	Expected Results
Output 1.2: A multi-stakeholder consultation, communication, and engagement strategy is made available to support the government in scaling up electric mobility through a just transition	Community Leadership and Commitment (guarantee sufficient representation of women in any public consultation mechanism)	Lack of legitimacy and adherence to the project, and weak sustainability over time	All consultations and activities carried out within the framework of the proposed consultation strategy should be aligned with Module 8 of the *Toolkit on gender and climate change*, and actively seek the inclusion of women within the different groups of civil society and the private sector. A specific section on gender shall be included as part of the strategy?s design.	Entire duration of the project	Percentage [%] of women attending engagement activities organized through this output. Goal: minimum 30% of women participation in consultation activities.	Guarantee and / or ensure that the project includes the gender dimension in the design, implementation, monitoring and evaluation phases.

Output	Gender Objectives	Gender-related risks	Measures	When	Indicators / Goals	Expected Results
Output 1.3: Private and public stakeholders increase awareness/ capacity/ knowledge on technical, financial, and regulatory aspects of electric mobility through a capacity building mechanism and the global program on electric mobility	Equal opportunities, integration, and non-discrimination	Perpetuating the lack of participation of women in the labour force in the transport sector	Design of courses and training activities shall include a strategy to increase the participation of women.	Y1 (design of modules), Y2 and Y3 (execution of modules)	Indicator: percentage [%] of women directly trained. Goal: at least 30% of the assistants are women according to their qualification (potentialities are identified in local study centres with related careers).	Technical Capacity. The female employment dimension is integrated throughout the value chain (both in managerial and operational positions, line, and support)

Output	Gender Objectives	Gender-related risks	Measures	When	Indicators / Goals	Expected Results
Output 1.4: A gender-sensitive mobility knowledge management system housed in the Ministry of Transport is made available for use by policy makers and key stakeholders	Data is endowed with enough granularity to capture gender disparities	Root causes for gender disparities remain unidentified	The KMS shall be designed to capture: - Women?s access to and control of electric vehicles - Women?s participation in decision making in sectoral planning and governance - Women?s share of socio-economic benefits and services resulting from the transition to e-mobility The project is to recommend ways for these considerations to live well beyond the duration of the project.	Y1 (design) and Y2 (implementation).	Indicator: Metrics for access, participation in decision making and participation in benefits are included in the KMS Goal: At least one indicator for each area of interest (access, decision making and benefits) is proposed and included in the KMS	Qualitative and quantitative measures of women?s involvement in the sector, including metrics to capture and quantify gender gaps

Output	Gender Objectives	Gender-related risks	Measures	When	Indicators / Goals	Expected Results
Output 2.1: The viability of light duty electric vehicles and associated charging infrastructure is demonstrated to local and national stakeholders in the logistics and services sector in Quito	Avoid replication of business-as-usual in terms of gender, where women are underrepresented in the sector	Limited participation of women in pilot activities replicate business-as-usual patterns	The participation of female drivers in pilot test is encouraged	Y2	Indicator: percentage of registered female drivers participating in the pilot tests. Goal: Female drivers in the logistic sector in Quito participate in the pilot tests.	Promote a hands-on participation of women in the deployment of electro mobility in Quito from the beginning
Output 2.2: Data from the pilots is collected, analyzed, and disseminated to key stakeholders	Incentivize women participation in the transport sector in ?off board? activities (i.e. activities outside of the vehicle)	Limited participation of women in pilot activities replicate business-as-usual patterns	Invite women in the logistics & services sector, as well as women involved in work with data sciences	Y2-Y3	Indicator: percentage of registered female drivers participating in the pilot tests. Goal: at least 35% of the assistants to the workshop in 2.2	Increased awareness of women of opportunities in the transport sector

Output	Gender Objectives	Gender-related risks	Measures	When	Indicators / Goals	Expected Results
Output 3.1: Business models and a policy framework for leasing, renting and subscription to electric vehicles are developed and submitted for adoption by the government, logistic companies, car dealers, financial institutions, and insurance companies	The business models developed by the project identify opportunities for the integration of women in the labour force and the reduction of work and salary gaps.	Perpetuation of existing gaps in terms of employment and salary	Proposed business models to include incentives to increase participation of women (e.g. by targeting specific credit constraints that affect women)	Y2-Y3	Indicator: Number of mechanisms proposed to incentivize the participation of women in leasing, renting and subscription of EVs Goal: At least one mechanism proposed for each commercialization modality (i.e. leasing, renting, and subscription).	Financial Capacity. Promotion of solutions that integrate the gender dimension in terms of subsidies, loans, and credits.
Output 3.2: Standards and a policy framework for regulating the energy efficiency, emissions standards, and safety of conventional and electric vehicles are updated and submitted for adoption by the Ecuadorean Service for Standardization (INEN)	This is a purely technical output for the regulation of ICE vehicles and EVs. No specific gender objectives.	-	-	-	-	-

Output	Gender Objectives	Gender-related risks	Measures	When	Indicators / Goals	Expected Results
Output 3.3: A just transition strategy for adopting standards and a policy framework which regulate fuel quality is drafted and submitted for adoption by INEN	The impacts resulting from the transition to a higher quality fuel are understood and include specific mitigation measures for women.	The just transition for the regulation of fuel quality does not have enough granularity to capture gender inequalities	The strategy that results from this output should also include a section on gender, where the impact (positive or negative) on existing gender gaps must be assessed. Negative impacts will require clear mitigation measures.	Y1, Y2, Y3	Indicator: The strategy includes an assessment of the impact of the increase in fuel quality/price by decile of income and disaggregated by gender. Goal: this is a yes/no indicator. In the baseline scenario, no strategy exists.	The just transition proposed under this output is gender-sensitive
Output 3.4: Regulations for the installation of public and private electric vehicle charging infrastructur e are drafted and submitted for adoption by INEN and GADs	This is a purely technical output for the regulation of ICE vehicles and EVs. No specific gender objectives.	-	-	-	-	-

Output	Gender Objectives	Gender-related risks	Measures	When	Indicators / Goals	Expected Results
Output 4.1: A proposal for regulating the re-use, recycling and disposal of electric and conventional vehicles is drafted and submitted for adoption by the Ministry of Environment, Water and Ecological Transition.	At a national level, most informal recyclers are women (54%). In cities such as Quito and Cuenca, this share is significantly higher (70% to 80%).[15] The resulting proposal must integrate the views and vulnerabilities of these stakeholders	The regulation of the end-of-life disposal of vehicles does not integrate the interests and vulnerabilities of recyclers, the majority of which are women	The proposal will include a chapter on the integration, formalization, and capacity building of this workforce.	Y3	Indicator: the draft proposal for the end-of-life disposal of vehicles includes a section with regulations for the integration, formalization, and capacity building of recyclers Goal: this is a yes/no indicator. In the baseline scenario, this is not regulated.	An improved framework leads to improved conditions for female (and male) recyclers in the waste sector.
Output 4.2: Waste companies are trained in reusing, recycling and disposing used vehicles (both conventional and electric) and electric vehicle batteries	The business models developed by the project identify opportunities for the integration of women in the labour force and the reduction of work and salary gaps, and the formalization of workers	Perpetuation of existing gaps in terms of employment, salary and working conditions	Capacity building activities targeting female recyclers for their integration in the end-of-life disposal value chain	Y2-Y3	Indicator: percentage [%] of women attending training Goal: at least 35% of women participate in the proposed workshops.	Expected results: women that participate as recyclers are empowered and trained to be part of the newly developed reclycling value chain.. Improved conditions for base recyclers.

[1] The GII measures gender inequalities (i.e. 0 indicates complete equality and 1 indicates complete inequality) in three important aspects of human development?reproductive health, measured by maternal mortality ratio and adolescent birth rates; empowerment, measured by proportion of parliamentary seats occupied by females and proportion of adult females and males aged 25 years and older with at least some secondary education; and economic status, expressed as labour market

participation and measured by labour force participation rate of female and male populations aged 15 years and older.

[2] Adapted from Ministry of the Environment, *Third National Communication of Ecuador to the United Nations Framework Convention on Climate Change* (2017), chapter 5

[3] Ministry of the Environment, *Third National Communication of Ecuador to the United Nations Framework Convention on Climate Change* (2017), p. 493.

[4] Ministerio del Ambiente, *Resultados del an?lisis de G?nero a nivel Nacional y de los sectores priorizados en la Contribuci?n determinada a nivel nacional (NDC) del Ecuador* (2019).

[5] Ministerio del Ambiente, *Resultados del an?lisis de G?nero a nivel Nacional y de los sectores priorizados en la Contribuci?n determinada a nivel nacional (NDC) del Ecuador* (2019).

[6] INEC, *Encuesta de Victimizaci?n y Percepci?n de Inseguridad*, (2011).

[7] Heather Allen, C?rdenas, G., Pereyra, L., Sagaris, L. *Ella se mueve segura (ESMS). Un estudio sobre la seguridad personal de las mujeres y el transporte p?blico en tres ciudades de Am?rica Latina. Caracas: CAF y FIA Foundation* (2019). Available here.

[8] Project to break the silence and report the sexual harassment on public transport, through cabins where professional legal and phycological support was given to victims.

[9] Ministerio del Ambiente, *Resultados del an?lisis de G?nero a nivel Nacional y de los sectores priorizados en la Contribuci?n determinada a nivel nacional (NDC) del Ecuador* (2019).

[10] International Transport Forum, *The Gender Dimension of the Transport Workforce* (2020)

[11] International Transport Forum, *Transport Innovation for Sustainable Development - A Gender Perspective* (2021)

[12] Global Environmental Facility, *Guidelines on Gender Equality* (2017), para. 23

[13] Ministerio de Ambiente, Agua y Transici?n Ecol?gica, *Caja de herramientas sobre g?nero y cambio clim?tico* (2019).

[14] Ministerio del Ambiente, *Resultados del an?lisis de G?nero a nivel Nacional y de los sectores priorizados en la Contribuci?n determinada a nivel nacional (NDC) del Ecuador* (2019).

[15] Ministerio del Ambiente, *Resultados del an?lisis de G?nero a nivel Nacional y de los sectores priorizados en la Contribuci?n determinada a nivel nacional (NDC) del Ecuador* (2019).

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes

Closing gender gaps in access to and control over natural resources;

Improving women's participation and decision making Yes

Generating socio-economic benefits or services or women

Will the project?s results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Elaborate on private sector engagement in the project, if any

A list of private sector stakeholders is included within section 2 above. The private sector will play an essential role in this GEF-7 project:

? Component 1.

o The private sector will participate in the development of the sectoral governance, mainly through the stakeholder engagement strategy. The private sector?s input will ensure that the coordination body takes into account the needs of recipients and investors (such as the automotive industry and the banking sector), as well the needs of suppliers and service providers (such as vehicle distributors and mechanics).

o The private sector, specifically representatives from the logistic sub-sector and EV service providers, will be recipients of training activities on the electrification of their fleets, electric vehicles maintenance and operation.

? Component 2

o The private sector is at the center of this component:

? Renting and leasing firms will provide the vehicles for the pilot. Leasing is not used in Ecuador and renting companies do not have electric vehicles among their fleets; hence, this would be Ecuador?s first contract of this type. The entity grouping companies providing this service (CORPORENT) was involved during the design stage of this project, and individual companies interested in participating in the pilot have provided letters of interest. During execution, a competitive process will be undertaken to select one firm for leasing; whereas CORPORENT will be included in the Technical Advisory Committee of the project, as well as the National Association of Companies in the Automotive Sector (AEADE). KIA and the local electricity utility EEQ will provide the charging infrastructure for the pilot.

? Logistic firms will be the users of the electric vehicles. They will provide the environment under which the vehicles will operate, including the routes, cargo, and the drivers that are to conduct the units. Besides from getting access to a hands-on experience with EVs within their own operations, they will benefit from the assessment of the technical, financial, environmental, and economic information and studies that result from the project based on the processing of the monitored data compiled throughout the pilot. Companies were contacted and manifested their interest during the design phase, mainly through AEADE and the UN Global Compact, which gather various firms in the private sector (including logistics and services). AEADE and the UN Global Compact will also play a key role during the execution, acting as nexus with the private sector.

? Financial entities are typically involved in traditional purchases (i.e. through the provision of credit for the purchase). However, banks may also be interested in alternative financing arrangements such as leasing. Lastly, banks can provide insurance services required under both types of contracts (i.e. traditional loan and renting/leasing/subscription contracts). Financial entities are also included among the firms that are part of AEADE and UN Global Compact for Ecuador.

? Component 3

o CORPORENT has been active in the discussion of the legal framework for renting companies; so they have been identified as a key actor in relation to output 3.1.

o The private sector, particularly fossil fuel stakeholders and vehicle distributors, will participate, through the community engagement strategy and the coordination unit, in the development of regulations and any proposals affecting the fiscal regime. AEADE is the key entity gathering private sector firms and representatives from the automotive sector.

o The private banking sector will participate through the stakeholder engagement strategy and campaign (output 1.2).

? Component 4

o Private waste management companies will participate in the process to develop the proposal for regulating the re-use, recycling and disposal of electric and conventional vehicles, as well as the specific legislation for ion-lithium batteries. This will include waste recyclers associations (e.g. *Red Nacional de Recicladores del Ecuador*), representatives from the steel sector with scrapping facilities (e.g. private firms ANDEC and ADELCA, among others), and land-fill owners.

5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

Risk is defined as an uncertain event or set of circumstances that, if materialized, will have an effect on the achievement of the project?s objectives. Risks have been identified during project design through detailed stakeholder consultations and tools such as the UNEP Safeguard Risk Identification Form (SRIF), the gender analysis and the theory of change. A qualitative 1-5 scale has been used to characterize the risk with regards to likelihood (probability of occurrence: 1 = not likely, 5 = expected) and potential negative impact on achieving project objectives (1 = negligible; 5 = extreme). In accordance with the combination of likelihood and impact, each risk is assessed as low (green), moderate (yellow), substantial (orange) or high (red) as follows:

Table 25: Risk Categorization

		Likelihood				
		1	2	3	4	5
Impact	5					
	4					
	3					
	2					
	1					

Climate and COVID risks are discussed in further depth in the sections following the below table.

#	Risk description	Risk category	Risk rating: likelihood	Risk rating: impact	Risk mitigation strategy	Whom	When

#	Risk description	Risk category	Risk rating: likelihood	Risk rating: impact	Risk mitigation strategy	Whom	When
1	Climate risk High impact climatic events (mainly storm surges and floods, very low probability of other extreme events) disrupt pilot or other project activities, damages electric vehicles, destroys infrastructure, and effect overall project execution. *For details see the ?climate risk assessment? section following this table.*	Climate	2	2	Project activities of components 1, 3 and 4 are primarily desk activities and will not be overly affected by such events. On the pilots, the vehicles will be parked in closed garages that are not affected by floods. Furthermore, a pilot protocol will be elaborated to ensure effective vehicle management during such events (see output 2.1).	Executing agency (EA)	Throughout the project, and particularly during rainy season (March and April)

#	Risk description	Risk category	Risk rating: likelihood	Risk rating: impact	Risk mitigation strategy	Whom	When
2	Political prioritization Lack of political buy-in and support for the uptake of electric vehicles and renewable energy (including due to causes such as COVID, civil unrest, or force majeure) leads to reduced support for the project and a lack of adoption of project strategies, policies and regulations.	Political / Financial	2	4	The project aims to mitigate this risk by establishing a national inter-sectoral electric mobility coordination body. The PMU will provide support to this newly created entity throughout the duration of this GEF-7 project, beyond which the coordination body is expected to have reached its maturity. The coordination body will also benefit from the capacity building activities and technical studies undertaken by the project. Moreover, an engagement plan (output 1.2) focused on the benefits of electromobility will be executed to provide bottom-up support for electric vehicles, leading to greater political support. The Executing Agency will ensure that appropriate beneficiaries for capacity building and awareness activities will be targeted. If the lack of political support affects the creation of the national coordination	EA, MAATE (National Project Director), the Project Steering Committee and the e-mobility coordination body (to be established early in project execution)	Throughout the project

#	Risk description	Risk category	Risk rating: likelihood	Risk rating: impact	Risk mitigation strategy	Whom	When
3	Procurement risk Slow or complex processes (inc. due to external factors) lead to delays in budget execution	Administrative / Financial	2	3	To mitigate this risk, the project execution has been delegated to an external entity (the GIZ). National ministries will provide overall guidance and leadership, but execution itself will not require integration of project funds into the ministry?s budget. GIZ will provide training and support to the Project Management Unit so that they fully understand how to efficiently organize the procurement processes involved in the project. In addition to this, the EA will be required to prepare yearly procurement plans that include contingency analyses that include mitigation plans for risks affecting key procurement processes. For example, procurement processes may be affected by the pandemic. At the beginning of project execution, the project timeline and dates of execution of all project activities will be re-evaluated taking into consideration any	EA, IA	- At the beginning of the project and at the beginning of each fiscal year

#	Risk description	Risk category	Risk rating: likelihood	Risk rating: impact	Risk mitigation strategy	Whom	When
4	Stakeholder engagement Lack of civil society and or public interest in electric mobility leads to a reduced materialization of co-finance and/or project outputs and outcomes that do not reflect their needs and interests	Social	1	3	In terms of a potential reduction of co-finance, the project has been designed with enough flexibility to accommodate for multiple scenarios. For instance, the project pilot (component 2) has been designed with two modalities that can either take place individually or in parallel, depending on the availability of the consolidation depot to be made available by the Municipality of Quito. Note that both modalities (with or without the consolidation depot) will allow for the drawing of similar conclusions and results. Likewise, two sources for electric chargers have been identified during the project preparation phase. The project will further mitigate the risk of reduced stakeholder involvement through the inclusion of key stakeholders in the Project Steering Committee, and also through the development and implementation of a multi-	EA	Throughout the project, with key focus on year 1.

#	Risk description	Risk category	Risk rating: likelihood	Risk rating: impact	Risk mitigation strategy	Whom	When
5	Gender risk Gender issues are not effectively incorporated into project processes and products, leading to project outputs and outcomes that are not gender sensitive.	Social	1	3	The project will mitigate this risk by executing a gender action plan (see section 3), which reviews each output in the project through a gender perspective, identifying specific risks and mitigation measures in each case. The project?s Gender Specialist with leading the execution of (and ensuring compliance with) the Gender Action Plan.	EA, Gender Specialist	Throughout the project.
6	Environmental risk An accident of one of the pilot electric vehicles results in environmental contamination (e.g. battery acid leakage)	Environmental	1	2	The project will mitigate the possibility of accidents by providing pilot driver test drive protocol, operation and safety training (see output 2.1). Specific training on the handling of batteries will also be undertaken in the context of Component 4.	EA, MAATE	Throughout the project, with key focus on years 2 and 3 when the pilot is taking place.

#	Risk description	Risk category	Risk rating: likelihood	Risk rating: impact	Risk mitigation strategy	Whom	When
7	Sanitary risk The COVID pandemic results in isolation measures leading to reduced need for and usage of vehicles, thus reducing pilot effectiveness in demonstrating EV viability.	Sanitary	1	4	The project was designed taking into consideration the effect of the pandemic. The pilot focuses on one of the very few sectors that has been counter-cyclical to the contraction observed in the rest of the economy, i.e. the logistics sector. Moreover, the project team will mitigate this risk by monitoring closely any perceived COVID pandemic measures, and by adjusting the workplan if needed to delay the execution of the pilots until later in the project.	EA	Throughout the project, with a key focus on year 1 (when the pandemic may have a stronger impact) and year 2 (pilot execution).

Climate risk assessment

At the June 2018 Council, the GEF?s Scientific and Technical Advisory Panel (STAP) issued clarified and codified screening guidelines. With respect to climate risk, the guidelines ask:

(i) How will the project?s objectives or outputs be affected by climate risks over the period 2020 to 2050, and have the impact of these risks been addressed adequately?

Following IPCC (2012)[2], **hazard** is defined as the potential occurrence of a natural or human-induced physical event that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resources[3]. **Exposure** is employed to refer to the presence (location) of people, livelihoods, environmental services and resources,

infrastructure, or economic, social, or cultural assets in places in which hazard events may occur. **Vulnerability** is defined as the propensity or predisposition to be adversely affected, and it encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. In the context of the assessment of climate impacts, **risk** results from the interaction of vulnerability (of the affected system), the likelihood of the occurrence of a climate related hazard, and exposure to the latter.

Given its status as a developing country, Ecuador is highly vulnerable to external factors of various kinds, ranging from natural or anthropic events to external market impacts, mainly because of its status as a primary-export economy. Climate change has exacerbated the country's vulnerability, which is critical in several areas, for example in the coastal area, where changes in coastal dynamics require adaptation measures in the face of rising sea levels, shoreline retracement, rising water temperature, acidification, check-out at extreme weather events, and human and economic losses. Although there are no contrasting forecasts of sea level rise in Ecuador, globally managed data foresees elevations that allow this phenomenon to be seen as a threat with significant incidence, mainly in the lowest areas, which can lead not only to increased flooding, but to an acceleration of coastal erosion and salinization of aquifers and final stretches of rivers.

In addition, the intensification of phenomena of natural variability, such as El Ni?o South Oscillation (ENSO), which is one of the main phenomena affecting the region and the country, and which has an occurrence cycle of 3, 5 and 7 years, generates alterations mainly due to increases in precipitation (El Ni?o Phase) and by precipitation deficits (La Ni?a Phase). This phenomenon triggers severe droughts and floods that have historically affected the national territory, including the coastal area, causing significant damage resulting in loss of human, socio-economic and environmental life. Vulnerability to phenomena like ENSO and related disasters such as floods and landslides is exacerbated by the fact that 96% of the urban population live in the coastal and mountainous region.

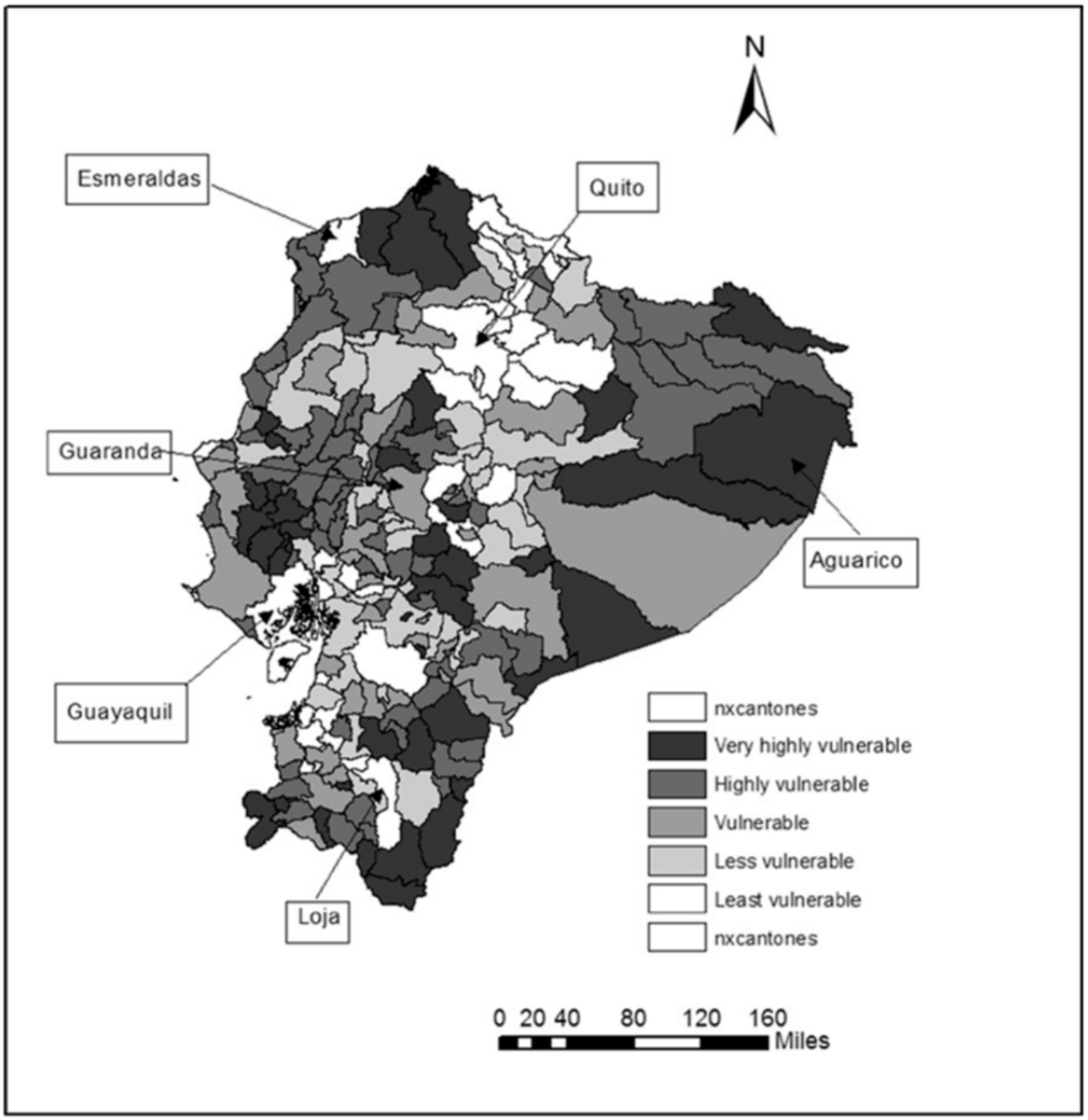
Among the main changes observed in precipitation, average temperature and absolute maximum and minimum temperatures in Ecuador in the period 1960-2010 there is an increase in temperature and spatial and seasonal variations of precipitation throughout the national territory. In the Galapagos Islands, recognized as a Natural Heritage of Humanity, there is a positive change in absolute average, maximum and minimum temperatures of 1.4?C, 1?C and 1.1?C, respectively. On average, the country's volcanoes have lost about 50% of their glacial surface area over the past half century.

Future climate projections under Ecuador's Third National Climate Change Communication show that, if the current temperature trend were maintained, the change that could be expected in Ecuador would be about a 2?C increase until the end of the century; and even the Amazon and the Galapagos would have increases greater than this value.

Ecuador's National Climate Change Strategy (ENCC) [4] defined the priority areas of work based on sectoral vulnerability in terms of adaptation to climate change. Sectors and areas prioritized by the ENCC are: 1) food sovereignty, agriculture, livestock, aquaculture and fisheries; 2) productive and strategic sectors (e.g. energy); 3) health; 4) water heritage; 5) natural heritage; 6) human settlements. Priority care

groups[5] and risk management are defined as cross-cutting topics. A map with the vulnerability per municipality is presented below:

Figure 25. Climate change vulnerability in Ecuador by municipality[6]



Potential climate-related effects that have been taken into consideration include:

a) **Pilot.** The pilot included in this project takes place in Quito, which is among the least vulnerable cities in Quito. Nonetheless, according to the city?s climate change action plan, the metropolitan area faces risks mainly in terms of heat waves (for the long run, i.e. 2040 and beyond) and floods (from the short to long run). [7] In the metropolitan district of Quito, flooding of avenues and streets usually occurs quickly after intense and sudden rains in the upper parts of the basins of steep slopes. Less intense rainfall of longer duration can also cause similar effects. On the other hand, rivers that run through flood valleys of low slopes can flow through them leaving abandoned channels and flooding new land. The highest risk levels are mainly located in urban areas, where intense rainfall events create problems due to the presence of slopes and the lack of hydraulic capacity of the sewage system.**[8]**To mitigate the potential impact of flooding, the project pilots will have safety protocols and systems in place (outputs 1.4 and 2.1, in particular, see deliverables D1.4.7 and D2.1.4). Climate forecasts will be used to alert drivers and inform them of alternative routes, when needed.

b) **Disruptions in data collection and data storage systems and infrastructure.** As the central activities in this project will take place in Quito (low vulnerability to events such as hurricanes) and involve mostly historical data that already exists in cloud servers, it is highly unlikely that the activities themselves are affected by the type of extreme events that could strike the region (e.g. fires due to increased temperatures). However, the knowledge management system that is to be established by this project (output 3.5) will outlive the latter?s specific activities, requiring periodic collection and processing of data. The project will thus ensure that the system has embedded procedures, guidelines, and protocols for the collection of data that consider the various ranges of vulnerability to climate risks throughout the country.

c) **Difficulties to undertake capacity building activities.** Training activities, workshops and meetings could be adversely impacted by extreme climate events. In this case, however, most activities are to take place in Quito, a location that can be easily reached from all over the country and the highest adaptation capacity in the country.

d) **Change in stakeholder priorities.** When a vulnerable country is impacted by extreme climate change effects, political priorities, investor?s interests, and co-financing availability might shift. While this may adversely affect the outputs of this project -since the latter targets government institutions and needs political attention to be successfully implemented- it is expected that any negative impacts attributable to climate change will result in an *increased* interest in the project?s outcomes. Moreover, the multi-stakeholder consultation, communication, and engagement strategy that is to be established as part of this project (output 1.2) will ensure that awareness of climate change impacts are given top priority.

Thus, being a short-term (i.e. three years) project based in an area with high adaptation capacity and focused almost entirely on the creation of enabling conditions for the transition to electric mobility, **this project can be deemed low risk in terms of climate change**.

(ii) Has the sensitivity to climate change, and its impacts, been assessed?

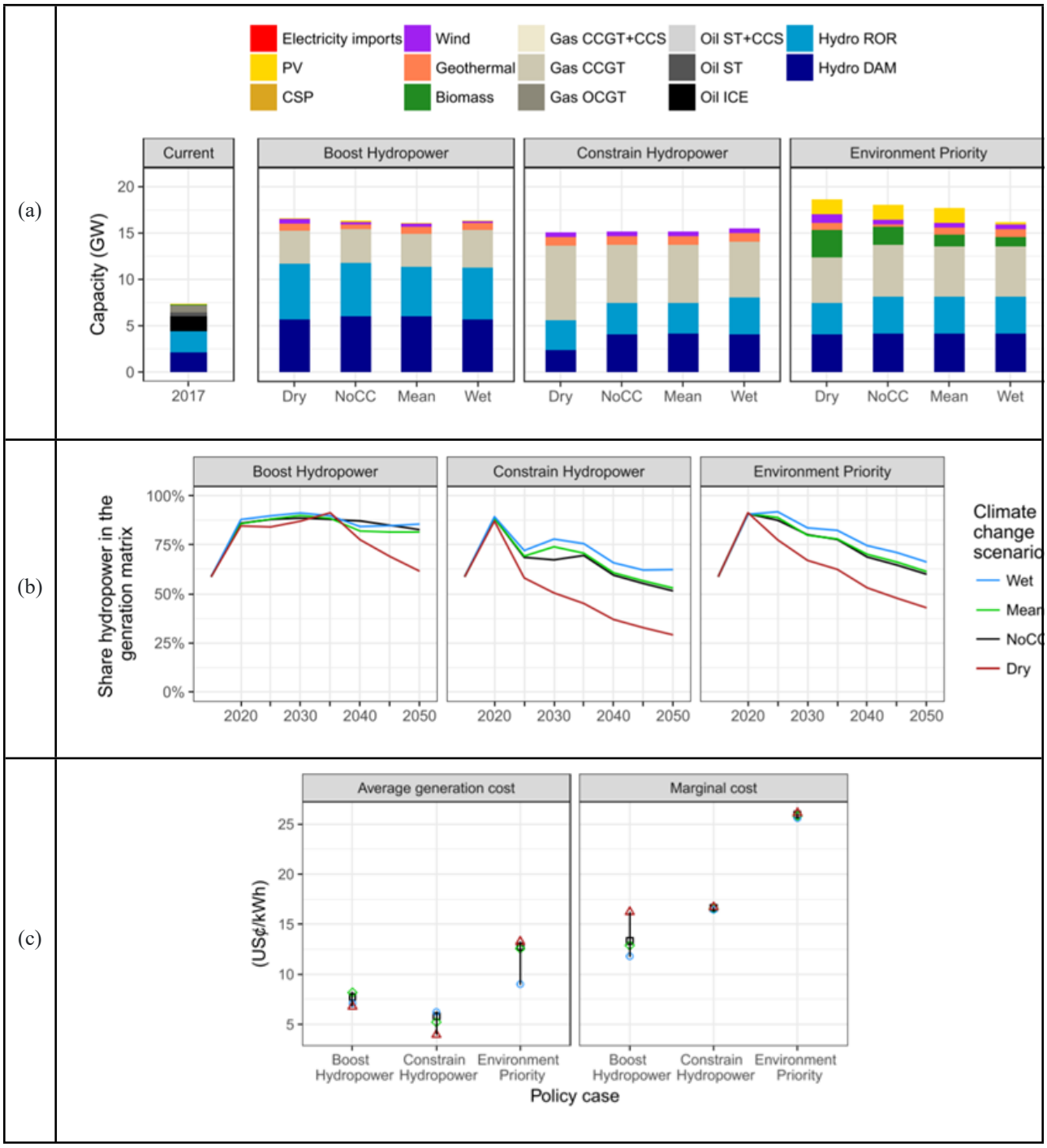
As mentioned before, during project execution the risk of climate-related disruptions is very low. However, many of the outputs that are to be prepared as part of the project need to consider potential impacts that would materialize long after project execution has concluded.

Following Carvajal et. al. (2019)[9], the project design considered a combination of policy and climate scenarios. While the climate assumptions explore the long-term uncertainty of hydropower production under uncertain future hydroclimatic conditions, the policy cases explore different long-term evolutionary pathways for the energy system as the result of various energy and environmental policy decisions.

Table 26. Climate change and policy scenarios (up to 2050) considered in the project design**[10]**

Climate change scenario	**Description**
NoCC	30-year average of historic values, representing constant hydroclimatic variables
Mean	mean of the ensemble of individual Global Circulation Models (GCMs) for the IPCC?s Representative Concentration Pathways (RCP) RCP4.5
Wet	+1 standard deviation of the ensemble of individual GCMs for the RCP4.5
Dry	?1 standard deviation of the ensemble of individual GCMs for the RCP4.5
Policy scenario	**Description**
Boost hydropower	Boost the expansion of hydropower according to Government plans up to 2025 + potential capacity beyond this date.
Constrain hydropower	Constrain the investment in large hydropower, only medium and small hydropower.
Environment priority	Prioritize emission cap according to the Government NDC and no large hydropower (> 450 MW).

Figure 26. Results in terms of (a) capacity (2017 vs 2050), (b) share of hydropower generation and (c) generation cost[11]



As mentioned, the scenarios considered show varying participation of hydropower and renewables under different climate scenarios. The base scenario (?boost hydropower?) considers official government plans; whereas the ?constrain hydropower? case considers a hypothetical scenario where large hydro power

capacity additions are not undertaken due to concerns in terms of the dam?s impact, replacing the required capacity by fossil fuels (and thus failing to meet the country?s NDC); ?environment priority? is similar, except that other renewables are used to avoid reverting back to fossil capacity, thus in full compliance with the NDC. The resulting generation costs under each scenario (Figure 27 (c)) will inform the total cost of ownership analysis to be prepared as part of output 3.1, as well as the distributional and equity aspects of the transition to electric mobility (deliverable D1.2.7); the resulting shares for each type of technology Figure 27 (a) and (b) will be used as an input for the long-term environmental breakeven analysis (D1.2.8).[12]

(iii) Have resilience practices and measures to address projected climate risks and impacts been considered? How will these be dealt with?

The overall focus of the project is on building resilience by reducing the country?s dependence on fossil fuel imports through the uptake of electric vehicles. Such imports are susceptible to severe price fluctuations due to global shocks, including those caused by climate change. Thus, by reducing such imports, the country is directly increasing its overall resilience.

(iv) What technical and institutional capacity, and information, will be needed to address climate risks and resilience enhancement measures?

As mentioned in the previous items, the project design has already identified the areas where climate projections will be of direct relevance, and resources have been allocated accordingly into the relevant outputs. Information on climate scenarios (including extreme weather events) is already available[13] and will be used as the starting point for the relevant deliverables (i.e. total cost of ownership analyses, assessment of equity and distributional aspects of the transition to e-mobility, as well as its environmental integrity in terms of materializing emission reductions). As for the operation of the pilot, operators and other actors involved will receive the required training as part of the project itself.

COVID-19

As in the rest of the Latin American region, the COVID-19 pandemic has had a dramatic impact in Ecuador. Since the first COVID-19 confirmed case and up to November 1st 2021, the country has accumulated 515.859 confirmed cases, and 32.958 deaths; 58% of the population is fully vaccinated. [14]

In April 2021, the number of cases displayed an upward trend, adding pressure to the health care system, and registering the new confirmed cases record, 53.107. The new deaths due to COVID-19 record was registered a couple months later, in July 2021, with 196 new deaths.[15]

Figure 28. Daily new confirmed COVID-19 cases in Ecuador (7-day rolling average)**[16]**

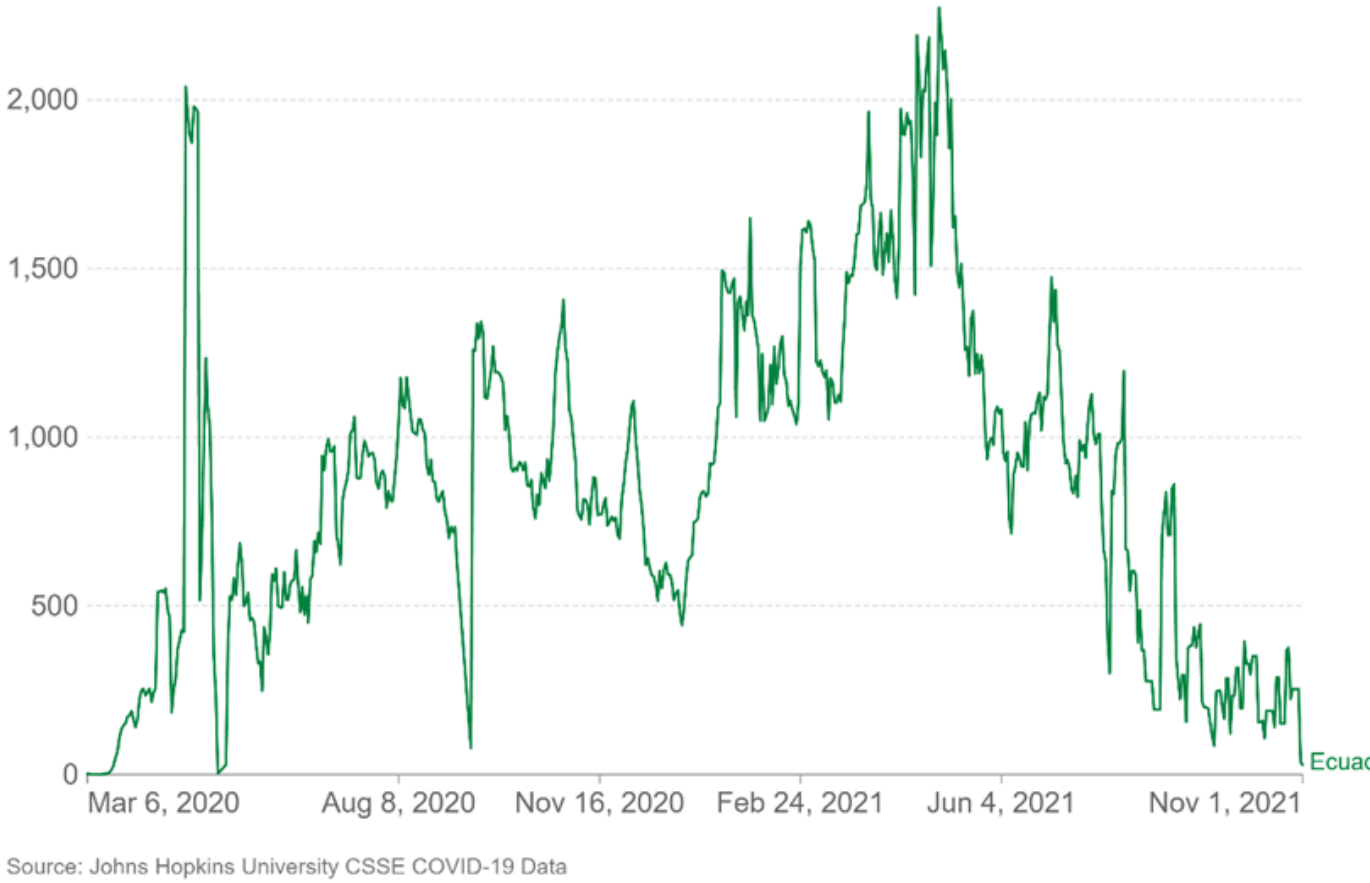
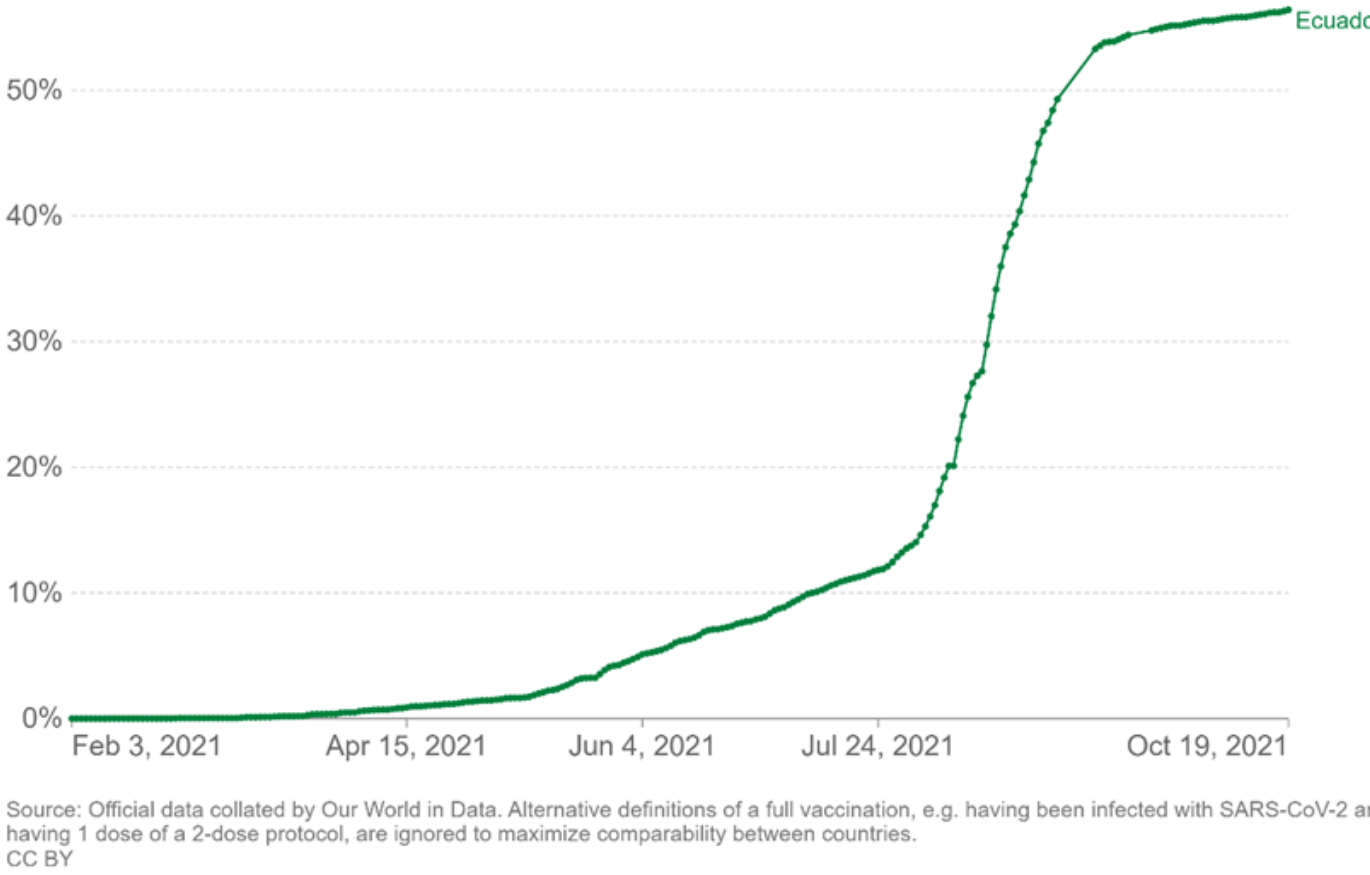
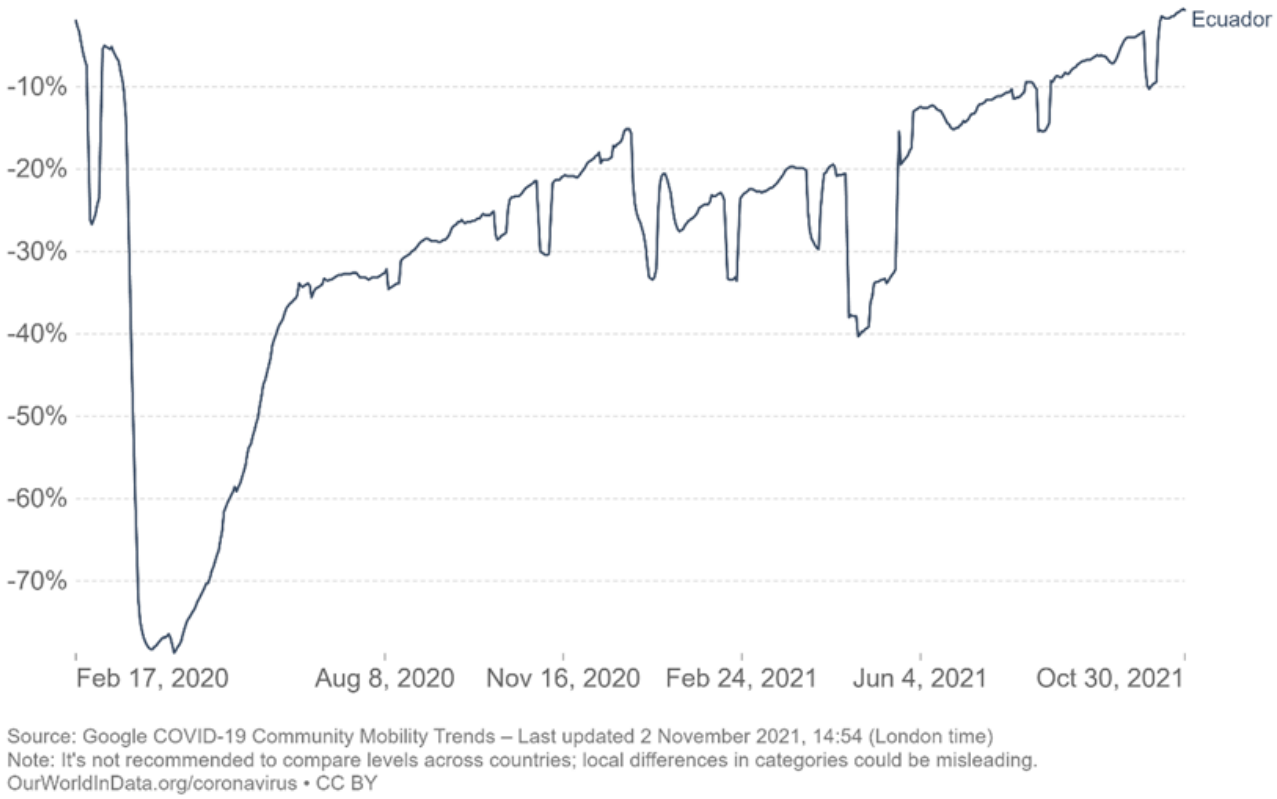


Figure 29. Percentage of the population fully vaccinated in Ecuador[17]



People mobility in Ecuador has been reduced during the first part of 2020, relative to pre-pandemic levels. Nevertheless, in the last months of 2021, mobility levels are recovering the normal patterns.[18]

Figure 30. People mobility rate, relative to pre-pandemic period in Ecuador**[19]**



Source: Our World in Data

Regarding the conditions to enter the country[20], as of November 1st 2021 it was mandatory to present a COVID-19 negative test for those passengers who have a vaccination certificate. Individuals without a certificate will have to undergo to a COVID-19 test within 72 hours of entrance to the country.[21] Additionally, the Andean Community of Nations (CAN, comprised of Colombia, Ecuador, Peru, and Bolivia) restored free entrance, circulation, and exit of private vehicles within the region?s borders. [22]

The pandemic led to the worst economic contraction in the history of Ecuador, with decrease of 7.8%, and similar impacts in terms of social and fiscal indicators[23] during 2020.[24] Ecuador's economy is highly dependent on agricultural production (with a significant percentage devoted to exports), oil and its refining, manufacturing (essentially of agricultural origin) and trade, which together account for almost 45% of gross domestic product. The economic contraction resulted from both the direct impact of confinement measures as well as from external drivers such as the fall of oil prices (with its subsequent impact on Ecuador?s balance of payment[25]), the fall of exports, tourism revenues and foreign remittances and transfers.[26]

By 2021, the World Bank projects an economic growth of about 3.4%, under the 5.2% growth projection for the Latin American and the Caribbean Region (LAC).[27]

Ways in which the COVID-19 pandemic can potentially affect the project are discussed below.

Risks related to the pandemic

- Lockdown and movement restrictions: mobility restrictions and the need for social distancing due to the pandemic could lead to reduced possibility for activities that have traditionally required in-person participation, such as workshops, meetings, trainings and consultations.

- Slowdown of procurement processes, i.e. procurement processes can be paralyzed or slowed down depending on the evolution of the pandemic and the offices it affects.

- Staff turn-over due to the illness: long leave periods to recover from the symptoms can cause delays in the execution of project activities.

- A change in stakeholder priorities can also take place as a result of the pandemic, shifting institutional efforts and resources towards the fight against COVID-19.

- Reduced automotive transport operations. Whether due to mobility restrictions imposed by health authorities, the increased possibility of teleworking, the need for social distancing, or a significant economic contraction, the COVID-19 pandemic has the potential to reduce the levels of transport travel in the country. In such a situation, fleet owners and private drivers could become less open to the adoption of new technologies, such as electric vehicles. This result would negatively impact on the effective execution of the project?s outputs, potentially leading to a slower adoption of electric vehicles.

Mitigation measures

Measures and protocols in relation to the pandemic are regulated by national and local (GAD) entities, with recommendations issued by a National Committee on Emergency Operations and decided upon by GADs; time-limited presidential decrees enforceable in the entire territory have also been issued during different moments of the pandemic.

A dynamic approach will be pursued to accommodate to various contingent scenarios:

- In the event of mobility restrictions and the need for social distancing, alternative forms of meeting organization and communication will be implemented (i.e. using online platforms). Almost two years of the beginning of the pandemic, such technologies are already commonplace and acceptable for usage by a broad range of stakeholders. Moreover, sometimes virtual meetings are considered as more efficient. This approach is foreseen for the stakeholder consultation rounds that are to take place during the different phases of the project, if restrictions are in place and social distancing is required.

- As for potential delays in procurement processes, the project timeline and dates of execution of all project activities will be re-evaluated taking into consideration any on-going risks due to COVID-19. Delegating execution to an external agency (instead of having the ministry execute directly) will provide more flexibility in terms of the applicable requirements.

- Regarding the shift in public sector priorities during the outbreak, it is expected that any negative impacts attributable to the pandemic in the short-run are reversed by increased interest in climate change risk in the medium to long-term, as it becomes clear that the consequences of climate change can be far worse than those of the pandemic.

- Reduced automotive transport operations. The project pilots are planned to take place in 2022 and 2023, by which stage it is projected that the COVID pandemic will have a reduced impact on the daily lives of citizens (i.e. as compared to the extent experienced in 2020 and the first half of 2021).

Opportunities

As numerous other countries, Ecuador is planning how to launch the economic recovery needed after the adverse effect the pandemic and restrictions have caused.[28] The the increasingly complex interactions between economic, political and human systems on one hand and environmental systems on the other contribute to the systemic nature of risk and its cascading effects.

The project was designed taking into consideration the effect of the pandemic. The pilot focuses on one of the very few sectors that has been counter-cyclical to the contraction observed in the rest of the economy, i.e. the logistics sector. Some preliminary figures indicate the following[29]:

- ? 70% growth in physical domestic e-commerce volumes across Latin America in 2020
- ? 30% growth in cross-border e-commerce volumes in Latin America in 2020
- ? 500% growth in home delivery of groceries and medicines in 2020 in Latin America
- ? An estimated 50 million Latin American consumers tried e-commerce for the first time in 2020

The growth of e-commerce is seen as an opportunity to kick-start the transition to electric mobility in a sector that is currently growing and exhibiting a large degree of dynamism, and that also has a large impact in terms of GHG emissions.[30]

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[1] World Meteorological Organization, *World weather information service* (2021). Available here.

[2] IPCC, 2012, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change* [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.

[3] Given the relatively short timeframe involved in this project (three years), the term *hazard* will focus on the occurrence of extreme events rather than on long-term climate variability. Hazards deriving from long-term variations in average temperature and precipitations will be considered in Output 1.2 (see deliverable D.1.2.8). However, it is important to stress that the high share of renewables in the Ecuadorean grid (>75%) makes it very unlikely for a reversal of emission reductions resulting from the transition to e-mobility.

[4] Ministerio del Ambiente, *Estrategia Nacional de Cambio Clim?tico 2012 ? 2025* (2012).

[5] Priority care groups are defined in the Constitution of Ecuador (art. 35), and include seniors, children, pregnant women, people with disabilities, people with severe or complex diseases, population at risk, victims of domestic or sexual violence and of natural or anthropogenic disasters, as well as people with low levels of income and limited coverage of basic services.

[6] Fernandez, M.; Bucaram, S.; Renteira, W.; *Assessing local vulnerability to climate change in Ecuador* (2015). *Springer Open Journal.* DOI 10.1186/s40064-015-1536-z

[7] Distrito Metropolitano de Quito, *Plan de Acci?n de Cambio Clim?tico de Quito* (2020).

[8] Ibid.

[9] This analysis is adapted from Carvajal, P.; Li, F.; Soria, R.; Cronin, J.; Anandarajah, G.; Mulugetta, Y. *Large hydropower, decarbonisation and climate change uncertainty: Modelling power sector pathways for Ecuador* (2019). *Energy Strategy Reviews* 23 pp. 86-99

[10] Carvajal, P.; Li, F.; Soria, R.; Cronin, J.; Anandarajah, G.; Mulugetta, Y. *Large hydropower, decarbonisation and climate change uncertainty: Modelling power sector pathways for Ecuador* (2019). *Energy Strategy Reviews* 23 pp. 86-99

[11] Carvajal, P.; Li, F.; Soria, R.; Cronin, J.; Anandarajah, G.; Mulugetta, Y. *Large hydropower, decarbonisation and climate change uncertainty: Modelling power sector pathways for Ecuador* (2019). *Energy Strategy Reviews* 23 pp. 86-99

[12] The long-term environmental breakeven analysis will identify critical thresholds (i.e. ?environmental breakeven?) for the share of different combinations of renewables below which the electrification of the Ecuadorean vehicles would result in a net increase of GHG emissions.

[13] Furthermore, UNEP is currently developing a GEF-7 CBIT project to improve the country?s climate transparency system. The latter will be executed by the same ministry in charge of the present e-mobility project, i.e. the Ministry of Environment, Water and Ecologic Transition (MAATE).

[14] Johns Hopkins University. Coronavirus resource center (2021) Ecuador figures available here.

[15] Johns Hopkins University. *Coronavirus resource center* (2021) Ecuador figures available here.

[16] COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. Available here

[17] Ibid.

[18] Ibid.

[19] Ibid.

[20] Measures in this section are presented to exemplify the type of actions undertaken as a response to the pandemic. However, it is important to stress that these are evolving quickly as the pandemic develops.

[21] Hosteltur. *Ecuador elimina PCR obligatorio a pasajeros con certificado de vacunaci?n*. Available here

[22] Infobae. *Colombia, Ecuador, Per? y Bolivia aprobaron la libre circulaci?n de veh?culos para volver a formentar el turismo afectado por la pandemia*. Available here

[23] OECD, *Impacto financiero del COVID-19 en Ecuador: desaf?os y respuestas* (2020)

[24] Banco Central del Ecuador. *Evaluaci?n impacto Macroecon?mico del covid-19 en la econom?a Ecuatoriana* (2020). Available here

[25] As discussed in the baseline section, Ecuador is a net exporter of heavy oil products and a net importer of refined fuels such as gasoline, diesel and liquefied petroleum gas (LPG).

[26] OECD, *Impacto macroecon?mico del COVID-19 en Ecuador: desaf?os y respuestas* (2020)

[27] Banco Mundial. *Perspectivas Econ?micas Mundiales* (2021). Available here

[28] Asamblea Nacional de Ecuador, *Ley Org?nica para el Desarrollo Econ?mico y Sostenibilidad Fiscal tras las Pandemia COVID-19* (published: 29 November 2021). Available here.

[29] Americas Market Inteligence, *Cinco oportunidades del sector de log?stica en am?rica latina para 2021* (April 2021). Available here.

[30] As discussed under ?Fleet fuel consumption? in the baseline section, light-duty vehicles used in logistics and services represent the second largest source of transport emissions, only after heavy-duty vehicles.

6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

Institutional arrangements

The Executing Agency (EA) of this project will be the Deutsche Gesellschaft f?r Internationale Zusammenarbeit (GIZ), who will act on behalf of the Ministry of Environment, Water and Ecologic Transition (MAATE). GIZ was selected after a call for proposals conducted by MAATE for this project, and will bring in additional experience to ensure that the project achieves its goals. UNEP will act as the Implementing Agency (IA), who will undertake overall project supervision and lead the reporting to the GEF.

Project activities will be undertaken by the Project Management Unit (PMU) consisting of the chief technical advisor (CTA) and a junior technical and administrative officer. The PMU will be supported by a technical team consisting of a senior technical expert, a regulatory framework specialist, an economist and a gender specialist, under the overall coordination of the project?s chief technical advisor. A National Project Director appointed and co-financed by the MAATE will be the overall leader of the PMU.

Figure 31. Project implementation arrangements

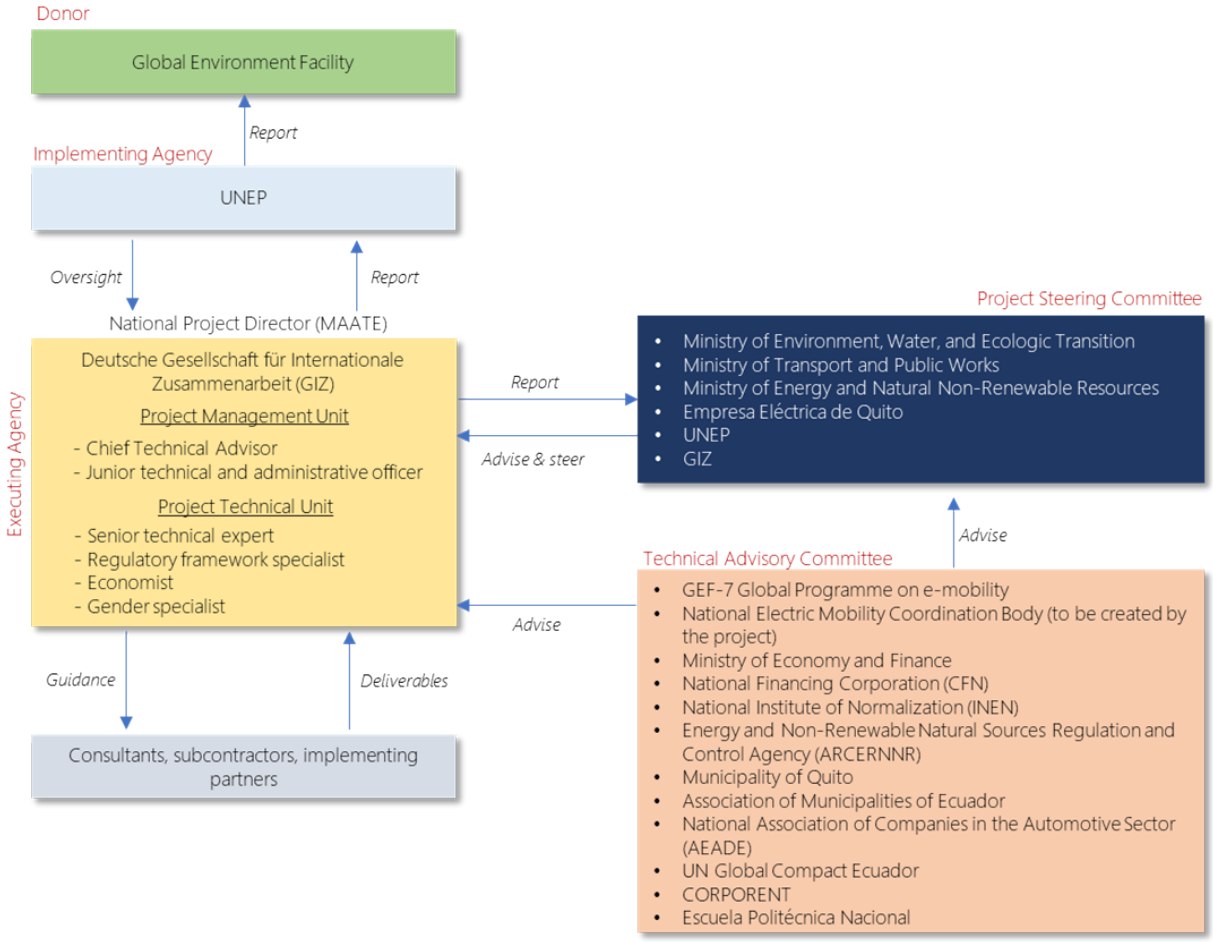


Table 27. Project governance

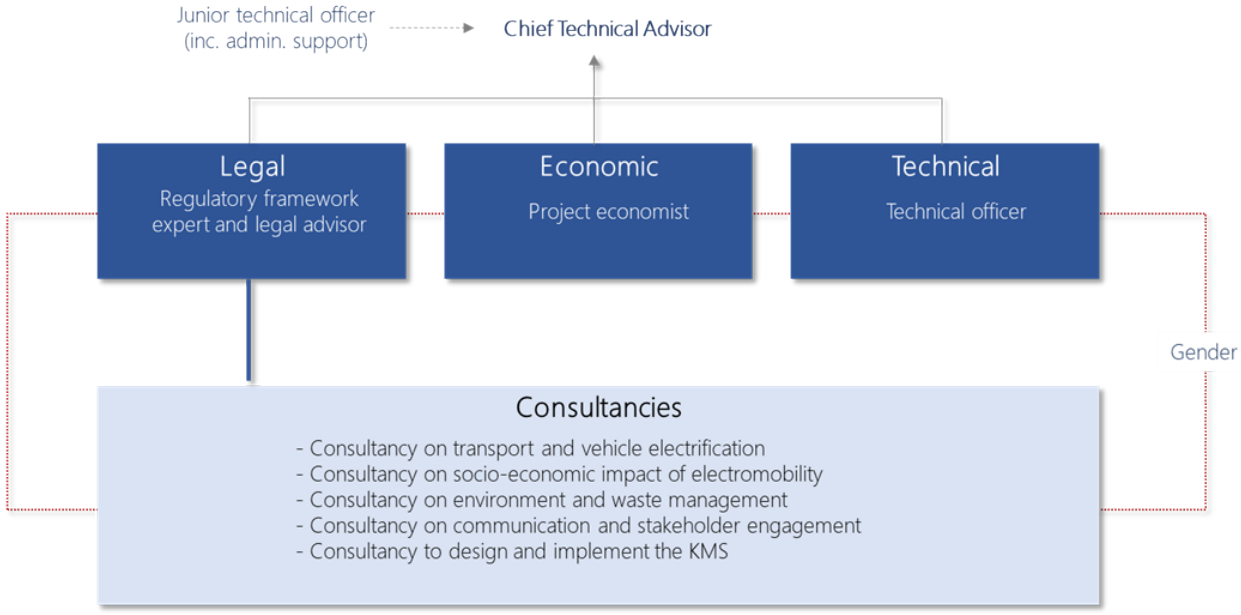
Body	Constitution and role
Executing agency	The project fund management agency will be the Deutsche Gesellschaft f?r Internationale Zusammenarbeit (GIZ), who will act on behalf of the Ministry of Environment, Water and Ecologic Transition (MAATE). The technical lead for the project will be its Project Management Unit.

Project management unit (PMU)	A project management unit will undertake management and reporting duties involved in the project. It will consist of: A project-financed Chief Technical Advisor (CTA), who will serve as the project manager. A junior technical and administrative officer will provide overall support, including in the preparation of draft technical and administrative reports. The PMU will report to a co-financed National Project Director, pertaining to and to be appointed by the Ministry of Environment, Water and Ecologic Transition. The PMU will be seated at the premises of the GIZ in Ecuador and the MAATE as required. Details on the scope of the work to be conducted by each team member are provided in annex H (terms of reference).
Project technical unit (PTU)	The project technical unit will support the Chief Technical Advisor in the various technical, legal, economic, social and gender aspects involved in the project, with focus on the adoption of the deliverables. The PTU will coordinate all technical work, under the supervision of the CTA, providing support to the national e-mobility coordination body throughout the approval / adoption process required for each of the measures resulting from the project. The PTU will consist of: A senior technical expert A regulatory framework expert and legal advisor A project economist A gender expert The project?s workplan has been designed so that each deliverable has a unique responsible expert from the PTU, depending on its scope; some of the deliverables been assigned directly to the CTA. The scope of the work to be conducted by each team member of the PTU are provided in annex H (terms of reference); the full list of deliverables (and the experts assigned to each) are presented together with the workplan, in Annex K.
Implementing agency	UNEP will act as the Implementing Agency. UNEP will build upon its experience as implementing agency for other GEF electric mobility projects in the region (Chile and Costa Rica), as its experience as lead agency for the GEF-7 global program on electric mobility. Furthermore, it will draw on in-house expertise on electric mobility led by its Mobility Unit, Energy Branch, Economy Division. In developing this project, UNEP has drawn upon experiences, good practices and lessons learned in developing and implementing electric mobility projects in Latin America and the Caribbean, as well as around the globe. UNEP?s significant experience with promoting electric mobility holds it in good stead to be the project implementing agency vis-?-vis other GEF agencies.

Steering Committee	The project steering committee will supervise and provide overall guidance to the executing agency and its management team for project execution. This will include as related to political alignment, technical quality, procurement, and financial management of the project. The steering committee will consist of the following entities: Ministry of Environment, Water and Ecologic Transition Ministry of Transport and Public Works Ministry of Energy and Natural Non-Renewable Resources Empresa El?ctrica de Quito GIZ (as the executing agency) United Nations Environment Programme (as the implementing agency) These are the same entities that lead the development of this proposal.
Technical Advisory Committee (TAC)	This body will also serve to provide thematic technical advice to project activities through in-kind support of its members. The following entities have manifested interest in participating in this committee: GEF-7 Global Programme on e-mobility National Electric Mobility Coordination Body (to be created by the project) Ministry of Economy and Finance National Financing Corporation (CFN) National Institute of Normalization (INEN) Energy and Non-Renewable Natural Sources Regulation and Control Agency (ARCERNNR) Municipality of Quito Association of Municipalities of Ecuador National Association of Companies in the Automotive Sector (AEADE) CORPORENT Other entities may be invited to participate upon decision by the Steering Committee. It will provide support, at the Steering Committee or Executing Agency?s request, on areas including: Institutional and regulatory dimensions of e-mobility. The TAC will facilitate the engagement of stakeholders in the preparation of project strategies, policies and regulations, according to each member?s area of expertise. Demonstration of e-mobility. The TAC will provide technical, organizational, and regulatory advice related to the design and implementation of the project pilots.
Project service providers	Project-financed consultancies to prepare project deliverables and support the achieving of project outputs.

Both the PMU and the PTU will be integrated fully by local professionals to maximize the development of local capacities. A series of consultancies (which can bring in international experts, as needed) have been included for specific assistance. The workplan was built assigning one single responsible for each deliverable according to its scope (technical, legal, financial, gender, etc.). Likewise, each deliverable that is to be prepared by consultancies is assigned to a single PTU member for revision, supervision, and clearance - again depending on its scope. This ensures a clear delimitation of roles and responsibilities throughout the project?s workplan, preventing any duplication of efforts. The full list of deliverables assigned to each member of the PTU and for each consultancy is available in Annex H of this document, which presents the terms of reference for staff members and consultancies required. Annex J provides further details on the roles and responsibilities of the implementing and executing agencies.

Figure 32. Project management unit and supporting consultancies



Coordination with other initiatives

The proposed GEF-7 project will touch on numerous aspects that are currently slowing down the adoption of electric mobility. As discussed in the baseline section, several recent or on-going initiatives are also contributing to this goal. The table below revisits the initiatives listed in the baseline section, highlighting its relevance for the proposed GEF project and the way in which the latter intends to capitalize potential synergies arising from coordination.

Table 28. Coordination with recent and on-going projects

Project	Objectives and relevance to this project	Intended coordination and synergies
Procurement of charging stations in Quito Empresa El?ctrica de Quito (EEQ, Quito Electricity Company) 2018 ? 2023 USD 290,000 (charging infrastructure) USD 2,000,000 (inter-urban charging infrastructure)	Installation of 11 charging stations The project pilot will use the fast-speed charging infrastructure installed by EEQ	Vehicles in the pilot will have access to EEQ?s charging stations and support from EEQ staff in charge of them. EEQ also intends to lead a project for the deployment of inter-city charging stations with other utilities in the country, which will provide the bases for the strategy for the electrification of the main corridors in the country (see deliverable D3.4.6). EEQ to participate in the project?s Steering Committee as a key actor (in their role as electricity utility and the first service provider with experience in the electrification of its own fleet).
Charging infrastructure BYD, Metropolitan Municipality of Transit Guayaquil and National Government 2019 USD 650,000	Installation of 20 charging devices to charge electric buses and taxis.	Technology used will inform the proposal for a national standard (output 3.4)

Project	Objectives and relevance to this project	Intended coordination and synergies
National Plan for the decarbonization of Ecuador MAATE with support from AFD 2021 ? 2023 EUR 1,000,000	Creation of a roadmap for the decarbonization of various sectors in Ecuador, including transport. The GEF-7 project will materialize the initial actions in the roadmap (to be developed before the end of 2023). As the roadmap will include a long-term timeframe, it will provide continuity to the outputs executed under this GEF-7 proposal, serving as a basis for scaling up.	Project led by the same ministry that will be in charge of this GEF-7 project.
Support for the transition of the energy matrix in Ecuador II Ministry of Economy and Finance (in technical coordination with the MEyRNNR) 2020 (20 year loan) USD 280,000,000 (IADB loan)	Two of the specific objectives from this programmatic cooperation are (i) to support the replacement of fossil fuels with electricity and enhance energy efficiency measures; and (ii) to promote access to electricity and bolster conditions to increase use of renewable energy sources. In particular, this project will support Ecuador in developing a national plan that includes Ecuador?s actions to reduce GHG emissions in the energy sector (aligned with the National Plan Towards Decarbonization); the update of the National Energy Forecast (including the Electricity Masterplan) and the National Energy Balance; the reduction of fossil fuel consumption in the residential sector (i.e. reduction of Liquified Petroleum Gas) and expansion of renewable capacity, and the modernization of the electricity sub-sector to accommodate new loads resulting from the energy matrix transition. These activities are of direct relevance for the technical outputs in this GEF-7 proposal?s component 3 (i.e. 3.2, 3.3, 3.4 and 3.5).	Technical work in this project is led by the MEyRNNR, who will be part of the proposed GEF-7 project?s Steering Committee.
Proposal for a National Strategy of Electromobility Hinicio (financed by: Inter-American Development Bank) 2020 ? 2021	Defines objectives and activities for the development of electromobility in Ecuador. While its targets have not been officially adopted, many of its recommendations are to be implemented by this GEF-7 project, namely outputs 1.1, 1.4, 3.2, 3.3, 3.4, and the regulation of the disposal of ion-lithium batteries included as part of output 4.1.	While this project is already over, several meetings with the consultant team took place during the design of this GEF-7 proposal

Project	Objectives and relevance to this project	Intended coordination and synergies
Advancing a regional approach to electric mobility in Latin America GCF readiness / UNEP 2019 - Present USD 200,000	Seeks to create adequate conditions to promote electric mobility through the exchange of experiences at a regional level.	The baseline analysis for the GCF readiness has been undertaken in parallel to the one developed for this GEF-7 project. The latter is expected to begin during the last months of the preparation of the GCF readiness. Two specific deliverables are to be given continuity by the GEF-7 project, namely: - the creation of an electric mobility group (conceptualized in the GCF readiness, to be formalized through output 1.1 of this GEF-7 proposal) - The recommendations for the creation and harmonization of regulations, policies, and standards, which will serve as the basis for output 3.4 (charging standards) of this GEF-7 proposal.
GEF Global Program for e-mobility UNEP 2021 ? 2025 USD 33,000,000 (global budget)	Support for the development of electric mobility through a regional platform	The GEF Global Program will provide support to this GEF-7 child project through the Latin America & the Caribbean Regional Platform, to be led by the Centro Mariano Molina, and the thematic working groups (of which, the ones on *light-duty vehicles* and *batteries and charging infrastructure* will be of direct relevance for this child project). An in-depth discussion on the many ways in which the child project will interact with the global project, please refer to subsection 1d. (?Child project?) of this proposal.

Project	Objectives and relevance to this project	Intended coordination and synergies
Development of the National Policy for Sustainable Urban Mobility (PNMU) for sustainable transport in Ecuadorian cities through Euroclima+. Ministry of Transport and Public Works (MTOP) and French Development Agency (AFD) 2020-2023 EUR 500,000	The PNMU will contribute directly to the goals of the present GEF-7 proposal, serving as co-financing to the latter. The National Urban Transport Plan will play a key role in establishing guidelines for the governance structure for the mobility of Ecuador. Some of the actions that have been prioritized during its preparation workshops include: - the creation of an information system for mobility (of relevance for component 1 of this GEF project, in particular output 1.1 and 1.4). - Developing Public Private Partnerships (PPP) and leasing frameworks in the transport and mobility sector, which will provide guidelines for the execution of output 3.1 of this project, - Improvement of vehicle efficiency (output 3.2) and fuel quality (output 3.3).	The MTOP is part of the GEF-7 project?s Steering Committee.
Global Fuel Economy Initiative (GFEI) Ministry of Energy and Natural Non-Renewable Resources (MEyRNNR) and UNEP / Centro Mariano Molina 2022 USD 18,000	The project will collect data on the fuel consumption of ICE vehicles in Ecuador. Using the Fuel Economy Policies Implementation Tool[1], it will assess the impact of different policy measures on the average fuel economy of newly registered cars and provide recommendations. These recommendations will be direct relevance for the drafting of standards for vehicle efficiency (output 3.2) and fuel quality (output 3.1) that are to result from this GEF-7 project.	Several coordination meetings were undertaken with the GFEI team during the design phase of this GEF-7 proposal. Centro Mariano Molina will also coordinate the regional platform of the GEF Global Program, hence, a direct nexus with the Technical Advisory Committee of this GEF-7 project will be established, thus ensuring proper coordination.

Project	Objectives and relevance to this project	Intended coordination and synergies
Public transport Cities Finance Facility C40 ? GIZ Project design completed in 2020 USD 450,000 USD (design only; implementation not covered in this amount)	The C40 Cities Finance Facility will help Quito electrify the Ecov?a Bus Rapid Transit (BRT) corridor. The impact of vehicle restrictions in the Historic City Center of Quito (to be piloted during this GEF project) on the Ecov?a Bus Rapid Transit design will be discussed with the Secretariat of Mobility of the Municipality of Quito.	As the host of the pilot of this GEF-7 project, the Municipality of Quito will take part in the project?s Technical Advisory Committee.
Electric taxis implementation in Loja BYD, Ecotaxi Cooperative 2017-present USD 1,785,000	Implementation of 51 electric taxis and charging station . The infrastructure will inform the choice of charging standards to be developed under this GEF-7 project (output 3.4)	Actors involved in this project will be invited to participate in the GEF-7 proposal?s workshop (see e.g. deliverable D2.1.1)
Implementation of 20 electric buses in Guayaquil ? Saucync Private companies 2019-Present USD 7,600,000 (CFN loan) + USD 400,000 equity	Implementation of 20 electric buses with a credit from CFN. This is one of the first e-mobility endeavors in the country, providing important lessons learned for this GEF-7 project.	Actors involved in this project will be invited to participate in the GEF-7 proposal?s workshop (see e.g. deliverable D2.1.1)

Project	Objectives and relevance to this project	Intended coordination and synergies
Conditional Credit line for Investment Projects Inter-American Development Bank and Ministry of Economy and Finance 2021 ? 2026 USD 33,000,000	Credit line for the replacement of combustion engine units by electric taxis and buses, giving the benefit of an additional bonus for scrap. This project is currently on hold; when implemented, it will be of direct relevance for component 4 (disposal of vehicles at the end of their lifetime)	The Ministry of Economy and Finance will integrate the GEF-7 project?s Technical Advisory Committee.
Non-refundable technical cooperation Inter-American Development Bank and Ministry of Economy and Finance 2021 ? 2026 USD 1,000,000	These funds are destinated to go with the conditional credit line for the technical, financial, and legal structure of the projects. They will contribute to the capacity building efforts in this GEF project (output 1.3)	The Ministry of Economy and Finance will integrate the GEF-7 project?s Technical Advisory Committee.
Pilot Electric Bus Government Council of Galapagos (CGREG) 2020	Donation from the Vice-presidency of an electric bus. This is one of the first e-mobility endeavors in the country, providing important lessons learned for this GEF-7 project.	Actors involved in this project will be invited to participate in the GEF-7 proposal?s workshop (see e.g. deliverable D2.1.1)

Project	Objectives and relevance to this project	Intended coordination and synergies
Design of a management model for the pilot bus of Galapagos Automobile Club of Ecuador, HINICIO and Government Council of Galapagos 2020 -2021 USD 18,000	Develop a management model and business model for the pilot electric bus of Galapagos, with the goal of future scaling. This is one of the first e-mobility endeavors in the country, providing important lessons learned for this GEF-7 project.	Actors involved in this project will be invited to participate in the GEF-7 proposal?s workshop (see e.g. deliverable D2.1.1)
Digitalization of transport Municipality of Quito and EC Solutions+ 2023 ? 2026 (to be confirmed)	Group Optimization of the use of public transport through a digital payment method in Quito. At the moment of writing this proposal, this project was not yet confirmed. However, if confirmed it could be added to the GEF-7 pilot?s (e.g. for the optimization of logistic routes for EVs considering existing and planned charging infrastructure)	As the host of the pilot of this GEF-7 project, the Municipality of Quito will take part in the project?s Technical Advisory Committee.
Municipality of Quito and EC Solutions+ 2020 - 2024 USD 597,000	Implementation of low duty electric transport (locally produced) of passengers and courier for the Historical Center of Quito (decarbonization of the center) + proposal for regulation of locally produced bikes and 3 wheelers.	Partner project. The EC Solutions+ pilot will begin earlier than the one from GEF-7 and use the same cross-docking station to be provided by the Municipality of Quito. Both projects will work together with the Municipality. Note that the EC Solutions+ focus is on the development of locally manufactured EV prototypes, whereas the GEF-7 project will use proven vehicles.

Project	Objectives and relevance to this project	Intended coordination and synergies
ACCESS - Accelerating Access to Low Carbon Urban Mobility Solutions through Digitalization (IKI project implemented by UNEP in Argentina, Brazil, Colombia, Ecuador, Mexico and Peru) 2023 ? 2026 (currently in the design and approval stage) 21,640,000 EUR (for all six participating countries)	Promotes a comprehensive approach on digitalization of transport in urban areas. The project will focus on scale up of digital technologies to accelerate measurable progress toward safer, more efficient, inclusive transport.	Partner project. UNEP is the implementing agency for this IKI project through its Air Quality and Mobility Unit. Digitalization can enable connected mobility, integrated logistics, and improved implementation with large potential for optimizing transport systems. Synergies during the execution of the pilot will be explored (see e.g. deliverable D2.1.2), depending on the approval timeline of both projects.
Vehicle Label Ministry of Transport and Public Works (MTOP) and AFD 2019 ? Present (label will become mandatory in 2023) USD 200,000	Design of a label for vehicles to give information about its energy efficiency, emissions, and security. The standards proposed for vehicle efficiency (output 3.3) will have to be aligned with the vehicle labeling standard, as the latter will become mandatory in 2023.	The MTOP is part of the GEF-7 project?s Steering Committee.

[1] GFEI *Fuel Economy Policies Implementation Tool ? FEPIT* (2016), available here.

7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assesments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

National Development Plan 2021-2025 (?Plan Nacional de Creaci?n de Oportunidades 2021-2025?, PNCO)

The PNCO is described in the baseline section of this document (refer to Table 7). This project will promote investments and the development of a nascent market; hence, it is aligned with objectives 2 and 3 of the economy and job creation strategic area (namely, *to promote an economic system with clear rules that encourages foreign trade, tourism, investments, and the modernization of the national financial system*; and *to increase productivity and competitiveness in the agricultural, industrial, aquaculture, and fishing sectors, under a circular economy approach*). As a mitigation project that will lead to a reduced usage of fossil fuels, it is also aligned with objectives 11 and 12 of the ecologic transition strategic area (namely, *to preserve, restore, protect, and make sustainable use of natural resources*; and *to promote sustainable development models, applying climate change adaptation and mitigation measures*.

National Climate Change Strategy (ENCC) 2012-2025

As mentioned in the baseline section, the ENCC is among the first policies related to climate change mitigation and adaptation in Ecuador. Energy (including the transport sector) is among the prioritized sectors in the strategy, and therefore, in all documents related to Climate Change that were developed afterwards (NCs, NDCs, etc.) and provide further details on the concrete actions that are to be implemented. As the present proposal consists of an e-mobility project expected to result in GHG emission reductions in the transport (and energy) sectors, this proposal is fully aligned to the ENCC.

Nationally Determined Contributions (NDC) and National Communications

As discussed in the baseline section, the scenario conditional of external sources of financing proposes various Nationally Appropriate Mitigations Actions (NAMA) for duty and passenger transport. These actions (also included in the Third National Communications to UNFCCC[1]) include mitigation actions in freight transport and logistics, including through the renewal of fleets.[2] [3] Promoting the renewal of fleets is among the key outcomes of this GEF-7 proposal, mainly through component 2 (i.e. the project pilot), output 3.1 (business models and a policy framework for leasing, renting and subscription to electric vehicles) and output 4.1 (an end-of-life vehicle disposal programme that will reduce the average age of the fleet).

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Sustainable Development Goals (SDGs):

In 2015 Ecuador adopted the United Nations? 2030 Agenda for Sustainable Development as national government policy.[4] This agenda puts forward a transformational approach to economic, social, and environmental sustainability, including a series of Sustainable Development Goals (SDGs).

As a mitigation project, this GEF-7 proposal will be mainly aligned with SDG 13 (Climate Action). Moreover, the improvement in air quality resulting from the reduction of fossil fuels is aligned with SDG 11 (Sustainable cities and communities). The innovative elements of the project (including but not limited to the technology itself) will be aligned with SDG 9 (Industry, Innovation and Infrastructure).

National Plan for Energy Efficiency (PLANEE) and Organic Law of Energy Efficiency LOEE

The National Plan for Energy Efficiency (PLANEE) was prepared in 2017 to introduce various energy efficiency measures aimed at a progressive substitution of fossil-fuel, high environmental impact power plants with low carbon technologies and renewable sources.

PLANEE is built around improvements in terms of six main pillars: 1) Legal and institutional framework, and access to information, 2) Residential, commercial, and public demand, 3) Industrial consumption, 4) Transport, 5) Self-consumption of the energy sector and 6) situation in the Galapagos archipelago. The transport pillar has the main objective to reduce the energy intensity in the transport sector. To achieve this, the PLANEE plans to optimize infrastructure for the circulation of transport (i.e. resulting in improved vehicle efficiency), to replace inefficient transport technologies (energy labelling and workshops in efficient driving techniques) and fuel switch (i.e. improving fuel quality and introducing new technologies, such as hybrid and electric vehicles).[5] This GEF-7 proposal is thus fully aligned with one of the main pillars of the PLANEE.

In March 2019, the National Assembly, published the Organic Law of Energy Efficiency (LOEE), which makes the PLANEE mandatory. The LOEE sets the logistics, freight, and passenger transport as a priority for the introduction of efficiency measures, including through electrification. It also sets the requirement of improving vehicle efficiency and fuel quality, as well as the need for a scrapping plan for vehicles in the transport sector at the end of their lifetime and a public-access information system with statistics and indicators relevant for the monitoring of the implementation of the PLANEE. This project will provide a socially-viable proposal for improving vehicle efficiency and fuel quality (outputs 3.2 and 3.3, respectively); it will address the creation of the scrapping framework through component 3, and the establishment of a sectoral KMS for the transport and energy sector (output 1.4).

United Nations Sustainable Development Framework (UNDAF) 2019 ? 2022

The 2019-2022 UNDAF with Ecuador establishes four priority areas, namely, people, planet, prosperity, and peace. This project will represent a direct contribution towards indicator 2.8 (?number of public policy instruments designed and/or implemented at national or local level to promote environmental sustainability in topics such as sustainable use of resources and conservation of biodiversity, climate change, chemicals

and hazardous waste management, international waters and promotion of renewable energies?) of the planet priority area.

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Alignment with other government initiatives and priorities:

The project will also be aligned to other policies that at the time of preparing this project document have not yet been officially adopted. These include:

- National Plan Towards Decarbonization (under development): the plan aims to set a strategy for the decarbonization of the Ecuadorean economy, creating a harmonized policy and regulatory framework that provides a consistent direction and appropriate signals to all key actors in the public and private sector. The GEF-7 project will materialize the initial actions in the roadmap (to be developed before the end of 2023). As the roadmap will include a long-term timeframe, it will provide continuity to the outputs executed under this GEF-7 proposal, serving as a basis for scaling up.

- 2050 National Energy Plan (NEP, under development): Two of the specific objectives from the 2050 NEP are (i) to support the replacement of fossil fuels with electricity and enhance energy efficiency measures; and (ii) to promote access to electricity and bolster conditions to increase use of renewable energy sources. The GEF-7 project is fully aligned to these goals, and will provide specific outputs towards their achievement (see e.g. outputs 3.2, 3.3 and 3.3).The 2050 NEP will ensure that the energy matrix in Ecuador is capable to sustain emission reductions from the transition to e-mobility in the long run.

- National Policy for Urban Sustainable Mobility (PNMU, under development): The National Urban Transport Plan will play a key role in establishing guidelines for the governance structure and the technical work required for the sustainability of the mobility sector of Ecuador. Thus, the PNMU will provide guidelines for the execution of both institutional (e.g. output 1.1) and technical (3.2, 3.3) outputs from this GEF-7 project.

- Proposal for a National Strategy for Electric Mobility (ENME): While the proposal has not been officially adopted (in the sense of not being legally binding), the document provides a preliminary roadmap and an inventory of required actions (some of which will be included in upcoming policy documents such as the PNMU). Many of its recommendations are to be implemented by this GEF-7 project, namely outputs 1.1, 1.4, 3.2, 3.3, 3.4, and the regulation of the disposal of ion-lithium batteries included as part of the deliverables in output 4.1. Moreover, the GEF-7 project will assess the technical, fiscal, distributional and social implications of the transition to e-mobility that is proposed by the ENME.

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[1] Ministerio del Ambiente, *Tercera Comunicaci?n Nacional del Ecuador a la Convenci?n Marco de Naciones Unidas Sobre Cambio Clim?tico* (2017).

[2] Gobierno de Ecuador, *Primera contribuci?n determinada a nivel nacional (NDC) para el Acuerdo de Par?s bajo la Convenci?n Marco de Naciones Unidas Sobre Cambio Clim?tico* (2019).

[3] Perspectives Climate Change; TYPSA, *Identificaci?n, evaluaci?n y escenarios de reducci?n de emisiones de GEI relacionadas*

con medidas y acciones de mitigaci?n a implementar a nivel nacional (2017).

[4] Bolet?n Oficial, *Decreto Ejecutivo 371* (2015).

[5] Ministerio de Electricidad y Energ?a Renovable, *Plan Nacional de Eficiencia Energ?tica 2016 - 2035*. Quito (2017).

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

As shown in Figure 1 in the barrier analysis, the current lack of a repository of sectoral information has been identified among the main root causes that are relevant for this project. This includes both information as well as the systematic processes and procedures to identify, capture, store, create, update, represent, and distribute knowledge for public and private decision-making and planning, awareness and learning across and beyond the energy and the transport sector.

Data will be an integral part of the transition to e-mobility, as plans are data-driven and data-intensive, requiring comprehensive foundational data (i.e. multipurpose data useful for defining the fundamentals of a transportation system) and specialized data (i.e. information useful for identifying the potential benefits of electrification, the best vehicles to electrify, and the best instruments to use when pursuing electrification). The Knowledge Management (KM) strategy of the project will thus be tackled through a dedicated output (output 1.4); the KM ecosystem is further expanded through the capacity building mechanism in output 1.3 and the stakeholder engagement and communication campaign in output 1.2.

The KM and monitoring system to be created by this project seeks to create an information repository that is regularly updated and useful to understand, communicate and steer the transition to e-mobility. It is envisioned that the successful implementation of this framework within the life span of the project will result in a solid foundation for the extended dissemination and exchange of transport, climate and energy knowledge in Ecuador, contributing directly to the objectives in the relevant national policies (i.e. the National Plan for Decarbonization, the National Sustainable Mobility Policy).

The KM approach is thus expected to meet the initial needs of the project as a temporary project/organizational structure, but with KM investments, structure, processes, and systems, which will continue to be functional beyond the life of the project, with clear capacity building and institutionalization across the relevant ministries and institutions. Moreover, the KM system (output 1.4) and the capacity building mechanism (output 1.3) will play an essential part in the replication of the pilots, systematically collecting and disseminating lessons learned to relevant stakeholders (mainly through deliverables in

output 2.2), identifying what works, what to avoid, and potential savings in terms of fuels and emissions. It will also play a key role in setting priorities for the development of intra- and inter-city charging infrastructure, collecting and making available technical information for managing the transition, and allowing to transparently document and disseminate ways in which private and public vehicle fleets can be converted to EVs without compromising the stability of the distribution networks. Thus, the knowledge management system will provide transparency and signal to the wider public the price and technical conditions to inform their investment decisions.

The KMS involves analyzing the current and future necessities of relevant public entities in terms of data management for transport and energy. Based on these and other international practices, a software for data management will be selected for implementation. In selecting and implementing the system, activities will focus on ensuring that the system is endowed with enough resolution to capture gender differences (mainly in access to EVs, but also on their sectoral representation in transport and mobility), as well as its sustainability post project and developing a plan for broad roll-out. Potential KM solutions that will be considered in the context of this project include intranet-based systems, content management systems, BI tools, knowledge map systems and knowledge & information portals. Activities will include the development of standardized transport and energy data collection, standardized definitions of common terminologies to be used with respect to the transition to e-mobility, KM Guidelines and Communication Guidelines for training key personnel in the use of the system, a repository of existing literature and reports, procedures to fill gaps in foundational data, the systematization of experiences and lessons learned from the Global Programme; implement national and sub-national institutional partnerships through technical exchange programs, internships and collaborative research agreements.

The complete Knowledge Management System for the project will be designed through a specific deliverable (D1.4.1). Through the project, the collecting entity will have:

- Fluent communication with as many of the data sources as possible, a capacity that will be developed throughout the project (supported by the public engagement and communication campaign, output 1.2) and materialized through Memorandum of Understandings for the provision of key information required.
- Technical capacity to clean the data, check for validity, and fill in gaps in fundamental data.
- Identified resources to host large data sets in an online, searchable format.
- Permanent fixture in Ecuador. The Ministry of Transport and Public Works has been proposed to house the KMS.

As mentioned throughout the text, the proposed GEF-7 project is part of the global GEF-UNEP Programme on E-mobility. Thus, the project will actively participate in the global programme?s global and regional activities, contributing to the knowledge exchange in the regional knowledge and investment platforms and the relevant global working groups, as well as by providing insights and knowledge. Moreover, the global programme will be essential in providing proxy data from countries with economic, cultural, and geographic similarities, thus contributing to the filling of any outstanding local gaps.

The elements in this project that are relevant for the knowledge management add up to USD 317,025 and include the following:

Table 29. Pillars of the KM strategy for the proposed project / KM budget

Description	Output and deliverable	Budget USD
A gender-sensitive mobility knowledge management system housed in the Ministry of Transport is made available for use by policy makers and key stakeholders	Output 1.4	83,200
Private and public stakeholders increase awareness, capacity, and knowledge on technical, financial, and regulatory aspects of electric mobility through a capacity building mechanism and the global program on electric mobility	Output 1.3	109,125
A multi-stakeholder consultation, communication, and engagement strategy is made available to support the government in scaling up electric mobility through a just transition	Output 1.2	82,200
KM for the project?s pilot, including: - Pilot operation and performance reports - Final workshop and presentation of results: vehicle techno-economic and environmental performance - Postprocessed data	Deliverables D2.2.2, D2.2.3 and D2.2.4	42,500
Total		**317,025**

9. Monitoring and Evaluation

Describe the budgeted M and E plan

Progress will be reviewed yearly through the Project Implementation Review (PIR), which is the tool foreseen in the GEF?s Project and Program Cycle Policy. The purpose of the PIR is to assess project performance, to analyze whether the project is on track, what problems and challenges it encountered, and which corrective actions are required so that the project can achieve its intended outcomes by project completion in the most efficient and sustainable way. It is the responsibility of the UNEP Task Manager to monitor whether the agreed recommendations are being implemented. In between PIRs, the project team

shall prepare and present intermediate internal progress reports (the ?Half Yearly Progress Reports?) to update project data and facilitate management. Developments in project execution will be monitored through regular follow-up meetings between the Implementation Agency and the Chief Technical Advisor.

In line with the GEF Evaluation requirements and UNEP?s Evaluation Policy, all GEF funded projects are subject to a performance assessment when they reach operational completion. This performance assessment will be either an independent Terminal Evaluation or a management-led Terminal Review.

In case a Review is required, the UNEP Evaluation Office will provide tools, templates, and guidelines to support the Review consultant. For all Terminal Reviews, the UNEP Evaluation Office will perform a quality assessment of the Terminal Review report and validate the Review?s performance ratings. This quality assessment will be attached as an Annex to the Terminal Review report, validated performance ratings will be captured in the main report.

However, if an independent Terminal Evaluation (TE) of the project is required, the Evaluation Office will be responsible for the entire evaluation process and will liaise with the Task Manager and the project implementing partners at key points during the evaluation. The TE will provide an independent assessment of project performance (in terms of relevance, effectiveness and efficiency), and determine the likelihood of impact and sustainability. It will have two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP staff and implementing partners. The direct costs of the evaluation (or the management-led review) will be charged against the project evaluation budget. The TE will typically be initiated after the project?s operational completion If a follow-on phase of the project is envisaged, the timing of the evaluation will be discussed with the Evaluation Office in relation to the submission of the follow-on proposal.

The draft TE report will be sent by the Evaluation Office to project stakeholders for comment. Formal comments on the report will be shared by the Evaluation Office in an open and transparent manner. The project performance will be assessed against standard evaluation criteria using a six-point rating scheme. The final determination of project ratings will be made by the Evaluation Office when the report is finalized. The evaluation report will be publicly disclosed and will be followed by a recommendation compliance process. The evaluation recommendations will be entered into a Recommendations Implementation Plan template by the Evaluation Office. Formal submission of the completed Recommendations Implementation Plan by the Project Manager is required within one month of its delivery to the project team. The Evaluation Office will monitor compliance with this plan every six months for a total period of 12 months from the finalisation of the Recommendations Implementation Plan. The compliance performance against the recommendations is then reported to senior management on a six-monthly basis and to member States in the Biennial Evaluation Synthesis Report

A summary of the planned M&E activities is provided in Annex J. The total GEF contribution for M&E activities (including the Inception Workshop and the Terminal Evaluation) is US$ 33,600.

Table 30. M&E actions and budget

Type of M&E activity	Responsible Parties	Budget from GEF	Time Frame
Inception Meeting	Chief Technical Advisor (CTA), National Project Director	USD $1,800	Within 2 months of project start-up
Inception Report[1]	CTA	As part of CTA budget	1 month after project inception meeting
Measurement of project progress and performance indicators	CTA	As part of CTA budget	Annually
End-point measurement of project outcome indicators, GEF Core indicators	CTA	As part of CTA budget	End Point
Semi-annual Progress/ Operational Reports to UNEP	CTA	As part of CTA budget	Within 1 month of the end of reporting period i.e. on or before 31 January and 31 July
Project Steering Committee (PSC) meetings and National Steering Committee meetings	Chief Technical Advisor (CTA), National Project Director	Co-financed by Ministry	Once a year minimum
Reports of PSC meetings	CTA	As part of CTA budget	Annually
Project Implementation Review (PIR) report	CTA	As part of CTA budget	Annually, part of reporting routine
Monitoring visits to field sites	CTA	As part of CTA budget	As appropriate
Terminal Review/Evaluation[2]	UNEP	USD $30,000	Typically initiated after the project?s operational completion
Final Workshop	CTA	USD 1,800	One month before technical completion

Type of M&E activity	Responsible Parties	Budget from GEF	Time Frame
Project Operational Completion Report	CTA	As part of CTA budget As part of CTA budget	Within 2 months of the project completion date
Co-financing report (including supporting evidence for in-kind co-finance)	CTA	As part of CTA budget	Within 1 month of the PIR reporting period, i.e. on or before 31 July
Publication of Lessons Learnt and other project documents	Chief Technical Advisor (CTA), National Project Director	As part of CTA budget	Annually, part of half-yearly reports & Project Final Report
Total		**USD 33,600**	

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[1] Report prepared following the IW; which includes:

- A detailed workplan and budget for the first year of project implementation,

- An overview of the workplan for subsequent years, divided per component, output and activities.

- A detailed description of the roles and responsibilities of all project partners

- A detailed description of the Project Management Unit and the Project Steering Committee, including an organization chart

- Updated Procurement Plan and a M&E Plan, Gender Action Plan

[2] Whether a project requires a management-led review or an independent evaluation is determined annually by UNEP?s Evaluation Office

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

The direct project beneficiaries include participants involved in the demonstrations and the trainees and future trainers attending the capacity building activities of the GEF-7 project and the global programme. On a broader sense, this project has been designed to explicitly include an assessment of the benefits and

costs resulting from the transition to e-mobility. Its benefits can be summarized in the following three main categories:

Environmental benefits

GHG emissions

According to the Third National Communication for Climate Change of Ecuador (2017), energy stands out as the largest emitting sector in the country, with close to half of Ecuador?s emissions (46%). In turn, emissions in the energy sector are largely dominated by the transport sub-sector, accountable for 45% of the sector?s contribution. The energy source for the fleet is: 86.30% gasoline, 13.22% diesel, 0.45% hybrid, 0.02% electric and 0.01% LPG[1], being the higher consumption of gasoline due to individual transport (automobile, pick up, SUV and motorcycle) and of diesel due to low and heavy-duty transport.

In Ecuador, electricity generation is largely dominated by renewable energies, with a 76.3% share from hydroelectric, 21.9% thermal and a 1.8% share from other renewables (biomass, wind, biogas and solar), and an average grid emission factor of 0.4509 kg/kWh, relatively lower than the global average. A large share of renewables is also expected for the mid-term future: according to Ecuador?s grid capacity expansion plan (the *Electricity Master Plan*), around 6 GW of new capacity will be introduced between 2021 and 2027, 81% of which will come from hydro power plants and other renewable sources.[2] This represents a great opportunity for the introduction of electric mobility, which will be largely powered by a clean grid. Thus, shifting from a fossil fuel-based mobility to electric mobility has been identified as one of the prominent strategies to achieve the reduction of GHG required to meet the country?s Nationally Determined Contribution (NDC).[3]

Air quality

As in most countries in Latin America, in Ecuador problems related to outdoor air pollution exist mostly in cities. Quito for example is a city close to the zero parallel, located at an altitude of 2830 meters above sea level. Due to its high location, the city has less oxygen in the air, resulting in less efficient combustion. In addition, it is surrounded by volcanic mountains that prevent optimal wind circulation and high levels of sunlight favor the formation of ozone at ground level. The main source of pollution in Quito is vehicular traffic and combustion. Buses and other diesel vehicles, often old and maintenance-free, are the main contributors to air pollution, as the use of low-quality diesel emits heavy metals; car fleet age and fuel quality issues are discussed in further detail in the baseline section. In Quito, between 2008 and 2018, the average level of PM2.5 in 24 hours exceeded the threshold recommended by the World Health Organization (WHO); the average annual level of PM2.5 exceeded both national and WHO standards. Similar results are reported in other cities in the country. [4]

Through the introduction and expansion of electric vehicles, the project will help to replace ICEs in the country in the medium to long term, reducing air pollution from road traffic-related emissions and thus improving air quality for the citizens of the country. Moreover, the project will also provide incentives to reduce the age of the ICE fleet, improve their emission standards and the type of fuel that these vehicles use: all of which will further contribute to an improvement in air quality.

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Waste

Finally, by focusing on safe management and disposal of vehicles at the end of their lifetime, the project also tackles long-present environmental issues, developing policies and regulations to mitigate environmental costs of the transition to e-mobility. However, by providing a direct focus on solid waste management of vehicles (both electric and conventional), the project aims to have a net positive effect on the environment through the reduction of derelict dumped vehicles.

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Economic benefits

As discussed in the baseline section -and as a result of insufficient domestic refining capacity to meet local demand- Ecuador is an importer of petroleum products, despite its production and exports of crude oil and petroleum liquids. In general, Ecuador exports heavy refined products, such as fuel oil, and imports lighter products, including gasoline, diesel, and liquefied petroleum gas (LPG). In 2020, national oil company and refinery Petroecuador imported 50.3 million barrels of derivatives (= USD 2,630 million) and exported 14.8 million barrels (=USD 485 million), resulting in a net deficit of USD 2,145 million[5]. The transition to EVs will serve to reduce this deficit, contributing to the overall competitiveness of the Ecuadorean economy. From a fiscal point of view, the introduction of EVs will generate important savings as the net deficit is not translated entirely due to the presence of subsidies. At the time of preparing this proposal, *extra* and *ecopa?s* gasolines (91% of the gasoline market) receive 11% and 18% of subsidies, respectively; whereas diesel has a subsidy as high as 39%. Hence, the transition to EVs can generate an important fiscal benefit to the country.

From the perspective of private and public fleet owners, the introduction of EV technology has important operational savings potential. Despite the high rate of subsidies for diesel and gasoline in Ecuador, a comparative analysis for the present operation estimates that an average electric bus could save between 65-77% in O&M costs compared to ICE vehicles. [6]

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Social benefits

Through its ?just transition? approach (output 3.5), the project will explicitly reflect on the allocation of benefits and costs from a social point of view.

Social benefits will result from the environmental and economic benefits discussed above. According to the US Environmental Protection Agency (EPA), fine particle pollution such as that found in vehicle tailpipe emissions causes early death (both short-term and long-term exposure), cardiovascular harm (e.g. heart attacks, strokes, heart disease, congestive heart failure), is likely to cause respiratory harm (e.g. worsened asthma, worsened Chronic Obstructive Pulmonary Disease (COPD), inflammation), may cause cancer and reproductive and developmental harm.[7] Improvements in air quality have the co-benefit of improving citizens' health and lowering associated health care costs and potential death rates, which has become even more relevant due to the COVID-19 pandemic. According to a recent study, the death toll attributed to air pollution is rapidly growing, making it now the world?s largest single environmental health risk (killing more people every year than malaria and AIDS).[8] In 2017, the number of deaths attributable to ambient air pollution in Ecuador was estimated at 3,330, up from 2,100 deaths in the year 2000.[9]

Similarly, the reduction of fuel imports can also have an impact in terms of energy security, replacing foreign fossil fuels by locally available renewable sources, which reduces vulnerabilities in supply and avoids political instability. Moreover, by reducing fossil fuel expenditures, the transition to e-mobility will result in more money staying local and boosting the Ecuadorean economy, funding jobs and increasing national tax revenue / reducing subsidies.

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[1] INEC. *Anuario de Estad?stica de Transporte* (2019)

[2] Ministerio de Energ?a y Recursos Naturales No Renovables. *Plan maestro de electricidad.* (2019)

[3] Ministerio de Energ?a y Recursos Naturales No Renovables. *Balance energ?tico nacional 2019* (2020)

[4] UNICEF Ecuador, *El aire que respiramos: los efectos de la contaminaci?n del aire y del cambio clim?tico en la salud de la ni?ez en el Ecuador* (2020).

[5] EP Petroecuador, *Informe estad?stico enero ? diciembre de 2020* (2021)

[6] Bastidas Auquilla, B. W., *Estudio de estrategias para la inserci?n de veh?culos el?ctricos tipo taxi en la ciudad de Quito* (2019). Master thesis, available here.

[7] U.S. Environmental Protection Agency, *Integrated Science Assessment for Particulate Matter* (2009) EPA 600/R-
08/139F.

[8] Piqueras, P.; Vizenor, A. *The rapidly growing death toll attributed to air pollution: A global responsibility* (2016). Available here.

[9] Statista. *Number of deaths attributable to ambient air pollution in Ecuador between 2000 and 2017* (2022). Available here.

11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification*

PIF	CEO Endorsement/Approval	MTR	TE
	Low		

Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

Section 1: Project Overview

Identification	*10630*
Project Title	*Support the shift towards low-carbon electric mobility in Ecuador*
Managing Division	*Economy division*
Type/Location	*National*
Region	*Latin America and the Caribbean*
List Countries	*Ecuador*

Project Description	*The objective of the project is to accelerate the introduction of low-carbon electric mobility and reduce fossil fuel consumption, greenhouse gas emissions and air pollution in the transport sector of Ecuador.* *The proposed project is structured across four components, which are necessary to address the barriers and facilitate the successful implementation of the efforts to achieve an integrated, sustainable, and low-emissions transport system.* *Component 1: Institutionalization of low-carbon electric mobility* *Component 2: Short term barrier removal through low-carbon e-mobility and renewable energy demonstrations* *Component 3: Preparing for scale-up and replication of low-carbon electric mobility* *Component 4: Long-term environmental sustainability of low-carbon electric mobility*
Relevant Subprogrammes	*Climate Change Mitigation*
Estimated duration of project	*36 months*
Estimated cost of the project	*1,280,275*
Name of the UNEP project manager responsible	*Asher Lessels*
Funding Source(s)	*GEF Trust Fund*
Executing/Implementing partner(s)	*Deutsche Gesellschaft f?r Internationale Zusammenarbeit (GIZ) on behalf of the Ministry of Environment, Water and Ecologic Transition (MAATE)*
SRIF submission version	*1*
Safeguard-related reports prepared so far *(Please attach the documents or provide the hyperlinks)*	? *Feasibility report [ ]* ? *Gender Action Plan [X]* ? *Stakeholder Engagement Plan [X]* ? *Safeguard risk assessment or impact assessment [ ]* ? *ES Management Plan or Framework [ ]* ? *Indigenous Peoples Plan [ ]* ? *Cultural Heritage Plan [ ]* ? *Others* _____

Section 2: Safeguards Risk Summary

A. Summary of the Safeguards Risk Triggered

Safeguard Standards Triggered by the Project	Impact of Risk[1] (1-5)	Probability of Risk (1-5)	Significance of Risk (L, M, H) *Please refer to the matrix below*
SS 1: Biodiversity, Ecosystems and Sustainable Natural Resource Management	1	1	L
SS 2: Climate Change and Disaster Risks	2	1	L
SS 3: Pollution Prevention and Resource Efficiency	2	1	L
SS 4: Community Health, Safety and Security	1	1	L
SS 5: Cultural Heritage	1	1	L
SS 6: Displacement and Involuntary Resettlement	1	1	L
SS 7: Indigenous Peoples	1	1	L
SS 8: Labor and working conditions	1	1	L

B. ESS Risk Level[2]

C.

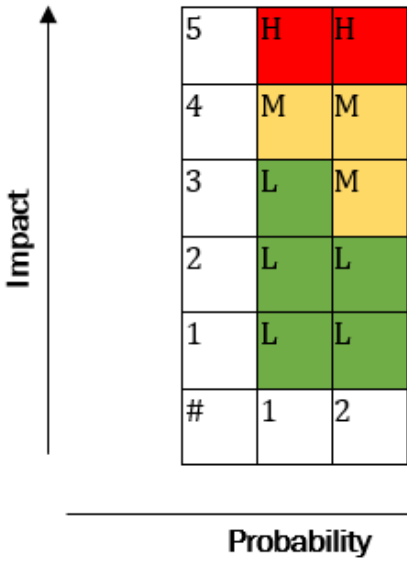
Refer to the UNEP ESSF (Chapter IV) and the UNEP's ESSF Guidelines.

Low risk ■

Moderate risk □

High risk □

Additional information required □



C. Development of ESS Review Note and Screening Decision

Prepared by

Name: __Martin Rodriguez Marat_____ Date: _18 January 2022_____

Screening review by

Name: _Yunae Yi_____ Date: __08 February 2022_____

Cleared[220]

D. Safeguard Review Summary (by the safeguard team)

This is a low-risk project. However, the guiding principles (GP 1-10 in the Section 3 below) should be responded throughout the project implementation. SS 2 and SS 3 would require attention through precautionary approach and close consultationwith relevant experts.

E. Safeguard Recommendations (by the safeguard team)

- No specific safeguard action required ☐
- Take Good Practice approach[221] ■
- Carry out further assessments (e.g., site visits, experts' inputs, consult affected communities, etc.) ☐
- Carry out impact assessments (by relevant experts) in the risk areas and develop management framework/plan ☐
- Consult Safeguards Advisor early during the full project development phase ☐
- Other _____

Section 3: Safeguard Risk Checklist

Screening checklist	Y/N/ Maybe	Justification for the response (please provide answers to each question)

Guiding Principles (these questions should be considered during the project development phase)		
GP1 Has the project analyzed and stated those who are interested and may be affected positively or negatively around the project activities, approaches or results?	Y	The project document includes an estimate of project beneficiaries, disaggregated by gender.
GP2 Has the project identified and engaged vulnerable, marginalized people, including disabled people, through the informed, inclusive, transparent and equal manner on potential positive or negative implication of the proposed approach and their roles in the project implementation?	Y	The project considered the impacts of transitioning to electric mobility on vulnerable people.
GP3 Have local communities or individuals raised human rights or gender equality concerns regarding the project (e.g. during the stakeholder engagement process, grievance processes, public statements)?	*N*	Not anticipated.
GP4 Does the proposed project consider gender-balanced representation in the design and implementation?	*Y*	Yes. The project includes Gender Analysis, which is followed by Gender Action Plan.
GP5 Did the proposed project analyze relevant gender issues and develop a gender responsive project approach?	Y	Yes. Note the comment above.
GP6 Does the project include a project-specific grievance redress mechanism? If yes, state the specific location of such information.	Y	See output 1.2.
GP7 Will or did the project disclose project information, including the safeguard documents? If yes, please list all the webpages where the information is (or will be) disclosed.	Y	Yes. As this is a GEF project, all the project documents will be publicly available on the GEF website (https://www.thegef.org/projects) as the UNEP website (https://open.unep.org/)
GP8 Were the stakeholders (including affected communities) informed of the projects and grievance redress mechanism? If yes, describe how they were informed.	Y	During project meetings (informing of the government officials).

GP9 Does the project consider potential negative impacts from short-term net gain to the local communities or countries at the risk of generating long-term social or economic burden?[5]	Y	Little to no potential negative impacts from short-term net gain are anticipated. It is more the opposite ? short term negative impacts due to increased fuel prices. To mitigate this there will be a dedicated output on community engagement, and also studies on socio-economic impacts, to ensure a just transition (output 3.5).
GP10 Does the project consider potential partial economic benefits while excluding marginalized or vulnerable groups, including women in poverty?	Y	Please see previous answer.
Safeguard Standard 1: Biodiversity, Ecosystems and Sustainable Natural Resource Management		
Would the project potentially involve or lead to:		
1.1 conversion or degradation of habitats (including modified habitat, natural habitat and critical natural habitat), or losses and threats to biodiversity and/or ecosystems and ecosystem services?	N	Not anticipated.
1.2 adverse impacts specifically to habitats that are legally protected, officially proposed for protection, or recognized as protected by traditional local communities and/or authoritative sources (e.g. National Park, Nature Conservancy, Indigenous Community Conserved Area, (ICCA); etc.)?	N	Not anticipated.
1.3 conversion or degradation of habitats that are identified by authoritative sources for their high conservation and biodiversity value?	N	Not anticipated.
1.4 activities that are not legally permitted or are inconsistent with any officially recognized management plans for the area?	N	Not anticipated.
1.5 risks to endangered species (e.g. reduction, encroachment on habitat)?	N	Not anticipated.
1.6 activities that may result in soil erosion, deterioration and/or land degradation?	N	Not anticipated.
1.7 reduced quality or quantity of ground water or water in rivers, ponds, lakes, other wetlands?	N	Not anticipated.

1.8 reforestation, plantation development and/or forest harvesting?	N	Not anticipated.
1.9 support for agricultural production, animal/fish production and harvesting	N	Not anticipated.
1.10 introduction or utilization of any invasive alien species of flora and fauna, whether accidental or intentional?	N	Not anticipated.
1.11 handling or utilization of genetically modified organisms?	N	Not anticipated.
1.12 collection and utilization of genetic resources?	N	Not anticipated.
Safeguard Standard 2: Climate Change and Disaster Risks		
Would the project potentially involve or lead to:		
2.1 improving resilience against potential climate change impact beyond the project intervention period?	Y	As an indirect benefit through the reduction of the dependency of imported fossil fuels.
2.2 areas that are now or are projected to be subject to natural hazards such as extreme temperatures, earthquakes, extreme precipitation and flooding, landslides, droughts, severe winds, sea level rise, storm surges, tsunami or volcanic eruptions in the next 30 years?	N	The project pilot will take place in Quito, which has low risk in terms of extreme events. Moreover, it will involve minimum infrastructure (charging stations already existent and vehicles that will be leased for the duration of the pilot). Areas subject to storms and floods will be avoided during the execution of the pilot, which will mainly involve the historic city center of Quito. Drivers will receive training on this regard (this is further discussed in the Climate Risk section of the project document).

2.3 outputs and outcomes sensitive or vulnerable to potential impacts of climate change (e.g. changes in precipitation, temperature, salinity, extreme events)?	Maybe	Climate change driven changes in precipitation may lead to reduced hydrology which is current the responsible for almost 75% of the electricity generation mix in Ecuador. While unlikely, it is technically possible that this would lead to a reduction in the emission reductions foreseen as a result of the project. A long-term environmental breakeven analysis (covering the period 2025 ? 2050) will be included as part of the deliverables (D3.5.4). This will serve to: - Identify critical thresholds (i.e. ?environmental breakeven?) for the share of different combinations of renewables, below which the electrification of the Ecuadorean fleet would result in a net increase of GHG emissions. - Provide recommendations and mitigation measures to avoid reaching these thresholds. - Identify projects (and capacity gaps) in the grid expansion plan that should be prioritized to ensure that the grid follows a sustainable pathway in terms of achieving net GHG reductions from e-mobility - Estimate the impact in the price of electricity and potential distributional effects.
2.4 local communities vulnerable to the impacts of climate change and disaster risks (e.g. considering level of exposure and adaptive capacity)?	N	N/A.

2.5 increases of greenhouse gas emissions, black carbon emissions or other drivers of climate change?	N	The project seeks to mitigate GHG and black carbon emissions through the promotion of electric mobility which provides cleaner modes of transport Moreover, studies in the project (see e.g. deliverable 3.5.4 discussed above) will contribute to a better understanding of energy pathways for the primary and secondary energy matrix that will ensure the sustainability of emission reductions from the project.
2.6 Carbon sequestration and reduction of greenhouse emissions, resource-efficient and low carbon development, other measures for mitigating climate change	Y	The project will lead to direct and indirect GHG emissions reduction through the promotion of sustainable and low-emissions transport
Safeguard Standard 3: Pollution Prevention and Resource Efficiency		
Would the project potentially involve or lead to:		
3.1 the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	N	The proposed project seeks to improve air quality through sustainable and low-emissions transport.
3.2 the generation of waste (both hazardous and non-hazardous)?	Y	To address this issue, the activities to be undertaken under project Component 4 will include the development of plans for vehicles disposal and end export and battery reuse and sound disposal.

3.3 the manufacture, trade, release, and/or use of hazardous materials and/or chemicals?	Y	To address this issue, the activities to be undertaken under project Component 4 will include the development of plans for vehicles disposal and end export and battery reuse and sound disposal.
3.4 the use of chemicals or materials subject to international bans or phase-outs? (e.g. DDT, PCBs and other chemicals listed in international conventions such as the Montreal Protocol, Minamata Convention, Basel Convention, Rotterdam Convention, Stockholm Convention)	N	Not anticipated.
3.5 the application of pesticides or fertilizers that may have a negative effect on the environment (including non-target species) or human health?	N	Not anticipated.
3.6 significant consumption of energy, water, or other material inputs?	N	The project seeks to reduce fossil energy consumption through the promotion of electric mobility powered with renewable energy sources.
Safeguard Standard 4: Community Health, Safety and Security		
Would the project potentially involve or lead to:		
4.1 the design, construction, operation and/or decommissioning of structural elements such as new buildings or structures (including those accessed by the public)?	N	During the pilot, the project will use already existing charging stations. Inter-urban corridors will be prioritized as part of output 3.4. However, this will not include detailed design of each of these corridors, which will be required to comply with national regulations to assess its environmental feasibility.
4.2 air pollution, noise, vibration, traffic, physical hazards, water runoff?	N	Not anticipated. Rather, the proposed project seeks to improve air quality through sustainable and low-emissions transport.

4.3 exposure to water-borne or other vector-borne diseases (e.g. temporary breeding habitats), communicable or noncommunicable diseases?	Maybe	The project will monitor COVID outbreaks during its execution. By January 15th 2022, 74.1% of the population has been vaccinated with at least two doses. A detailed COVID analysis (including ways in which the COVID-19 pandemic can potentially affect the project) is included in the project docuemnt.
4.4 adverse impacts on natural resources and/or ecosystem services relevant to the communities? health and safety (e.g. food, surface water purification, natural buffers from flooding)?	N	Not anticipated.
4.5 transport, storage use and/or disposal of hazardous or dangerous materials (e.g. fuel, explosives, other chemicals that may cause an emergency event)?	Maybe	Additional health and safety protocols for the drivers and charging station operators will need to be put in place to ensure safe operations of demonstration vehicles. Note however that the project will involve up to 6 electric vehicles, i.e. the project is very low scale. In terms of long-term impact, the project will develop currently inexistent regulations for the disposal of end-of-life vehicles (conventional and electric) and ion-lithium batteries from electric vehicles.
4.6 engagement of security personnel to support project activities (e.g. protection of property or personnel, patrolling of protected areas)?	N	It is not anticipated to receive or require additional security besides basic public security provided in Ecuador.
4.7 an influx of workers to the project area or security personnel (e.g. police, military, other)?	N	Not anticipated.
Safeguard Standard 5: Cultural Heritage		
Would the project potentially involve or lead to:		

5.1 activities adjacent to or within a Cultural Heritage site?	N	Not anticipated.
5.2 adverse impacts to sites, structures or objects with historical, cultural, artistic, traditional or religious values or to intangible forms of cultural heritage (e.g. knowledge, innovations, practices)?	N	Not anticipated.
5.3 utilization of Cultural Heritage for commercial or other purposes (e.g. use of objects, practices, traditional knowledge, tourism)?	N	Not anticipated.
5.4 alterations to landscapes and natural features with cultural significance?	N	Not anticipated.
5.5 significant land clearing, demolitions, excavations, flooding?	N	Not anticipated.
5.6 identification and protection of cultural heritage sites or intangible forms of cultural heritage		
Safeguard Standard 6: Displacement and Involuntary Resettlement		
Would the project potentially involve or lead to:		
6.1 full or partial physical displacement or relocation of people (whether temporary or permanent)?	N	Not anticipated.
6.2 economic displacement (e.g. loss of assets or access to assets affecting for example crops, businesses, income generation sources)?	N	Not anticipated.
6.2 involuntary restrictions on land/water use that deny a community the use of resources to which they have traditional or recognizable use rights?	N	Not anticipated.
6.3 risk of forced evictions?	N	Not anticipated.
6.4 changes in land tenure arrangements, including communal and/or customary/traditional land tenure patterns (including temporary/permanent loss of land)?	N	Not anticipated.
Safeguard Standard 7: Indigenous Peoples		
Would the project potentially involve or lead to:		
7.1 areas where indigenous peoples are present or uncontacted or isolated indigenous peoples inhabit or where it is believed these peoples may inhabit?	N	Not anticipated.

7.2 activities located on lands and territories claimed by indigenous peoples?	N	Not anticipated.
7.3 impacts to the human rights of indigenous peoples or to the lands, territories and resources claimed by them?	N	Not anticipated.
7.4 the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	N	Not anticipated.
7.5 adverse effects on the development priorities, decision making mechanisms, and forms of self-government of indigenous peoples as defined by them?	N	Not anticipated.
7.6 risks to the traditional livelihoods, physical and cultural survival of indigenous peoples?	N	Not anticipated.
7.7 impacts on the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	N	Not anticipated.
Safeguard Standard 8: Labor and working conditions		
8.1 Will the proposed project involve hiring or contracting project staff ?	Y	The project will recruit local experts and international experts.
If the answer to 8.1 is yes, would the project potentially involve or lead to:		
8.2 working conditions that do not meet national labour laws or international commitments (e.g. ILO conventions)?	N	Not anticipated. The executing agency (GIZ) has strict standards in terms of how it recruits its work force, as discussed during capacity assessment meetings.
8.3 the use of forced labor and child labor?	N	Not anticipated.
8.4 occupational health and safety risks (including violence and harassment)?	N	Not anticipated.
8.5 the increase of local or regional unemployment?	N	Not anticipated.
8.6 suppliers of goods and services who may have high risk of significant safety issues related to their own workers?	N	Not anticipated.

8.7 unequal working opportunities and conditions for women and men	N	Not anticipated. The project will have gender quotas in terms of its own staff and governance structures. A gender action plan will ensure that the project does not replicate undesirable patterns, while at the same time seeking ways to improve the share of women participating in the transport sector. This is further discussed in the Gender section of the document.

[1] Refer to UNEP Environmental and Social Sustainability Framework (ESSF): Implementation Guidance Note to assign values to the Impact of Risk and the Probability of Risk to determine the overall significance of Risk (Low, Moderate or High).

[2] **Low risk**: Negative impacts minimal or negligible: no further study or impact management required.

Moderate risk: Potential negative impacts, but limited in scale, not unprecedented or irreversible and generally limited to programme/project area; impacts amenable to management using standard mitigation measures; limited environmental or social analysis may be required to develop an Environmental and Social Management Plan (ESMP). Straightforward application of good practice may be sufficient without additional study.

High risk: Potential for significant negative impacts (e.g. irreversible, unprecedented, cumulative, significant stakeholder concerns); Environmental and Social Impact Assessment (ESIA) (or Strategic Environmental and Social Assessment (SESA)) including a full impact assessment may be required, followed by an effective comprehensive safeguard management plan.

[3] This is signed only for the full projects latest by the PRC time.

[4] Good practice approach: For most low-moderate risk projects, good practice approach may be sufficient. In that case, no separate management plan is necessary. Instead, the project document demonstrates safeguard management approach in the project activities, budget, risks management, stakeholder engagement or/and monitoring segments of the project document to avoid or minimize the identified potential risks without preparing a separate safeguard management plan.

[5]For example, a project may consider investing incommercial shrimp farm by clearing the nearby mangrove forest to improve the livelihood of the coastal community. However, long term economic

benefit from the shrimp farm may be significantly lower than the mangroves if we consider full costs factoring safety from storms, soil protection, water quality, biodiversity and so on.

Supporting Documents

Upload available ESS supporting documents.

Title	Module	Submitted

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

Objective	Indicator	Baseline	Mid-term target	End of project target	Means of verification	Risks (see section 5)
Accelerate the introduction of low-carbon electric mobility and reduce fossil fuel consumption, greenhouse gas emissions and air pollution in the transport sector of Ecuador	A. Metric tonnes of greenhouse gas emissions avoided during the project (GEF core indicator 6)	0	121 tCO2e	243 tCO2e	Monitoring of mileage and energy consumption of electric vehicles deployed in demonstration projects and compared with estimated emissions from an equivalent internal combustion engine vehicle	1-3; 6
	B. Number of direct beneficiaries disaggregated by gender (GEF core indicator 11)	0	Women: 200 Men: 277	Women: 336 Men: 784	Workshop reports, capacity-building reports, community engagement reports, pilot reports, and surveys of electric vehicle and charging station users	1,2,5,7

Outcome	Indicator	Baseline	Mid-term target	End of project target	Means of verification	Risks
1. The government demonstrates enhanced coordination, consultation and capacity for promoting the scaling up of electric	1.1. A national electric mobility coordination unit is established by the government	No coordination unit exists	Unit is established (at least 2 meetings held up to project mid-term)	Institutional mandate and statute are formally adopted through an inter-ministerial resolution.	Government records and meeting reports	2,4,5

mobility in Ecuador	1.2. Number of reports on experiences and lessons learned from the Ecuador project shared with the Global Program on Electric Mobility	0	0	2	Confirmation by global program team of receipt of best practice reports	Project effectively produces deliverables 1.5.4 and 2.1.9 and shares it with the global program
2. The private sector gradually adopts electric vehicles for their operations	2.1. Number of electric vans in circulation in Ecuador	5 (2020).	+20 (since the beginning of the project)	+ 50 (since the beginning of the project)	AEADE yearbook	2-7
3. Key actors (government, private sector, and financing institutions) implement regulations and innovative mechanisms to incentivize a just transition to electric mobility	3.1. EVs introduced through non-ownership based commercial mechanisms (renting, leasing, subscription)	0 (i.e. all EVs have been introduced through traditional purchase arrangements)	4 (minimum number of light duty vehicles to be leased by the project; these will be the first EVs that are acquired through these commercialization models)	20 EVs have been delivered to private /public users or businesses through at least 6-month renting, leasing or subscription.	Corporent website and information compiled through the project?s own KMS	4, 7

	3.2 Number of e-mobility regulations submitted by the e-mobility coordination body for adoption by the relevant governing institutions	0	0	A minimum of 2 proposals for regulations, standards, norms or other forms of legislation under component 3 have been adopted by the e-mobility coordination body and submitted to the final approving entities (INEN, ARCERNNR, Ministries and/or the National Assembly).	Government records and meeting reports	2
4. The national government takes action towards implementing standards for ensuring the environmental sustainability of electric mobility	4. Draft Ministry Resolution regulating the end-of-life vehicle disposal for electric and conventional vehicles	Unified text of secondary legislation for the environment? (Executive Decree 3516) does not include provisions for electric nor conventional vehicles	Report of regional and international good practices, for regulating the end-of-life of conventional and electric vehicles, and the reuse of batteries, and recommendations for Ecuador	Draft ministry resolution reviewed by the e-mobility coordination body and considered at least on one occasion by the Ministry of Environment, Water and Ecologic Transition (MAATE) and the National Transit Agency (ANT)	Government records and meeting reports	2, 4, 6, 7

[1] 1: Climate risk; 2: Political prioritization; 3: Procurement risk; 4: Stakeholder engagement; 5: Gender risk; 6: Environmental risk; 7: Sanitary risk (i.e. COVID-19)

[2] 1: Climate risk; 2: Political prioritization; 3: Procurement risk; 4: Stakeholder engagement; 5: Gender risk; 6: Environmental risk; 7: Sanitary risk (i.e. COVID-19)

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

Please refer to the separate pdf files uploaded to the GEF portal:

? Annex B.1 ? Responses to GEF secretariat reviews on the PFD;

? Annex B.2 ? Responses to GEF secretariat reviews on the PFD addendum;

? Annex B.3 ? Responses to STAP comments;

? Annex B.4 ? Responses to GEF Council comments (also included here)

a. UNEP responses to GEF Council comments on the Global Programme to Support Countries with the Shift to Electric Mobility (GEFID 10114)

Comment by Yoshiko Motoyama, GEF Alternate Council Member, Japan, Deputy Director Global Environment Division, International Cooperation Bureau, Ministry of Foreign Affairs of Japan, Council, Japan made on 6/1/2020

The below comments from Japan were provided prior to the Council meeting. An initial agency response was provided and can be found in the list of documents specific to the project in the GEF Portal.

On single-country projects, especially with large stated co-finance ratios, and cyclical-industry-related projects, such as Project 10564 (Environmentally Sustainable Development of the Iron and Steel Industry) and Project 10544 (electric mobility addendum):

? We anticipate that participants of these projects may be severely impacted by the COVID-19 crisis. How realistic are the published co-financing arrangements to be met, and for the industry to meet the higher operating costs - - without de facto subsidization from the GEF?

Response:

The current health crisis related to COVID-19 poses some difficult challenges for the automotive sector, but also, looking more specifically at the electric vehicles segment, it offers some opportunities.

Challenges include delays related to the finalization of the design of some of the national child projects, due for instance to international travel restrictions for the specialists involved in the design and the relative consultations. Broader challenges also include depression of demand for cars, at least in the short term, and potential shift in government priorities to focus limited national budget and workforce to more pressing health- crisis related issues. At this point it is difficult to make assumptions regarding the extent to which this will affect government priorities with regards to the allocation of budget and work force. What can be said is that there is a clear case to be made for mobility to as a key pillar for sustainable and clean transportation investments in the context of economic recovery plans.

Opportunities: According to today?s knowledge, there seems to be a correlation between air quality and COVID- 19, whereby COVID-19 incidence and mortality are significantly higher in areas that have high levels of local air pollution. This includes particulate matters (e.g. PM2.5, PM10)1 as well as N2O from both mobile (e.g. trucks and cars) and stationary (e.g. coal power stations) emission sources2. Since electric mobility has the potential to significantly contribute to improved urban air quality, we assume that it will play an important role in countries? strategies to respond to the COVID-19 pandemic.

Similarly, a shift to electric mobility will significantly reduce the dependency of countries to import petroleum petrol fuels. It therefore increases resilience against restrictions or price spikes resulting from international crisis.

1 Harvard University: ?COVID-19 PM2.5, A national study on long-term exposure to air pollution and COVID-19 mortality in the United States?, available at: https://projects.iq.harvard.edu/covid-pm

2 Yaron Ogen, 2020, ?Assessing nitrogen dioxide (NO2) levels as a contributing factor to coronavirus (COVID-19) fatality?, Science of The Total Environment, available at: https://www.sciencedirect.com/science/article/pii/S0048969720321215

While during COVID-19 vehicles sales have plummeted by half or more, electric vehicles sales have been relatively less affected. Analysts from Bloomberg New Energy Finance have estimated that the electric segment of car sales will continue to outperform in terms of growth the traditional cars one as we move past the crisis, even though oil prices at a historic low will create some negative headwinds. However, orders of buses are likely to suffer delays if public perception of mass transit as unsafe does persist.

Furthermore, in terms of green recovery, clean mobility is expected to play a key role in getting the global economy back on track. Continued social distancing measures will have an impact on how we

use transportation services, and in particular public transportation, but certain modes of public transport are expected to grow, in particular in low and middle-income countries. These modes include 2&3 wheeler taxis, or usual taxis and ride- hailing providers using passenger cars, to reduce close contact with higher numbers of riders. For many of these modes good electric alternatives are available.

Based on current trends and signals it is expected that after COVID-19 the shift to electric mobility would continue, if not increase. Many city governments around the world are looking at opportunities to take advantage of the significant reduction in urban congestion linked to the COVID-19 mobility restrictions to introduce permanent limitations to the use of private vehicles, especially if internal combustion engines. Such measures will not only reduce local air pollutants (such as particulates PM2.5 and PM10, but also N2O) and carbon emissions but can also increase resilience of transport systems against the current - and any potential future - health crises. The contribution of low-carbon mobility, including electric mobility, to a more resilient economy will be further integrated in the Programme and highlighted throughout the training components to be delivered to participating countries.

? What happens to the funds/projects if some participants cease to become going concerns (=i.e. bankruptcy)?

Response:

The information presented in the project documentation (PIFs and PFDs) represents the best available information available at the time of the submission to Council, following the technical review from the GEFSEC. Some level of change in the project design and in the availability of the amount of co-financing estimated ex- ante is possible and sometimes even desirable, considering the additional in depth design analysis conducted during the project preparation phase, including through the PPG-funded activities, between the submission of PIFs/PFDs and the submission of the relative CEO ER. Co-financing arrangements and amounts specified in PIFs/PFDs are best-case estimations that GEF Implementing Agencies and National Executing entities or participating actors provide for the formulation of the project proposals. These up-front estimates are assessed as part of the GEFSEC review process in terms of their relevance and adequacy vis-?-vis the scope and objective of the proposed Project/Program activities.

Once the PIF/PFD is approved by Council, as part of the detailed design process, Agencies and actors listed as other providers of co-financing amounts are asked to reassess and formally confirm that the co-financing volumes which had been included in the PIF/PFD have been approved by the competent authority within each specific organization. This is formalized through the submission of co-financing confirmation letters. In case a specific entity is no longer able to provide the previously stated co-financing amount, either in full or in part, generally Implementing Agency and GEFSEC would work together to assess if the stated co-financing is essential to achieve the project/program?s objective. If so, GEFSEC and Agency assess if the expected amount of co- financing that is no longer available can

be replaced by existing or additional co-financing from other actors. In case the co-financing is deemed essential, and there is no possibility to source such funds that are considered necessary to achieve the stated objectives, GEFSEC and Agency would consider whether to revise the approved project/program, and if not possible/advisable the project/program would not receive CEO Endorsement.

Given that the development phase will take around 12 months, and that the COVID crisis might trigger some government support to accelerate the further uptake of electric vehicles, as we have seen in France, for example (see quote below) , we hope that the co-finance might not be such an issue in a year from now, when the CEO endorsement documents will be due for submission. In any case, if planned investments and/or co-finance becomes an issue, agencies will work with the project developers to identify other sources of co-finance that can substitute the initial set of co-financiers, while keeping the project scope. If this is not possible, the developers will try to re-adjust the scope to respond to available co-finance that is still aligned with the project objectives. If this fails as well, then the developers might wish to either postpone the project or discuss with the country if the project should/can go ahead.

? We raised at the last council our interest in verifying the ability of GEF and its accredited agencies to conduct independent audits of such contributions, including verifying and assessing the abilities of the involved parties to meet the co-financing obligations of this project. We recognize that this process --- along with many other due diligence procedures --- could be increasingly impaired by the latest COVID- 19 crisis. Detailed explanations on how the Secretariat plans to handle these types of issues would be appreciated (preferably in writing to be posted on the GEF website, as it is not clear from the existing material and guidelines on the website)

Response:

In addition to the explanation provided above on the dynamics of co-financing, co-financing is reported on a yearly basis, based on progresses related to the sourcing and use of co-financing amounts. In the case of the e- mobility Programme, the Lead Implementing Agency is UNEP. For each project implemented by UNEP, the Project Manager has responsibility to seek signed co-finance reports from each co-financier of that given project. While the co-financiers are not audited, their signed (by the authorized authority in each entity providing co- financing) co-finance reports are available for the mid-term and terminal evaluators, so that the evaluation process can assess if that given GEF project reached or not the co-finance amounts which had been estimated up-front.

? We would also like to stress the need for transparency and balanced involvement of private sector providers in any of these corporate projects (particularly highly cyclical sector projects such as the ones included in this work program in the steel and automobiles sectors), especially amid the

COVID crisis, given that all such industry participants indiscriminately face severe business conditions. Projects should be carefully constructed and communicated, so that they are not deemed to infringe upon rules against subsidization of particular entities, thereby ?reinforcing the market power of some targeted companies at the expense of other firms? (as per the rules). For example, ?to de-risk investments in ?.? in the project description/ objectives implies the potential of subsidization, highlighting the need for transparency in their construct and execution, so that they are visibly in line with GEF rules and regulations and the Private Sector Engagement Strategy to be adopted at this Council session. This type of crystal-clear communication/ governance insurance measure is essential for the GEF to credibly raise funding for private sector-driven projects in a tough financial environment.

Response:

We certainly acknowledge the importance of the point being raised here: all projects must be careful to run clear, fair and transparent procurement policies, which Agencies have in place for GEF projects. The recently adopted MINIMUM FIDUCIARY STANDARDS FOR GEF PARTNER AGENCIES Policy (GA/PL/02, of Dec 19, 2019),

which covers both the Agency?s internal procurement policies and procurement by recipients of funds, provides that:

Specific GEF Partner Agency policies and guidelines promote economy, efficiency, transparency and fairness in procurement through written standards and procedures that specify procurement requirements, accountability, and authority to take procurement actions. As a minimum, these policies and guidelines provide for:

o Open competition and define the situations in which other less competitive methods can be used; and

o Wide participation through publication of business opportunities; descriptive bid/ proposal documents that disclose the evaluation criteria to be used; neutral and broad specifications; non-discriminatory participation and selection principles; and sufficient time to submit bids or proposals.

UNEP is the GEF agency leading the global e-mobility programme and will take on this guidance in the development of the global project and its own child projects and will also pass it along to all other Implementing Agencies (UNDP, UNIDO, DBSA and EBRD). Of course, the participation of private sector partners and entities is key for the e-mobility programme and UNEP and the other Implementation Agencies will continue to seek their support and participation in the program. The Program objective is to promote a shift towards electric mobility and away from Internal Combustion Engines, and as such all projects will be working with private sector partners that are actively working in this space.

In this context, it may also be useful to refer to the GEF-7 Programming Directions, para 121, as they refer to the Climate Change Focal Area:

121. To take advantage of the GEF?s comparative advantage, programming under this objective does not prioritize direct support for large-scale deployment and diffusion of mitigation options with GEF financing only. Rather, GEF-7 resources should be utilized to reduce risks and enhance enabling environments in order to facilitate additional investments and support by other international financing institutions, the private sector, and/or domestic sources to replicate and scale up in a timely manner.

The global e-mobility program is responding to the GEF?s grant role to support innovation and technology transfer at key early and middle stages of development, focusing on the demonstration and early deployment of innovative technologies to deliver sustainable energy solutions that control, reduce, or prevent GHG emissions.

Comment by Kordula Mehlhart, GEF Council Member, Head of Division on Climate Finance, BMZ, Council, Germany made on 6/18/2020

Germany approves the following PIFs in the work program but asks that the following comments are taken into account:

Germany approves the addendum to the global programme that contributes to the adoption of e-mobility by strengthening the technical and financial capacities of countries and taking into account different local prerequisites and requirements.

Suggestions for improvements to be made during the drafting of the final project proposal:

? The introduction of e-busses to local public transportation fleets differs from other e-mobility forms,

e.g. from heavy duty long-distance trucks, when it comes to technical aspects, charging infrastructure and the role of public / private investments. Given the unique involvement of public stakeholders in the purchase and operation of e-busses as well as the significant effect e-busses can have in terms of GHG-emission reductions in urban centers, this subject deserves a great amount of attention. Germany therefore proposes, that the significance of the acceleration of e-bus adoption be reflected in the program structure, by creating an additional working group focused on e-busses in public transportation.

Response:

Many countries have prioritized the introduction of electric busses in their country projects. Often as part of their efforts to introduce mass transit/ bus rapid transit systems. There will be a key interest in developing tools about the introduction of e-busses in developing country operating environments. There are also many lessons learned and examples (good and bad) in all regions that need sharing (for example the Chile and South Africa pilots). On the other hand, no country projects have prioritized electric trucks in their projects. Generally, this sector is seen as the last sector to switch, after busses, 2&3 wheelers and light duty vehicles (with the exception of the smaller delivery trucks like vans and so). Therefore, our thinking is to focus the HDV working group on busses. With possibly (probably) a smaller sub-group focusing on electric trucks. So rather than having a busses sub-group, we want to focus the HDV working group on busses and have a sub-group on trucks.

? Germany welcomes that information exchange and knowledge management are a substantial part of the programme. We suggest establishing a close working relationship to the new TUMI (Transformative Urban Mobility Initiative) E-Bus mission. The ?TUMI E-Bus Mission? follows a similar logic and approach in supporting cities in the uptake of e-busses. As the e-bus implementation in public transport is largely dependent on an involvement of city level decisionmakers, the TUMI E-Bus Mission can contribute to the proposed programme by feeding in local perspectives and requirements.

Response:

UNEP already has existing working relations with the Transformative Urban Mobility Initiative. Coordination with and involvement of the TUMI initiative in the global e-mobility programme will be added to the project document (especially through the activities implemented as part of the Regional Support and Investment Platforms).

Comment by Anar Mamdani, Director, Environment Division (MSS), Global Issues and Development Branch (MFM), Global Affairs Canada, Council, Canada made on 6/26/2020

? We recommend that there be some consideration to mitigating the environmental impacts of electric vehicles, particularly where facilities for managing batteries don?t exist.

Response:

Component 1 of the global e-mobility project includes a Global Thematic Working Group on ?Electric vehicle charging, grid integration, renewable power supply and battery re-use, recycling and safe

disposal?. This Working Group?s main objective will be to develop and make available knowledge materials that support governments in their ambitions for advancing a sustainable roll out of electric mobility, including policy instruments to ensure the sustainability of the battery supply chain and the end-of-life treatment of batteries. It also aims at the facilitation of discussions between regulators, recyclers and battery / vehicle manufacturers to better understand and enhance battery design to improve recyclability of batteries, especially with regards to economic viability.

In addition, Component 4 of the country child projects is usually focused on the long-term environmental sustainability of low-carbon electric mobility, which include outputs/activities to ensure/promote the environmentally sound management of used batteries (i.e. collection, re-use, recycling and disposal).

Comment by Elizabeth Nichols, U.S. Department of State | Bureau of Oceans, International Environmental and Scientific Affairs (OES), Office of Environmental Equality and Transboundary Issues (EQT), Council, United States made on 7/2/2020

? Within Bangladesh, we recommend additionally coordinating with the State Minister for Power, Energy, and Mineral Resources, and the Dhaka North City Corporation Mayor.

Response:

Comment taken and shared with UNDP project proponents in charge of the Bangladesh child project. This recommendation will be considered during the proposal development phase of the Bangladesh e-mobility project.

? Within Sri Lanka, there was very minimal reference to the project?s stakeholders. We look forward to seeing much more clearly defined information on stakeholders and their engagement in the next stage of proposal development.

Response:

Comment taken and shared with UNEP project proponents in charge of the Sri Lanka child project. Engagement of project stakeholders will be further elaborated during the proposal development phase of the Sri Lanka e- mobility project.

Comment by Dr Katharina Stepping, Deputy Head of Unit Climate Finance, Federal Ministry for Economic Cooperation and Development (BMZ), Council, Germany made on 6/28/2019

Germany welcomes the proposal aiming to support countries to design and implement electric mobility programs as part of an overall shift to sustainable, low carbon transport sector. Germany welcomes the proposal as the first global inter-agency electric mobility programme and appreciates that the project clearly aims at supporting the rapid introduction of electric mobility in GEF recipient countries, herby making a contribution to the low carbon transition in the transport sector. At the same time, Germany has the following comments that it suggests be addressed in the next phase of finalizing the project proposal:

Suggestions for improvements to be made during the drafting of the final project proposal:

? Germany welcomes that the project foresees a clear role for the private sector as a supplier for electro mobility technologies. However, given that private sector investments in electric mobility will be key, Germany would welcome the inclusion of activities that specifically directed at spurring private investments in electric mobility (from the demand side). For instance, some firms have switched parts of their operations to electric fleets. These types of opportunities could be considered within the PIF.

Response:

Almost all of the Country Child Projects are geared towards the introduction of electric 2&3 wheelers (and sometimes e-passenger cars) as well as e-buses into private or government owned public transportation fleets through: 1) Awareness raising, capacity building and institutionalization of e-mobility; 2) Short term barrier removal through demonstration of e-mobility; 3.) Scale-up and replication through development of e-mobility policies, business models and financial mechanisms; and 4.) Support of environmental sustainability through battery re-use / end-of-life considerations and integration of renewable power for vehicle charging. The Country Child Projects therefore target to spur e-mobility demand in the project countries.

The Regional Support and Investment Platforms under the Global Programme will create market-place events whereby the current as well as potential new projects meet with financiers (development banks, venture capital, green funds) and e-mobility manufacturers. The idea is to bundle demand for EVs and EV supply equipment and to raise interest from manufacturers in regions of the world, which are not yet in the focus of manufacturers, but have a great market potential.

The Global Working Groups and the Regional Supply and Investment Platforms are a means of private sector participation, and invites all major EV and EV supply equipment manufacturers to participate in events, tasks groups, etc. This also includes bringing together multinational EV and EVSE

manufacturers with the vibrant mobility service provider start-up scene in low and middle-income countries.

Many Country Child Project also include work streams to incentivize the local assembly and manufacturing of e- vehicles, such as e-motorcycles and e-3wheelers.

? Germany welcomes the comprehensive and overall well-structured project design. To further facilitate an overview of the project?s intended activities, Germany welcomes the inclusion of quantitative indications in the description of component 3 on how many pilot projects, regulatory measures etc. are planned.

Response:

Each country child project includes a project results framework with quantitative indicators and end-of-project targets to measure the number of pilot projects, regulatory measures, etc., achieved/developed within the framework of the GEF project. However, at the time of submission of the Global Child Project, not all Country Child Projects (and in particular those 10 Country Child Projects submitted as part of the second round) have been finalized, and thus the exact amount of policies planned, business models envisaged and financial mechanisms to be set-up cannot not be provided.

? While the proposal provides a comprehensive overview of highly relevant initiatives and programmes, Germany welcomes including existent initiatives such as the Transformative Urban Mobility Initiative and the C40 Cities Finance Facility as well as upcoming initiatives such as TUMIVolt to enable exchange of experiences as well as potentials for future collaboration. This is especially relevant considering the planned future expansion of the proposed project to countries like Nigeria and Mexico which are partner countries to above mentioned initiatives.

Response:

UNEP has working relations with both TUMI as well as C40 (in particular through the ?Zero Emission Bus Rapid- deployment Accelerator? (ZEBRA) initiative), and coordination with and involvement of both initiatives in the global e-mobility programme, especially through the activities implemented as part of the Regional Support and Investment Platforms, will be added to the project document.

? Germany welcomes the proposal?s reliance on IEA scenarios to lay out the project approach. To even further increase the proposal?s line of argument, Germany would welcome a very brief

explanation on why the proposal focuses on the IEA?s B2DS and not on the 2DS scenario when describing the programme?s focus. This could for example be provided on page 26 in the first paragraph.

Response:

Work funded by the GEF working towards Climate Change Mitigation is related to the UNFCCC and the Climate Agreements achieved as part of the Conference of the Parties (COP). The Paris Agreement?s central aim is ?to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius?. The IEA Beyond 2 Degree Scenario (B2DS) reflects this. Language can be added as suggested.

Comment by James Woodsome, International Economist, International Development Policy, International Affairs, U.S. Department of the Treasury, Council, United States made on 7/3/2019

Feasibility. The core of this proposal for Armenia deserves further scrutiny. The claim of 5,000 electric vehicles does not fit with other statistics, for example press reports citing the Minister of Nature Protection as saying that 30 electric vehicles were imported into Armenia in 2018. While there may have been a several-fold increase in electric vehicle imports in Armenia since 2016, those imports would have started from extremely low levels. That Armenia would manufacture electric vehicles does not track with the fact there is no real manufacturing industry even for traditional petroleum fuel vehicles at present. Due to the ratcheting duties caused by incremental adoption of the Eurasian Economic Union (EAEU) common external tariff, Armenia will face steadily increasing prices for imports of cars from outside the EAEU, complicating the adoption of such technology. We encourage more background investigation before its basic feasibility can be established.

Response:

Regarding the question on Armenia, unfortunately there is a mistake with the short description of the Armenia child project baseline in Table 2 of the PFD. This will be corrected during the Child Project development and a note will be attached to the PFD to that effect. The 5,000 EVs mentioned and the local manufacturing actually belong to Ukraine. The US Council comment is right and Armenia imported about 30 EVs in 2018 (h ttps://energyagency.am/en/page_pdf/tsragri-anvanoum). The project feasibility in Armenia will be further analyzed during development, but the government has prioritized the promotion of electric vehicles as one of the transport measures in their NDC. Armenia recently waived the VAT on EVs to stimulate the EV market (https://energyagency.am/en/category/noroutyounner-ev-mijocaroumner/elektromobilneri-

nermoutsoumy-k azatvi-aah). In general, high import duties for vehicles can be an opportunity rather than a barrier for EV import. In case these duties are waived or reduced for EVs (to some extent that is already the case with the VAT exemption for EVs in Armenia), it provides a meaningful monetary incentive for customers to buy electric vehicles. EV market uptake in Norway is largely due to import and registration tax exemptions for EVs, while import of conventional cars is subject to high taxes. Yerevan has instituted an exemption of parking fees for EV?s and has deployed some recharging infrastructure. Armenia already has a low emissions factor of about 0.4 tons of CO_2/MWh and the introduction of EV?s in Armenia would be able to reduce emissions with such a grid profile, and Armenia has introduced several policies to incentivize renewable power generation investments. For example, projects have been implemented or have been committed to improve energy transmission efficiency and reliability, and investment in renewables is taking off. This GEF project aims to demonstrate light duty vehicles in a government fleet in Yerevan, and in 2019, 23 charging stations will be installed through a GEF-6 funded Small Grant Programs implemented and led by UNDP. Promoting electric vehicles together with renewable energy will improve energy efficiency and further reduce CO_2 emissions, air pollution and energy dependence in Armenia. This will be in full alignment with the countries? NDC and its strong commitment to the introduction of clean and sustainable energies.

Comment by Lauren C?line Naville Gisn?s, NORAD, Department for Climate, Energy and Environment, Council, Norway made on 6/29/2019

? We put great emphasis on cutting GHG emissions through electrification of the transport sector. We are of the opinion that if all take concerted action, it will drive down costs because of scale production.

? Every country has to choose their own path. However, an important lesson so far is that one needs to tax emissions. You need carrots and sticks. In line with general GEF principles of an enabling policy framework, one should pay attention to relevant tax policies when designing GEF programs, including policies for reducing fossil fuel subsidies.

Response:

The Child Country Projects all include work on the development of adequate policy frameworks to support the uptake of e-mobility ? including regulatory, fiscal and other local measures. For example, some of the country projects include outputs on fiscal reforms in order to base registration and / or import taxation for vehicles on CO2 emissions or fuel consumption. In some of the countries (i.e. in some of the SIDS), work will be brought forward to liberalize the power market and to allow the supply of power by independent power producers, which facilitates the introduction of renewable

power generation and breaks the monopoly of subsidized petroleum fuel powered electricity generation.

ANNEX C: Status of Utilization of Project Preparation Grant (PPG). (Provide detailed funding amount of the PPG activities financing status in the table below:

Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF: **US$ 50,000**			
Project Preparation Activities Implemented	***GEFTF Amount (US$)***		
	Budgeted Amount	***Amount Spent to date***	***Amount Committed***
PPG expert technical consultant (lead project document development, including the CEO endorsement document, annexes and appendices)	25,375	11,453	14,000
Ecuador national expert (in charge of compilation of country data for baseline development, organization of stakeholder consultations including with possible co-finance partners, translation of national reports and local support)	14,500	9,444	-
Regional e-mobility technical expert (modelling of GHG emission scenarios and calculation of emission reductions, project document technical review; assistance in organizing stakeholder consultations)	5,125	5,125	-
Total	**45,000**	**26,022**	**14,000**

The unspent balance of USD 9,978 will be spent during project execution, as per the GEF policy: If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent funds, agencies can continue to undertake exclusively preparation activities up to one year of CEO Endorsement/approval date. No later than one year from CEO endorsement/approval date. Agencies should report closing of PPG to Trustee in its Quarterly Report.

ANNEX D: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.

Demonstration sites	*Latitude*	*Longitude*
Quito	-0.225219	-78.5248

ANNEX E: Project Budget Table

Please attach a project budget table.

GEF budget category & detailed description	Outcome 1	Outcome 2	Outcome 3	Outcome 4	Subtotal	M&E	PMC	Total
02. Goods					**0**		**3,578**	**3,578**
Hardware					0		3,578	3,578
03. Vehicles		**45,000**			**45,000**			**45,000**
Procurement of 6 micro/L6 electric vehicles		45,000			45,000			45,000
07. Contractual services (company)	**95,000**	**242,000**	**170,000**	**50,000**	**557,000**		**15,600**	**572,600**
Consultancy on communication and stakeholder engagement	60,000				60,000			60,000
Consultancy on environment and waste management			25,000	50,000	75,000			75,000
Consultancy on socio-economic impact of electromobility			45,000		45,000			45,000
Consultancy on transport and vehicle electrification	35,000	20,000	100,000		155,000			155,000
Independent financial audits					0		15,600	15,600
Leasing of electric vehicles		216,000			216,000			216,000
Vehicle monitoring services (including data management system)		6,000			6,000			6,000
08. Contractual services (individuals)	**55,000**				**55,000**	**30,000**		**85,000**
Consultancy to design and implement the Knowledge Management System	55,000				55,000			55,000
Terminal Evaluation					0	30,000		30,000
11. Salary and benefits/Staff Costs	**107,503**	**119,704**	**125,073**	**24,382**	**376,661**		**45,000**	**421,661**
Chief technical advisor	47,040	60,960			108,000		21,600	129,600
Gender specialist	16,363	8,182	12,273	8,182	44,999			44,999
Junior Technical Officer	15,300	7,362	3,600		26,262		23,400	49,662
Project Economist			56,400		56,400			56,400
Regulatory Framework Expert and Legal Advisor	10,800		31,200	9,000	51,000			51,000
Technical Officer	18,000	43,200	21,600	7,200	90,000			90,000
12. Training, Workshops, Meetings	**8,100**	**3,600**	**5,400**	**5,400**	**22,500**	**3,600**		**26,100**
Coordination body meeting logistics (venue, catering and IT)	4,500				4,500			4,500
Workshops	3,600	3,600	5,400	5,400	18,000	3,600		21,600
13. Travel	**51,025**	**1,500**			**52,525**			**52,525**
Local travel expenses for staff	6,025	1,500			7,525			7,525
Travel expenses for the global and regional programmes on electric mobility	45,000				45,000			45,000
14. Office supplies					**0**		**1,000**	**1,000**
Office supplies					0		1,000	1,000
15. Other operating costs		**21,600**			**21,600**		**51,211**	**72,811**
Pilot project running costs and operation and maintenance expenditures		21,600			21,600			21,600
Procurement, HR, legal and record keeping costs					0		51,211	51,211
Total general	**316,628**	**433,404**	**300,473**	**79,782**	**1,130,286**	**33,600**	**116,389**	**1,280,275**

ANNEX F: (For NGI only) Termsheet

Instructions. Please submit an finalized termsheet in this section. The NGI Program Call for Proposals provided a template in Annex A of the Call for Proposals that can be used by the Agency. Agencies can use their own termsheets but must add sections on Currency Risk, Co-financing Ratio and Financial Additionality as defined in the template provided in Annex A of the Call for proposals. Termsheets submitted at CEO endorsement stage should include final terms and conditions of the financing.

Not applicable.

ANNEX G: (For NGI only) Reflows

Instructions. Please submit a reflows table as provided in Annex B of the NGI Program Call for Proposals and the Trustee excel sheet for reflows (as provided by the Secretariat or the Trustee) in the Document Section of the CEO endorsement. The Agencys is required to quantify any expected financial return/gains/interests earned on non-grant instruments that will be transferred to the GEF Trust Fund as noted in the Guidelines on the Project and Program Cycle Policy. Partner Agencies will be required to comply with the reflows procedures established in their respective Financial Procedures Agreement with the GEF Trustee. Agencies are welcomed to provide assumptions that explain expected financial reflow schedules.

Not applicable.

ANNEX H: (For NGI only) Agency Capacity to generate reflows

Instructions. The GEF Agency submitting the CEO endorsement request is required to respond to any questions raised as part of the PIF review process that required clarifications on the Agency Capacity to manage reflows. This Annex seeks to demonstrate Agencies? capacity and eligibility to administer NGI resources as established in the Guidelines on the Project and Program Cycle Policy, GEF/C.52/Inf.06/Rev.01, June 9, 2017 (Annex 5).

Not applicable.