Quito, Ecuador

SOLUTIONSPLUS | LIVING LABS UPDATE

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PROJECT PARTNERS

ABOUT

This is a summary of the paper, submitted to the journal 'Sustainable Earth Review' developed under SOLUTIONSplus project. Currently the paper is under peer review.

TITLE

Capacity and market potential for local production and distribution of electric two-wheelers in Southeast Asia, focused on Thailand, Indonesia, and Vietnam

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LAYOUT

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PICTURES

All the pictures are provided by the ITDP

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QUITO, ECUADOR

The SolutionsPlus project aimed to accelerate the transition to sustainable urban mobility through innovative and integrated e-mobility solutions. To this end, the consortium partners created Living Labs at city level to test different types of innovative and integrated e-mobility solutions. Living Labs reach beyond the implementation of technological innovations and also include elements of information, inspiration and initiation to achieve a stronger and sustainable impact of the project activities.

INFORM

Boost capabilities of local and national authorities, public transport operators and entrepreneurs about innovative urban e-mobility solutions across various transport modes by **informing them about tools** to plan, assess, implement and operate e-mobility solutions.

INSPIRE

Foster the take-up of e-mobility innovations by businesses, start-ups, local and national governments and transport operators by **inspiring** officials, operators, industry and businesses through peer-to-peer exchange on innovative e-mobility products and services.

INITIATE

Strengthen policy and business **collaboration** by **initiating** partnerships between local and national governments and local and European entrepreneurs and supporting the development of new e-mobility models business implementation plans.

IMPLEMENT

Create reference models for e-mobility innovation by **implementing** demonstration actions to test innovative e-mobility technologies and services, foster their **replication** and ensure their long-term **sustainability**.

IMPACT

Contribute to global **sustainability and climate goals** by boosting the **impact** of this project through the integration of the innovative concepts into policy, funding, operation, research and business practice.

The Metropolitan District of Quito (DMQ), the capital and most populous city of Ecuador, has 2.8 million inhabitants. Since 1995, Quito has had an integrated mass transit system (BRT) currently composed of 5 lines, one of which operates with trolleybuses. Despite its continuous expansion, the system has already reached its limit, and 40% of its fleet reached the end of its useful life. Thus, the need to introduce new (zero-emissions) units is urgent. It is worth noting that in December 2023, Quito launched its first subway line and is currently in the process of integrating and modernizing the whole public transport system. the Municipality of Quito adhered in the past years, such as the C40 Clean Air Cities Declaration, the C40 Clean and Healthy Streets Declaration and the Mobilise Your City Global Initiative, in 2020 the Municipality of Quito issued its Climate Action Plan for Quito (PACQ). With the PACQ (2020), Quito commits to reduce GHG emissions by 30% in comparison to 2015 by 2030 and achieve climate neutrality by 2050. Given that

the transport sector has been identified as the largest generator of GHG emissions in the city, being responsible for 40% of them, actions to mitigate its impact need to be prioritized. Thus, the PACQ defines the following mitigation actions for a sustainable urban mobility:

· Zero emissions public transport
· Zero emissions Historic Center
· Integrated and efficient public transport
· Active mobility
· Low carbon freight transport

In this context, the Municipality works to advance on various fronts to promote sustainable mobility in general and more specifically electric mobility. On one hand, in February 2024, the Municipality approved the Sustainable Mobility Master Plan 2023-2042 (PMMS by its Spanish acronym), which is the document that will guide the implementation of mobility policies for the next 20 years.

DEMONSTRATION ACTION IN QUITO

The Quito demonstration activities contributed to the advancement of e-mobility in three fronts:

Component 1, the main component of the demonstration, is the multimodal e-mobility hub in the Historic Center of Quito. This pilot contributed to the consolidation of the Zero Emissions Historic Center through the introduction of locally designed and assembled Light Electric Vehicles (LEV) to improve the last mile logistics and connectivity in the area. For this, the project allocated seed funds for the development of prototypes and subsequent assembly of Light Electric Vehicles, both passenger and cargo. The implementation of pilot was executed in two phases. The first phase of the pilot tested 10 e-cargo bikes for last mile logistics in the field. The second phase tested 4 e-mini vans, 2 for cargo and 2 for passenger transport, and 4 e-quadricycles.

Component 2 contributed with capacity building and technical assistance on e-buses targeted at municipal representatives working in the field.

Component 3 focused on the development and use of mobility-as-a-service (MaaS) solutions. Specifically, in the context of the project, Pluservice developed a MaaS App during 2020 and 2021 with the permanent participation of the Mobility Secretariat, the Municipal PTO and the Subway operator to ensure that the app is in line with the local needs of the PT system. The app was tested between November and December 2022 to help students plan trips and pay for public transport.

INFORM

Tools and different types of **knowledge products** on low-carbon urban logistics, cycle logistics, light electric vehicles (LEV), charging infrastructure, batteries and e-buses were incorporated in the **SOLUTIONSplus online toolbox** and shared with the city, addressing the knowledge gaps identified in the course of the project.

INSPIRE

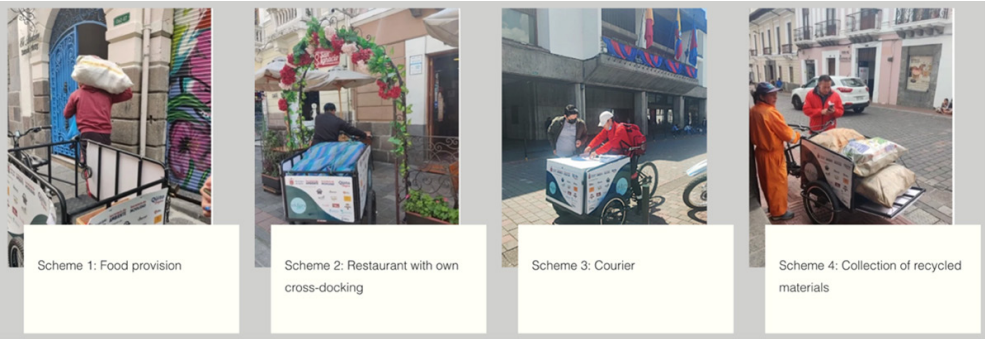
A total of four learning modules were carried out virtually in the context of the Regional Training Programs of 2021 and 2022, addressing the gaps identified in the Technical Needs Assessment: 1) low-carbon urban logistics, 2) LEV regulations, 3) charging infrastructure, and 4) e-buses. Quito not only benefited from the content presented, but was able to share initiatives that public and private actors are pushing forward in the city (e.g.: Zero Emissions Zone and locally manufactured e-bus).

Between July 18th and August 3rd, 2022, a SOLUTIONSplus delegation (WI, FIER and UEMI) joined the local team and held a series of meetings and workshops, where topics such as e-buses, charging infrastructure, MaaS, LEV and urban logistics were discussed with members of national and local entities, as well as with private stakeholders.

In November 2023, an expert from the SOLUTIONSplus partner ZLC was on-site to present the results of the logistics model and recommendations developed to all the relevant stakeholders, including the municipal authorities, logistics operators and to the Mathematical Modelling Centre (ModeMat) of the National Polytechnic School (EPN), the entity in charge of carrying on the modelling beyond SOLUTIONSplus.

In March 2024, a multistakeholder delegation of 14 people from Quito, representing the Municipality, the Municipal PTO, LEV manufacturers and logistics operators participated in the Latin American e-Mobility Forum 2024 (LAEMF) in Bogotá, Colombia. The LAEMF, organised by SOLUTIONSplus and the GEF7 Regional Platform, summoned approximately 100 participants from the region and provided the opportunity to learn in situ from one of the countries leading the transition to e-mobility in Latin America, both in public transport and in urban logistics.

Additionally, Quito benefited from its participation in other SOLUTIONSplus capacity building activities, including virtual and on-site peer-to-peer exchanges, site visits, e-courses, expert advisory boards and international conferences related to e-bike sharing systems, low-carbon urban logistics, last-mile connectivity, e-cargo bikes, e-buses, e-BRT, trolleybuses, MaaS, batteries, Eco-driving and the Low-Carbon Mobility Management (LCMM) Tool from T-Systems.



INITIATE

In Quito, the start-ups ECargoBikeUIO (10 e-cargo bikes), Sidertech (4 e-quadricycles) and Grupo Miral (4 e-mini vans) received seed funding for the local design and assembly of different types of LEV, mainly for logistics, but also for passenger transport. Sidertech received Valeo drivetrains in a kit to be easily integrated in the e-quadricycles. In addition, PEM Motion, one of the companies selected under the European Innovators Calls supported ECargoBikeUIO, Sidertech and Grupo Miral in vehicle design and battery sizing. Further support on vehicle design, charging, batteries and homologation was provided by IDIADA. Finally, SOLUTIONSplus supported the city with the elaboration of a pre-feasibility study for the electrification of 1 BRT corridor.

Moreover, SOLUTIONSplus contributed to the inclusion of women in the transport sector. In partnership with logistics and passengers transport operators, universities, NGOs and other local stakeholders working to close the gender gap in transport, SOLUTIONSplus selected a group of 30 women to be trained in the driving of e(trolley) buses, e-vans and e-cargo bikes.

IMPLEMENT

Component 1: E-cargo bikes and e-quadricycles

On August 18th, 2022, the prototypes of the e-cargo bikes and the e-quadricycles, locally manufactured with the seed funding provided by SOLUTIONSplus, were launched with the local authorities of Quito in the National Polytechnic School (EPN). The activity allowed potential users to test the vehicles and provide suggestions to the design to suit their needs for the design.

The manufacturing process of 10 e-cargo bikes was finalised building on the suggestions provided in the launch by the 20 companies that expressed their interest in testing the different types of SOLUTIONSplus vehicles in their operations. Moreover, the local team counted on the support of two local universities, the National Polytechnic School (EPN) and the San Francisco University (USFQ), for the vehicle technical evaluation and the pilot design, as well as the inputs provided by the ZLC. In this context, the first pilot phase of the multimodal e-mobility hub in the HCQ started on November 7th, 2022 and ended on January 6th, 2023. During this period, the pilot worked with 4 operating schemes and 7 users, i.e., 2 food distributors, 1 restaurant, 2 couriers and 2 recycling associations, which were selected on the basis of the ex-ante data collection process carried out in 2021 and the subsequent planning and preparation phase. A private parking lot was rented as a collaborative cross-docking platform, that was used by 3 of the users. In order to extract sound data from the pilot, several tools, such as GPS tracking, surveys and interviews were applied.

In April 2023, a call for expressions of interest for the permanent custody of the e-cargo bikes was launched among the participants in the pilot. The 10 e-cargo bikes were handed over to the pilot participants that showed the best results in all operating schemes. Since then, the SOLUTIONSplus e-cargo bikes have transported approximately 300t, travelled 25,000 km and avoided 6 tCO2. According to the scale-up assessment conducted, if all ICE logistics vehicles in the HCQ were replaced by electric, approximately 600t CO2 emissions would be avoided every year.

The 4 e-quadricycles and the 4 e-vans manufactured by the local SMEs Sidertech and Grupo Miral, correspondingly, are being tested by large food and beverage distributors, courier companies and municipal companies responsible for passenger transport and waste collection. The results are being processed.

Component 2: Mobility as a Service (MaaS) app

The MaaS app was developed during 2020 and 2021 by Pluservice in permanent exchange with the Mobility Secretariat, the Municipal PTO and the Subway operator in order to ensure that the app is aligned to the local needs of the PT system. In October 2022, with the approval of the Municipal PTO, the pilot design and implementation started. A group of 37 students of the National Polytechnic School (EPN) used the app to plan their journeys, top up their e-wallets, and buy and validate PT tickets between November 21st and December 16th (4 weeks) in the University Station of the BRT System.

A total of 216 tickets were issued and 164 tickets validated via app (75% of the issued tickets) for a value of USD 57.40. 88% of the students stated that they will use the App 3 times/week to everyday if the application was publicly available. Moreover, 80% of students agreed that the application should include other PT options and sustainable modes.

IMPACT

The SOLUTIONSplus team supported the Municipality of Quito in the **review and adjustment of the Draft Ordinance of Micromobility,** in which SOLUTIONSplus recommended broadening the scope to include not only personal micro-vehicles, but the full spectrum of LEV. The adjusted draft is under discussion in the Mobility Secretariat before going to the City Council for approval.
Moreover, the team has been in permanent contact with funding and international cooperation agencies working in the country, such as the World Bank, the Inter-American Development Bank, UNEP, AFD, GIZ, etc., in order to **identify potential synergies and funding for the scale-up** of the project. In this context, the GEF7 e-mobility project in Ecuador (USD 1,3M) will build on the knowledge and experience generated by SOLUTIONSplus and the ACCESS project (€2,4M) funded by IKI will add a digital layer to the components implemented under SOLUTIONSplus to consolidate their scale-up and replication. The EU-funded project eBRT 2030 also included Quito as one of the follower cities.
Finally, the gender and e-mobility project led by UNEP included Ecuador as one of its six countries. The project will work with local organizations from the private and public sector to create pathways to increase the number of women trained in transport-related careers and provide recommendations on how to systematically reduce the entry barriers of women in the sector, addressing the whole transport value chain. All this is reflected in **Quito's City Roadmap** for which a workshop series with almost 100 representatives from the public and private sector, as well as academia, was conducted in January 2024.
Moreover, the pilot had positive social impacts, and the vehicles were perceived as having high quality in terms of their suitability. Important improvements in the working hours, cargo delivered / collected and even in the income per hour were observed. Hence, given the significant economic, environmental and social gains shown in the demonstration phase, **substantial improvements can be expected from an upscaled approach in the Historic Center and citywide.**

REPLICABILITY

The vehicles developed and tested are suitable for use in cities around the world, especially in historic districts with narrow streets, areas that are prone to high traffic congestion, and in cities that have access restrictions and traffic calming measures in place. The significant efficiency gains experienced in all operating schemes and the adaptability of the vehicles to different use cases reveal a high scale-up and replication potential. The use of Light Electric Freight Vehicles in urban logistics operations was replicated in Bogotá, Medellín, Barranquilla and Bucaramanga in Colombia; Cuenca and Azogues in Ecuador; and in Escobar and Vicente López, two districts of the Metropolitan Area of Buenos Aires, Argentina.

PedidosYA riders in the CargoBike.UY and Wheele e-cargo bikes

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