

Integrated Urban Electric Mobility Solutions in the Context of the Paris Agreement, the Sustainable Development Goals and the New Urban Agenda

solutiona
plus

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Global Conference on Electric 2 and 3 Wheelers

InCo flagship project on
“Urban mobility and sustainable electrification in large urban areas in developing and emerging economies”

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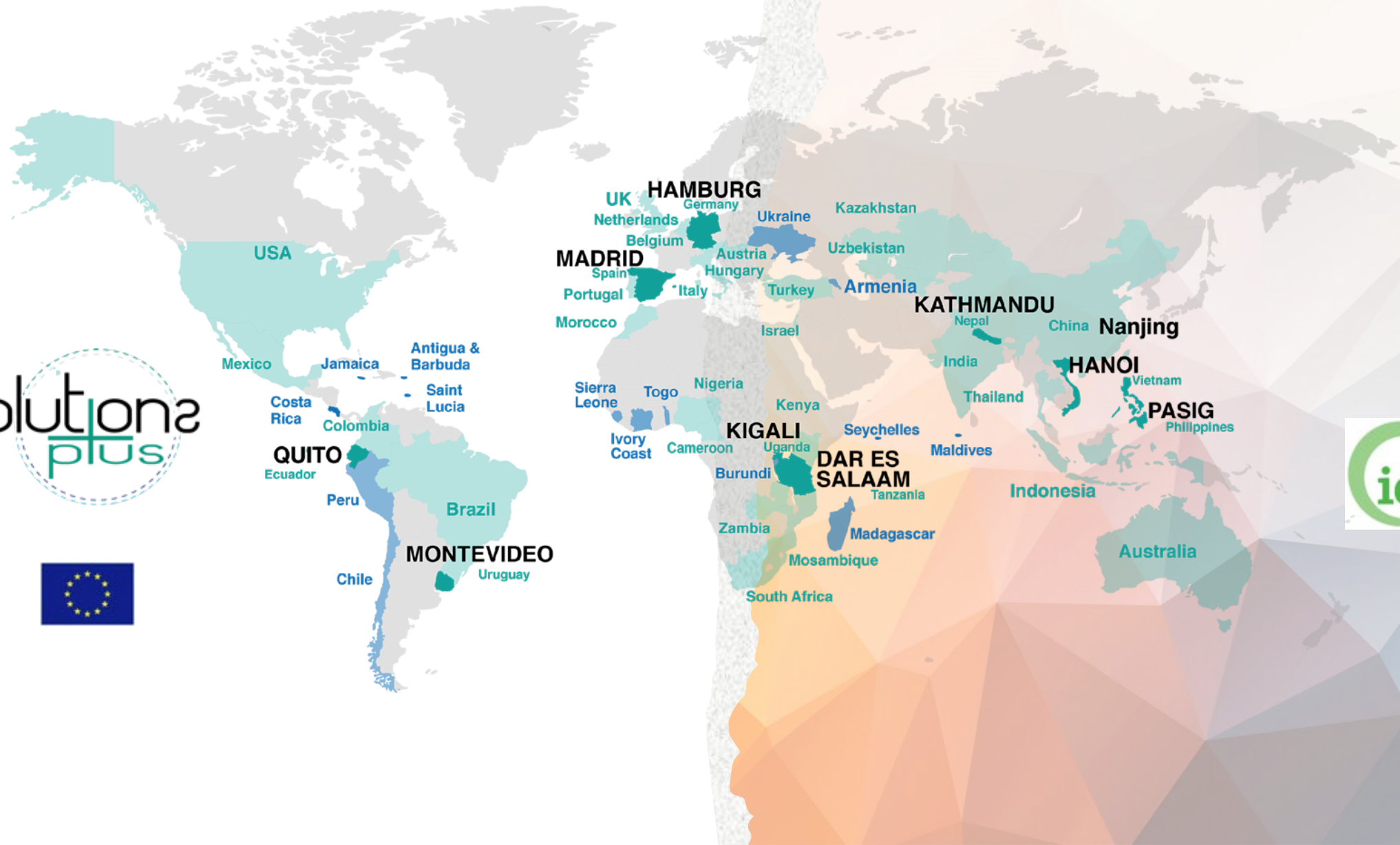


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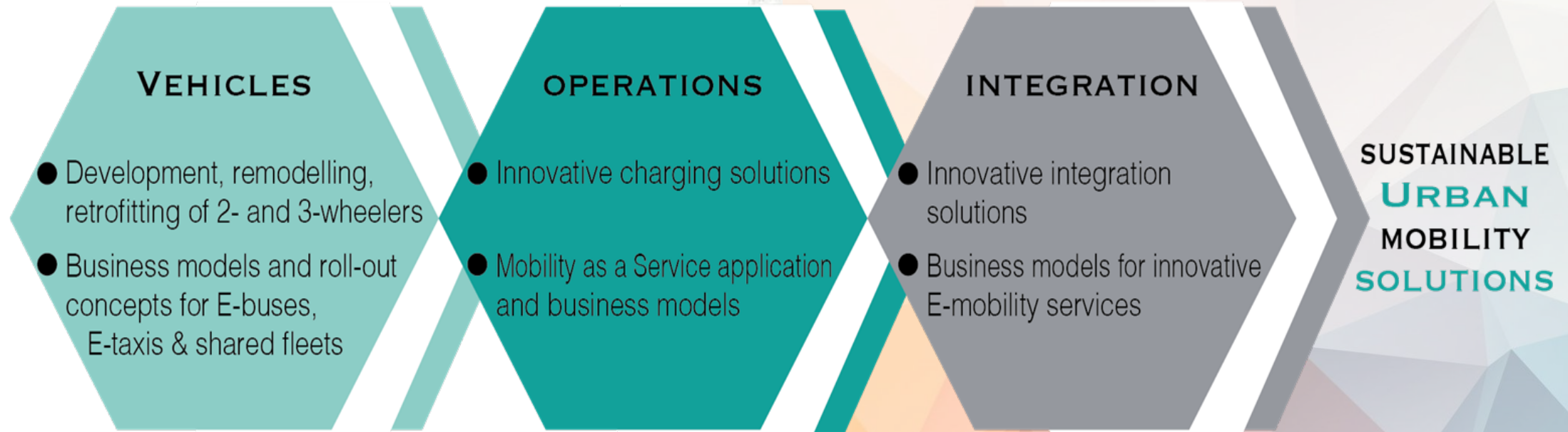
- Funded under the Horizon 2020 call GV-05-2019
- Duration: 1 January 2020 - #June 2024
- Total budget: €20,233,098.75 (EU Contribution:€17,970,258.75)
- Consortium of 46 partners, 116 associated and support partners
- 10 Living Labs: Kathmandu, Manila/Pasig, Hanoi, Montevideo, Quito, Kigali, Dar es Salam, Hamburg, Madrid and Nanjing (self-funded)



Joint Global e-Mobility Platform



Accelerate transformational change towards sustainable urban mobility through innovative and integrated electric mobility solutions.



**BUSINESS OPPORTUNITIES, INDUSTRY PARTNERSHIPS,
ALLIANCES OF LOCAL AND NATIONAL GOVERNMENTS, BANKABLE PROJECTS**

SOLUTIONSplus concept: five-pillar conceptual approach



INFORM

A range of tools, methods and guides and adapts them for a comprehensive toolbox on e-mobility solutions across all modes.



INSPIRE

Exchange among city officials, transport operators and entrepreneurs to share their experiences on specific technologies, policy and infrastructure measures, implementation processes, operations, business and financing solutions.



INITIATE

Initiate partnerships among local and European companies and facilitates the joint development of business models, building on sound assessments of economic, social and environmental costs and benefits.



IMPLEMENT






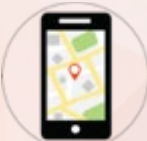






Support cities in implementing innovative, sustainable e-mobility solutions, which include technical feasibility, cost-benefit assessments for up-scaling institutional and governance analysis, organisational aspects, stakeholder dialogue, and development of finance options.



IMPACT

Help integrate the innovations initiated and tested by the project into local, national and global policy, finance and business decision making processes.

Business models and associated tools

VEHICLES		OPERATION		INTEGRATION	
	Electric 2- and 3-wheelers		Innovative charging solutions of high-capacity bus-systems		Mobility as a Service (MaaS) solutions
	Electric buses, e-BRT, mini-buses, taxis		Use of existing systems and grids for the charging of electric vehicles		Eco-routing
	Retro-fitting Electric (mini)-bus		Seamless Charging		Network Planning and Management
			(Smart) charging and charging services		Fleet Bundling
			Inner city & last Mile E-delivery shared services		

Capacity Building and Peer-to-Peer Exchange



Capacity Building activities

SOLUTIONSplus Global E-learning Programme @ *Mobility Academy* platform

Course 1- Electric mobility: More than just electrifying cars

Course 2- E-buses and integration in cities' public transport system <https://mobility-academy.eu/>

Course 3: E-mobility and ITS

Course 4: Electrification of paratransit



Peer-to-peer exchange

E-bike sharing system

E-3 Wheeler

Site visit at Hamburg Hochbahn (E-bus)

Study tour in Madrid @ EMT Madrid (E-bus, LEV)

Regional Training on E-mobility in Asia, Africa and Latin America

Online and on-site trainings organised based on the capacity building needs on EV in each region, including city specific in Asia



IN-PERSON E-BUS TRAINING PROGRAMME on Electric Bus Procurement, Planning and Financing

- LATAM – Chile
- Africa – Dar Es Salaam
- Asia – Kuala Lumpur

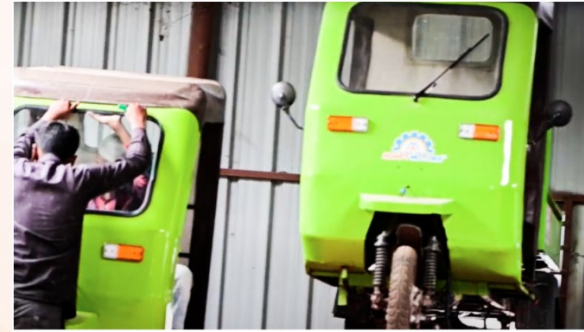
SOLUTIONSplus Toolbox



VEHICLES



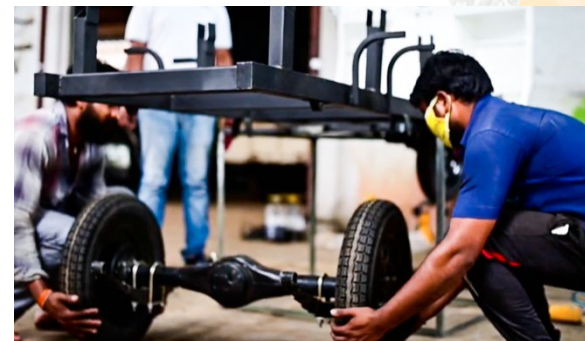
OPERATIONS



INTEGRATION



USER



CHALLENGES

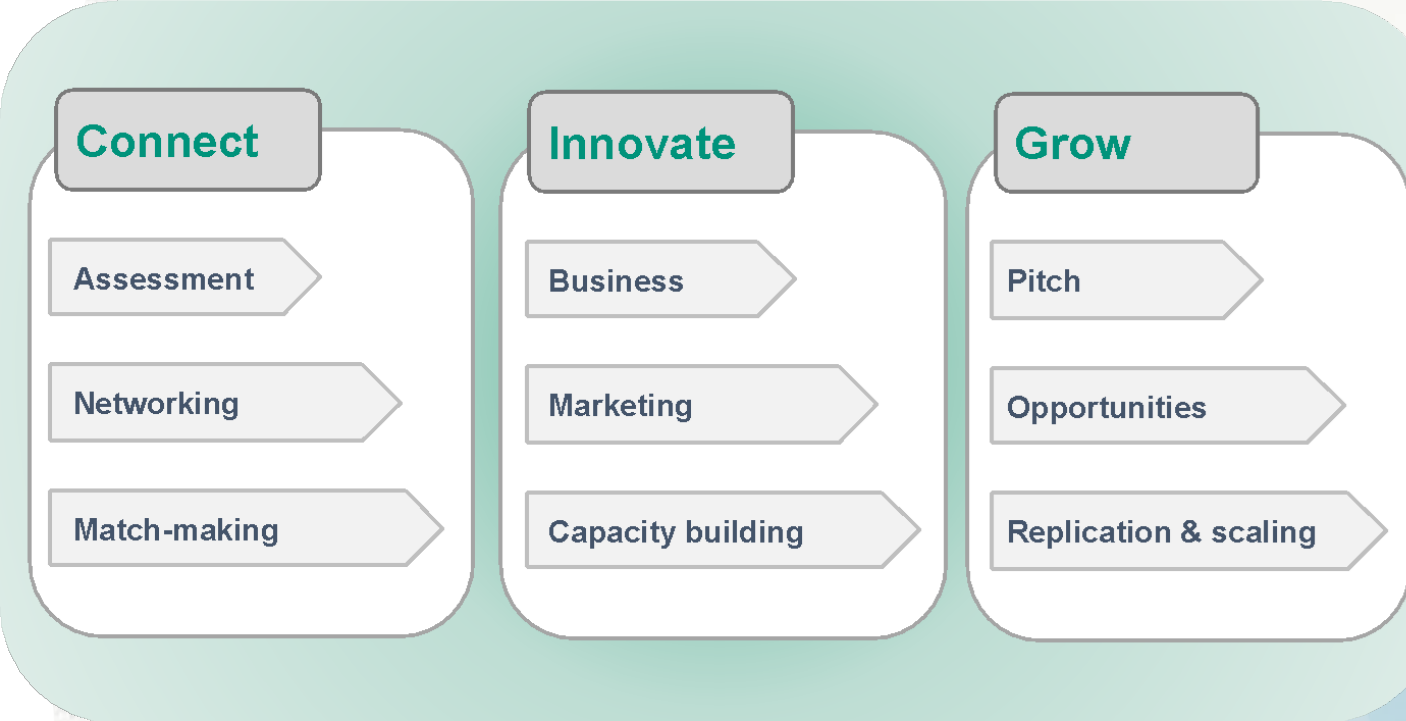


DEMO PROJECTS

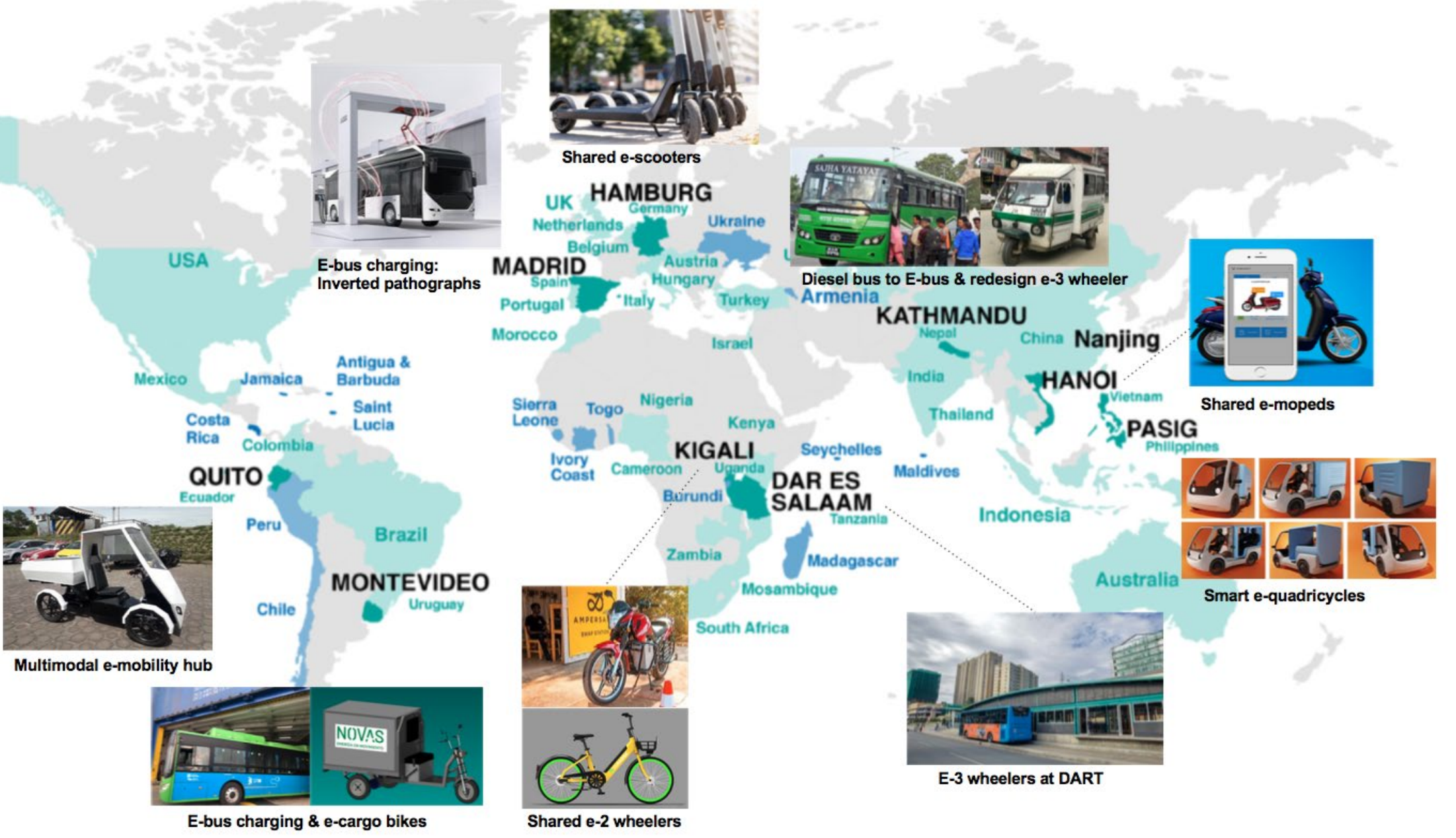
➔ <https://emobility.tools/>

Start-up Incubator

- A virtual space to learn, connect and grow
- Business support and training to local innovators
- On-demand services and trainings
- Partnership development



Demonstration actions in SOLUTIONSplus cities



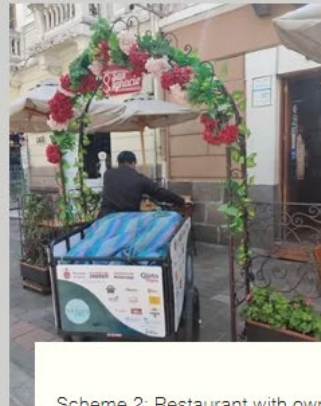
Quito



1. Two components: 1) the **multimodal e-mobility hub** in the Historic Center of Quito and 2) the **Mobility as a Service (MaaS) app**.
2. Multimodal e-mobility hub in the Historic Center of Quito with **10 e-cargo bikes**, locally manufactured, deployed at the area to transport supplies, goods, light parcels and recycled materials with a two months of operations (11/2022 to 1/2023)
3. **Four operating schemes and seven participants** including a local fruit and vegetable vendor, restaurants, a bike messenger association, two courier companies and two waste picker's associations.
4. **Testing a Mobility as a Service Application (MaaS App) for Public Transport.**



Scheme 1: Food provision



Scheme 2: Restaurant with own cross-docking



Scheme 3: Courier



Scheme 4: Collection of recycled materials

QUITO

Component 1: Multimodal e-mobility hub in the Historic Center of Quito (HCQ)

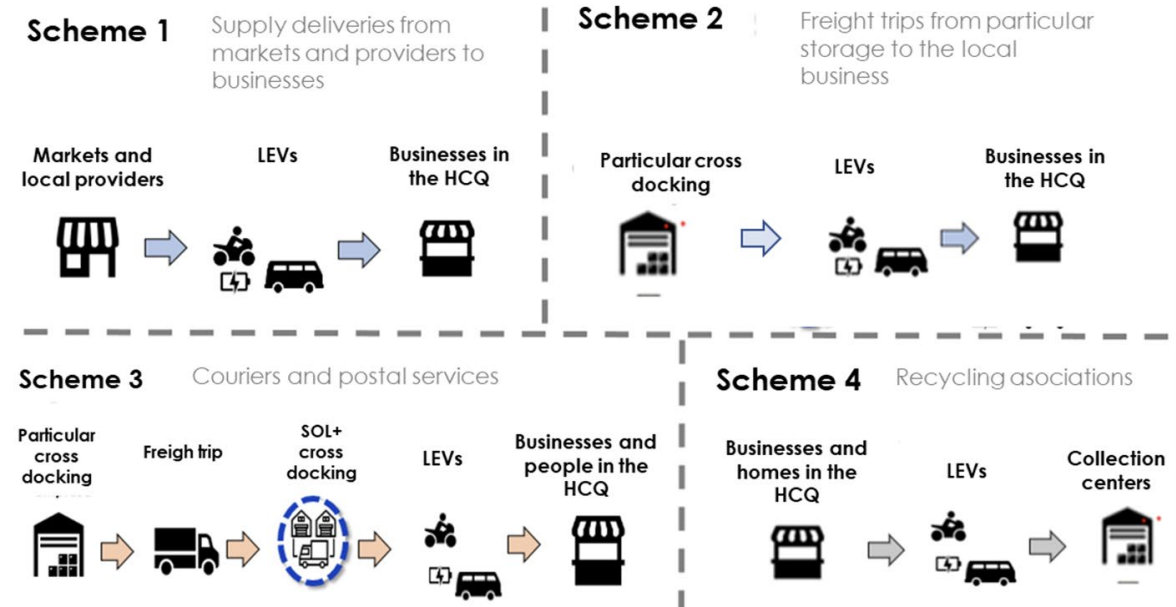
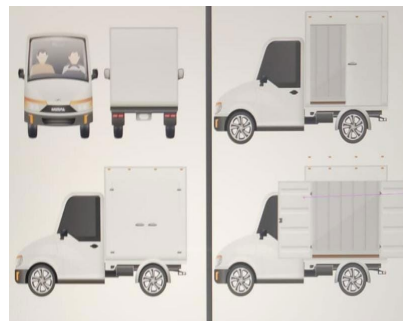
Progress

LEV MANUFACTURING

- 1) 3 start-ups selected: ECargoBikeUIO, Sidertech & Grupo Miral
- 2) 10 e-cargo bikes finished
- 3) 10 e-quadracycles awaiting the arrival of 2 Valeo kits
- 4) 2 e-vans in the design phase
- 5) 20 Eols from local companies

TECHNICAL ASSISTANCE

- 1) Support in the vehicle design & battery sizing / selection
- 2) Support in the vehicle performance testing & pilot design (local)
- 3) Intermodal corridor via Design Studio (TUB)
- 4) Logistics recommendations & model from ZLC ready
- 5) Policy recommendations to the Micromobility draft Ordinance



Montevideo



1. SOLUTIONSplus and the Julio Ricaldoni Foundation (FJR) hosted an event to launch the LEV prototypes locally produced.
2. The SOLUTIONSplus delegation joined the Municipality (IM) and the Public Utility Company (UTE) teams in the Ciudadela Terminal for a site visit that was followed by a working session.
3. The procurement process will be launched soon and the e-taxi chargers needed have been secured via the 2nd EU Matching Call.
4. The urban logistics component was carried out with the support of the MOVÉS Project of the Ministry of Industry and Energy and the Julio Ricaldoni Foundation (FJR). For the pilot, two e-cargo bikes, one of each manufacturer, were introduced in the operations of PedidosYA, the Latin American subsidiary of Delivery Hero, for a period of two weeks.



PedidosYA riders in the CargoBike.UY



Wheele e-cargo bikes

MONTEVIDEO - Demonstration update

Component 2: Local design and assembly of LEFV

Progress

LEV MANUFACTURING

- 1) 3 start-ups selected: CargoBikeUY, Wheele & GreenStar
- 2) 8 e-cargo bikes & 2 e-tricycles finished
- 3) 2 e-quadricycles awaiting the arrival of 2 Valeo kits

TECHNICAL ASSISTANCE

- 1) Support in the vehicle design via the EU Innovators Call
- 2) BMS selection – compatibility with Valeo drivetrains (UDELAR)
- 3) Support in the vehicle performance testing



Hamburg



1. 4 physical e-scooter parking zones have been implemented.
2. T-Systems initiated and coordinated the **electrification of the taxi fleet** together with the city of Hamburg.
3. The living lab Hamburg was accompanied by the integration of a Low Carbon Mobility Monitoring (LCMM) tool to **measure the fuel or electricity consumption and emissions of taxis.**



Hanoi



1. Hanoi demo on shared e-mobility systems will be piloted in two major locations, at BRT station and AEON shopping mall. The shared e-mobility system consists of **electric 2-wheelers** (50 e-mopeds and 10 QIQ e-bikes).
2. E-mopeds procurement and arrangements for last mile connectivity for **fifty units of e-mopeds** (Vinfast Ludo).
3. A first trial fo V-Share from QiQ was conducted and **IoT was installed**.
4. In November 2022, the **pilot project for last-mile connectivity was launched** in Hanoi to offer a connection between a BRT Station (Van Khe) and the AEON Mall in Ha Dong using electric two-wheelers.



Progress

- **E-mopeds procurement and arrangements**
 - 50 units of e-mopeds (Vinfast Ludo) are procured
 - Vehicle registration is complete
 - Dedicated parking lots are selected
 - Ensure drivers safety: helmets, insurance
- **App and IoT**
 - V-Share App - vehicle positioning
 - integration with sensors



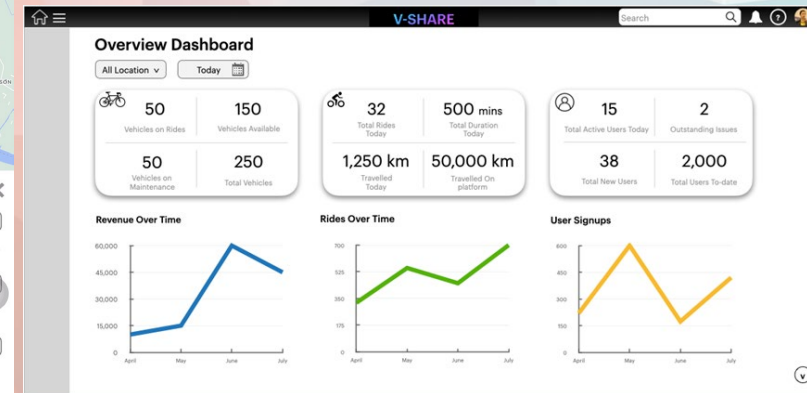
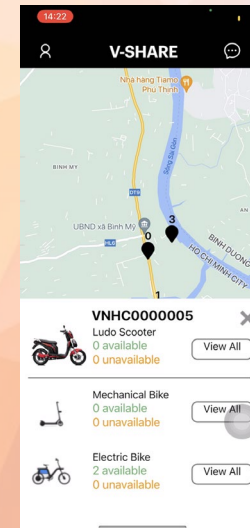
Vinfast e-mopeds



QiQ e-bikes

Innovation & opportunities

- Extend the services to new metro lines – 15K passengers/day – that lack last-mile services – use parking lots for docking station
- Collaboration with UNEP-implemented BMU-IKI project - 25 e-mopeds (TAILG) for shared system



V-share app displays

Kathmandu



1. Sajha Yatayat has selected a supplier for the supply & delivery of a conversion kit for **conversion of diesel bus to electric bus**.
2. Prototypes for remodeling of e-3 wheelers (Safa Tempo) for passenger and cargo use cases, by local company – Clean Energy International (CEI), **are ready and are on the test run**.
3. Prototypes for a new design of e-3 wheelers with a multi-use concept and e-shuttle van are complete.
4. SOLUTIONSplus launched the **electric 3-wheelers** in Kathmandu 11/2022 as the first phase.



Remodeling e-3 wheelers (Safa Tempo) for Passenger and Cargo



- Chassis repair, drive unit and battery replacement, and bodywork
- 1000 kg payload, 23KWh battery (passenger), 15KWh (cargo)
- Prototypes are ready (Nov 2022) and are on a test run

Challenges and Adaptation

- Local material availability – timely delivery and quality
- Lack of technical staff

By **Clean Energy International**
(Local Manufacturer)



25 years old Safa Tempo- Paratransit service



Remodelled Safa Tempo – Passenger (11 pax)



Remodelled Safa Tempo - Cargo

New design of e-3 wheelers - Passenger, Cargo and Waste collector



- Multipurpose concept (e-3W)
- 500kg payload/ 350kg (e-cargo), 10KWh battery
- Integrate EU technology (Valeo eAccess 48V drive)
- 1 unit of cargo is ready but w/o Valeo drivetrain

Challenges and Adaptation

- Installation of Valeo drivetrain – sophisticated system and no local availability of compatible components – in communication with Valeo+ P2P at Valeo

By **Shree Eco-Visionary**
(Local Manufacturer)



Passenger e-3W (6pax)



E- Waste collector



E- Cargo

E-shuttle van

Pasig: Shared e-mobility for cargo and passenger services

Progress

- **E-Quadricycle and FLEV prototype development**
 - Prototype of e-quad and FLEV completed by Tojo motors (local start-up); currently in the production phase
 - Integrated EU technology (Valeo eAccess 48V drive)
 - Lightweight (Body: FRP composite; E-quad: 300 kg payload, FLEV: 700 kg)
 - Fitted with an informatics system
- **Booking app**
 - Tested in Sep 2022 - the app trial run on Pasig City's existing e-tricycles.
- **Charging solutions**
 - Assessment of charging facilities' location



E-Quadricycle

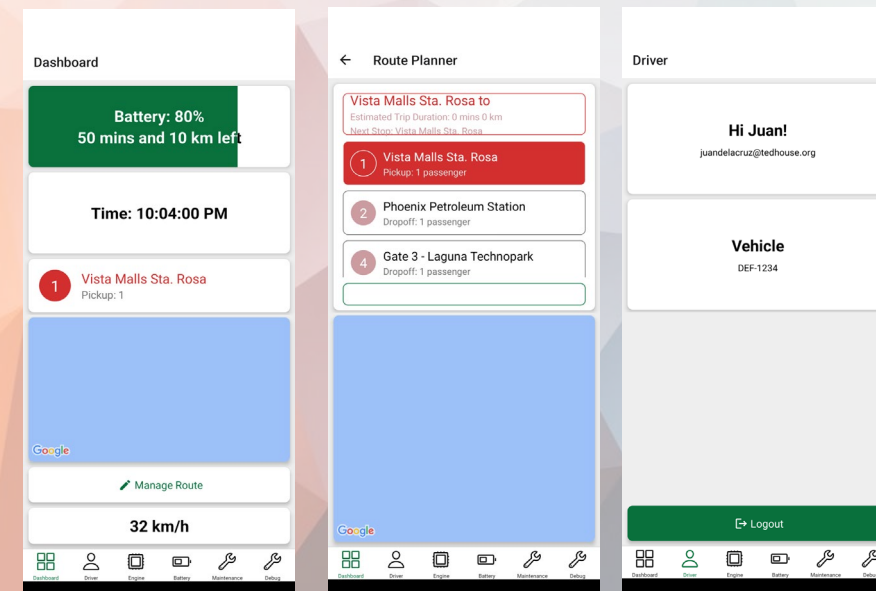
FLEV

Challenges & adaptation

- Redesigns (i.e. upgraded battery capacity, upsized chassis size) had to be made due to changes in technical specifications of parts as well as limited availability
- Adjustment with Valeo drive – due to available chargers (FLEV), Climate

Innovation & opportunities

- Cost-competitive, locally appropriate, and multi-purpose
- Collaboration with UNEP-implemented BMU-IKI project: Charging pods and solar charging network
- Exploring expanding charging solutions in city through private-public partnership with city government and local charging providers



Booking app: Driver app

Kigali



1. The project supports first and last connectivity by promoting electric two-wheelers providing feeder services to the public transport system. This takes the form of an **electric bikeshare system, bike racks, and electric motorcycle-taxis.**
2. In September 2021, **Guraride's bikeshare** was launched for a first stage with 80 conventional bicycles
3. In July 2022, **80 bike racks** were deployed at strategic locations.
4. Electric motorcycles-taxis: **35 women** were recruited and trained under ad-hoc conditions by a partnership consisting of SOLUTIONSplus, Ampersand and the GIZ.



Kigali - E-bike sharing

Progress

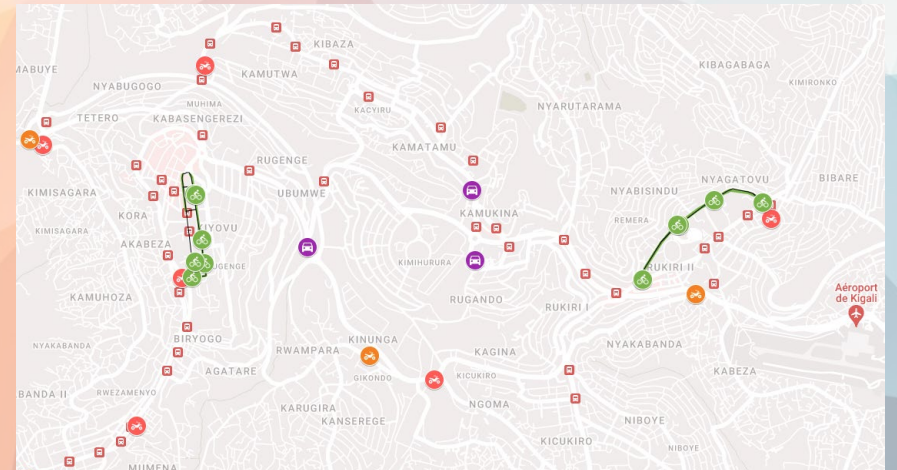
- Guraride: launch in September 2021; 50 electric bicycles in 2023
- Technical support on the operation of shared systems (redistribution, data, battery charging options)
- Peer-to-peer training on e-bike share systems in February 2022

Challenges & adaptation

- Financial feasibility to scale-up: study to identify financial and business model options

Innovation & opportunities

- Scaling up to build a consistent network



Kigali - Electric moto-taxis

Progress

- Ampersand: Battery as a Service
- 24 e-moto-taxis handed over in November 2022
- Gender-inclusive component
- Technical support for the drivetrain (Valeo), battery sizing, design and industrialisation strategy (IDIADA, PEM Motion)
- Connection to financiers

Challenges & adaptation

- Female drivers : ad-hoc training & research on barriers

Innovation & opportunities

- From 60 to 800+ motorcycles during SOLUTIONSplus time
- Rwanda: scale-up via a NAMA Facility proposal
- Regional market (Kenya, Tanzania); partnership with Total Energies; large market



Dar es Salaam



1. Auto Truck E.A. Limited's **two new electric three-wheeled vehicles** are 85% complete, launch planned in 2023.
2. Second component: the **conversion of internal combustion engine (ICE) three-wheeled vehicles**.
3. In 2021, the Germany-based organisation EURIST was selected to provide **pedal-assist electric bicycles** in Dar es Salaam.
4. E-bikes were jointly designed by EURIST, Hero India and the Germany-based e-bike company HNF Nicolai. **16 e-bikes and 5 additional batteries** were shipped in October 2022.



Dar es Salaam | Electric three-wheelers

Progress

- Two start-ups launching early 2023
 - **Auto Truck**: two new prototypes; retrofit of one bajaj; fleet management system (Teltonika)
 - **SESCOM**: retrofit of three bajajs; technical assistance on battery sizing & retrofit (IDIADA, PEM Motion)
- Dar es Salaam Institute of Technology (DIT) as an EV Center



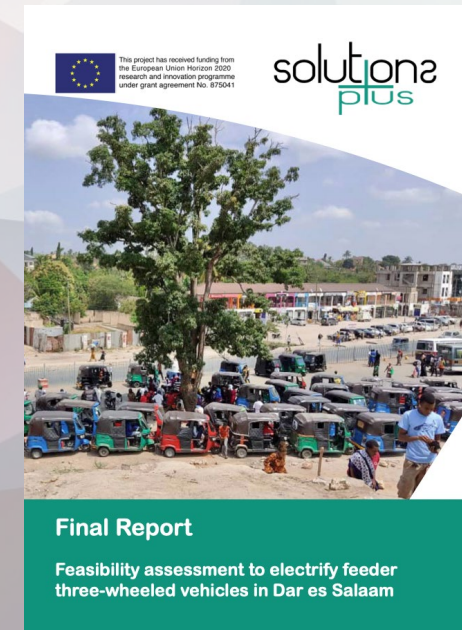
Challenges & adaptation

- Lack of technical skills: EU matchmaking
- Peer-to-peer training with Kochi (India) in July 2022
- Lack of data on typical bajaj patterns: Feasibility Assessment



Innovation & opportunities

- Market: high number of bajajs; further BRT lines
- Scaling-up the e-bajaj fleet with an ongoing call for innovators
- Scale-up opportunities via the EU Delegation, GIZ, UNDP



Dar es Salaam | Electric bicycles



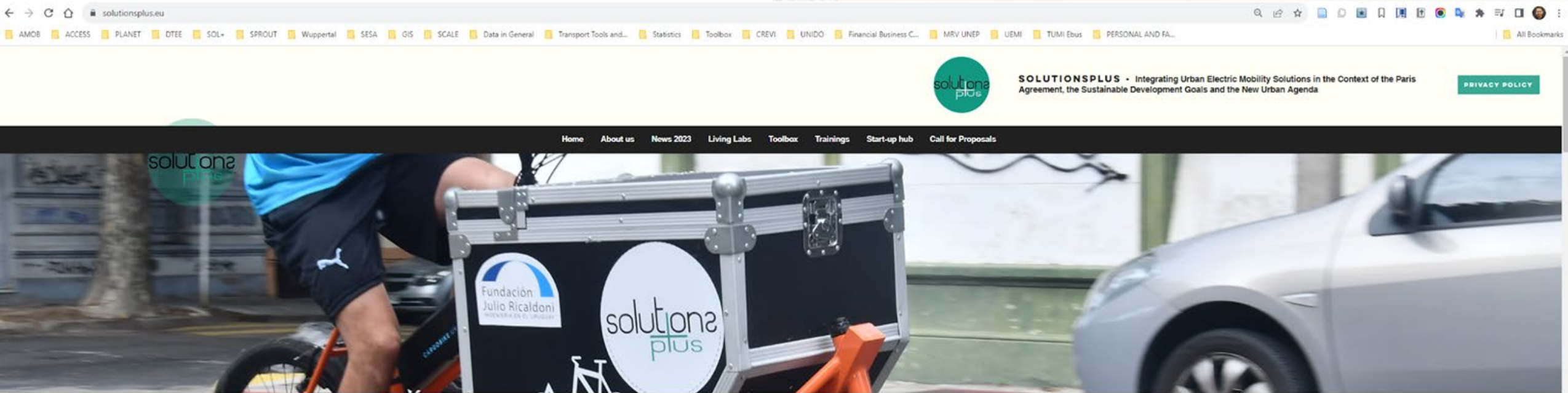
Progress

- 16 pedal-assist electric bicycles co-designed (EURIST, Hero India, HNF Nicolai)
- Training & assembly workshop at DIT in November 2022
- Use for urban deliveries & medical supplies

Innovation & opportunities

- Frugal vehicles overlooked so far
- Opportunities to scale for urban deliveries in Dar es Salaam and in the East African region: study
- Creation of a new company, African Ebike Trading GmbH

https://www.solutionsplus.eu/



SOLUTIONSPPLUS

SOLUTIONSplus brings together highly committed **cities, industry, research, implementing organisations** and **finance partners** and establishes a global platform for shared, public and commercial e-mobility solutions to kick start the transition towards low-carbon urban mobility. The project encompasses city level demonstrations to test different types of innovative and integrated e-mobility solutions, complemented by a comprehensive toolbox, capacity development and replication activities. **Demonstration actions are being launched in Hanoi (Vietnam), Pasig (Philippines), Lalitpur/Kathmandu (Nepal), Kigali (Rwanda), Dar es Salaam (Tanzania), Quito (Ecuador), Montevideo (Uruguay), Madrid (Spain), Nanjing (China) and Hamburg (Germany).**