



# Urban Pathways



## URBAN PATHWAYS

### Demonstration actions & Living Labs

**UN HABITAT**  
FOR A BETTER URBAN FUTURE

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Demonstration actions & Living Labs

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# Contents

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<b>1</b>	<b>Introduction to the Urban Pathways approach</b>	<b>6</b>
<b>2</b>	<b>The Urban Pathways Living Concept</b>	<b>7</b>
2.1	MOBILITY	7
2.2	WASTE MANAGEMENT	10
2.3	ENERGY	11
2.4	INTEGRATED URBAN DESIGN: EcoZones as cross-sectoral framework	12
2.5	CAPACITY BUILDING & AWARENESS RAISING	12
2.6	MONITORING & EVALUATION	13
<b>3</b>	<b>Past, present and future pilot in UP cities</b>	<b>17</b>
3.1	Belo Horizonte	17
	<b>Pilot and Demonstration Action</b>	17
	The Zone 30 implementation in the Cofisco Neighbourhood	17
	Air Quality sensing powered by Citizen Science	18
	<b>Outlook Planned and/or possible future action</b>	18
	Fleet renewal of diesel by electric buses	18
	EcoZone Santa Tereza - Low emissions and Zero waste in one of the most traditional neighbourhoods	19
	Agroecology and Well Being: Waste Management and Urban Agriculture in Belo Horizonte	20
	Building Green Infrastructure: Restoration of Landfills in Public Parks	21
3.2	Hanoi	22
	<b>Pilot and Demonstration Action</b>	22
	E-mobility for last-mile connectivity	22
	<b>Outlook Planned and/or possible future action</b>	22
	EcoZone at Trieu Khuc, Hanoi	22
3.3	Kochi	23
	<b>Pilot and Demonstration Action</b>	23
	Electric 3-Wheelers (E-autorickshaw)	23
	<b>Outlook Planned and/or possible future action</b>	23
	EcoZone at Kadavanthra, Kochi	23
3.4	Nairobi	24
	<b>Pilot and Demonstration Action</b>	24
	Placemaking, pedestrianization and impact on public health - Luthuli Avenue Transformation	24
	Cycling promotion and advocacy	26
	Inclusive Mobility	26
	Air Quality Sensing powered by Citizen Science	27
	Municipal solid waste collection in Nairobi and Mombasa	28
	COVID-19 related interventions (I): Using creative methods to spread key messages on COVID-19 and low carbon services	29
	COVID-19 (II): Supporting Start-ups - Urban Tech Innovations as emergency response for COVID-19	30

<b>Outlook Planned and/or possible future action</b>	31
Mainstreaming green housing in an incremental and self-build context	31
Waste Management: Inter-counties consultation for improved municipal solid waste management in	.....
Nairobi Metropolitan Area	31
<b>3.5 Kathmandu</b>	32
<b>Pilot and Demonstration Action</b>	32
Scale-up E-mobility	32
E-mobility in public transport	32
Car-free day in Kilagal	33
<b>Outlook Planned and/or possible future action</b>	33
Portable Air Quality Monitoring device	33
<b>3.6 Pasig</b>	34
<b>Pilot and Demonstration Action</b>	34
Locally Developed/Assembled E-Cargo Quadricycles	34
<b>Outlook Planned and/or possible future action</b>	34
EV charging as a public space and commercial area component	34
<b>3.7 Kigali</b>	35
<b>Introduction</b>	35
<b>Pilot and Demonstration Action</b>	35
E-mobility for last-mile connectivity	35
<b>Outlook Planned and/or possible future action</b>	35
Integration of e-mobility in the waste collection fleet	35
EcoZone pilot: Integrating mobility and waste issues	35
<b>3.8 Dar es Salaam</b>	36
<b>Pilot and Demonstration Action</b>	36
Integrating e-mobility for last-mile connectivity	36
<b>Outlook Planned and/or possible future action</b>	36
Integration of e-mobility in the waste collection fleet	36
EcoZone pilot: Integrating mobility and waste issues	36
<b>3.9 Quito</b>	37
<b>Pilot and Demonstration Action</b>	37
Multimodal e-mobility hub	37
<b>Outlook Planned and/or possible future action</b>	37
An inclusive Low-emission Zone (LEZ)	37
Comparative EcoZones	38
Development of 'Circular Quito' Strategy	39
Food Waste Reduction	39
<b>3.10 Montevideo</b>	40
<b>Pilot and Demonstration Action</b>	40
Installation of charging infrastructure for e-buses	40
<b>Outlook Planned and/or possible future action</b>	40

Integrating e-mobility in waste collection (pilot with composting NGO) .....	40
Food waste reduction campaign.....	41
<b>4. Other replication cities .....</b>	<b>41</b>
<b>4.1 Honduras .....</b>	<b>41</b>
<b>Pilot and Demonstration Action .....</b>	<b>41</b>
Sustainable Urban Mobility Plan (SUMP) and a Low-emission Zone in Comayagua .....	41
<b>Outlook Planned and/or possible future action .....</b>	<b>41</b>
Democratising disaster risk management and ecosystem-based adaption .....	41
<b>4.2 Santiago de Chile .....</b>	<b>42</b>
<b>Outlook Planned and/or possible future action .....</b>	<b>42</b>
District integration through the development of an EcoZone in Santiago .....	42
<b>4.3 Hai Phong, Vietnam .....</b>	<b>42</b>
<b>Pilot and Demonstration Action .....</b>	<b>42</b>
Pedestrian Street along Tam bac River.....	42
<b>4.4 Birendranagar, Nepal .....</b>	<b>43</b>
<b>Pilot and Demonstration Action .....</b>	<b>43</b>
Sustainable Urban Mobility Plan (SUMP) Formulation for Birendranagar Municipality, Surkhet .....	43
<b>4.5 Mombasa, Kenya .....</b>	<b>44</b>
<b>Pilot and Demonstration Action .....</b>	<b>44</b>
Easing movement & logistics of small-scale businesses in Mombasa through adoption of E-Handcarts..	44
<b>4.6 Addis Ababa .....</b>	<b>45</b>
<b>Pilot and Demonstration Action .....</b>	<b>45</b>
Car Free Days in 2019.....	45
<b>5. Overview - Budget for UP pilot activities .....</b>	<b>46</b>

# 1. Introduction to Urban Pathways approach

The Urban Pathways (<https://www.urban-pathways.org>) has the objective to make an active contribution to delivering on the Paris Agreement at the city level in the context of the New Urban Agenda and the Sustainable Development Goals. Its aim is to make a direct contribution to sustainable urban development by focusing on implementation projects in the areas of mobility, energy, and resource management. The project is funded by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and is implemented by UN-Habitat, the Wuppertal Institute and UN Environment. Urban Pathways started in four pilot countries (India, Brazil, Kenya and Vietnam) to develop a Living Lab framework, which is then intended to be replicated across the partner regions. As of now (June 2020) Urban Pathways has stretched its activities far beyond those countries, being active in 10 pilot cities and replicating activities in more than 15 cities.

**The Urban Pathways project builds on four pillars:**



This report focuses on the last pillar, summarizing the concrete local implementation projects, aiming to boost low-carbon urban development in our partner cities. Before we detail our current and future (planned) activities for each city, we will describe the structured approach for our pilot activities. It entails activities in three sectors: mobility, resources / waste management, energy (below). While the concepts serve as guiding ideas they are of course adapted to the local contexts. It is also worth mentioning that the Urban Pathways project is working on an approach that aims to integrate the different sectors / activities in one neighbourhood, e.g. in low-traffic, low-emission, low-waste neighbourhoods (EcoZones).

**The UP implementation approach is composed of the following key elements:**

- 1) Context-based: Builds on on-going activities promoted by the municipality and / or local NGOs
- 2) Multi-stakeholder and interinstitutional approach: Connects different stakeholders working in similar projects to identify synergies and generate a higher impact
- 3) Neighbourhood level: Works on small scale pilots at the neighbourhood level that are low-cost, participatory and easily replicable at a larger scale
- 4) Intersectoral: Integrates different sectors (mobility, waste and energy) for a higher impact and understanding of climate change mitigation
- 5) M&E: Monitors and evaluates the impact of the implemented activities in order to adapt, improve and replicate the pilots
- 6) Circular Economy: Explores circular economy opportunities to address key urban system issues and amplify the potential of its economic, social, and environmental benefits; establishes new circular city functions and services, and innovative business models, and thus creating an effective framework for the circular transition.

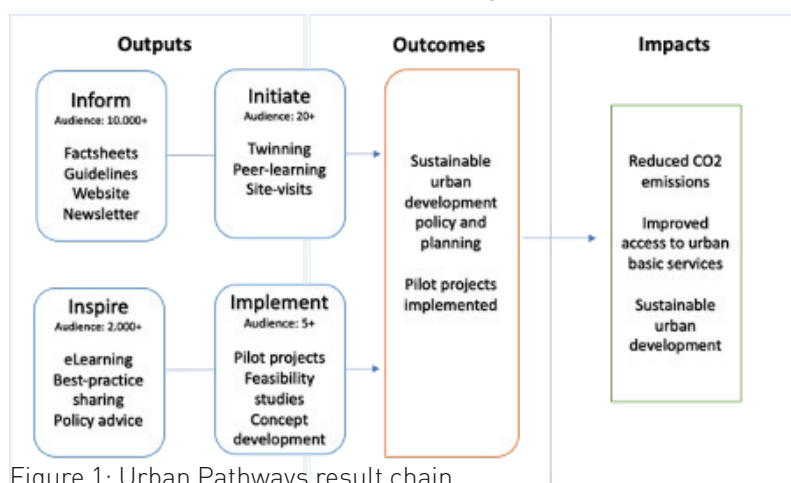


Figure 1: Urban Pathways result chain

## 2. The Urban Pathways Living Lab Concept

To enable transformative change towards sustainable, low-carbon cities it is vital to go beyond a mere technical perspective on low-carbon technologies and take a systemic approach. The Living Lab concept that the Urban Pathways project applies aims to combine small to medium sized implementation concepts with wider transformation pathways. Testing innovative urban development solutions at different Technology readiness levels (TRL) and in different environments can enable replication and can contribute to a supportive political, legal, economic and fiscal landscape (Lah, 2017). An integral part of effective Living Lab approach is the facilitation of close cooperation between local, regional and national decision-makers, operators, industry and businesses to develop innovative solutions that not only fit into the local context but also are scalable and replicable (Voytenko et al., 2016). The Urban Pathways Living Lab approach considers cities as a socio-technical system that consist of technologies, regulations, institutional settings, the economic system, interests, influence and power structures, behavioural patterns, and social norms. It considers that urban sub-sectors should be well integrated and solutions should be tailored to the specific local economic, technological, social, political and environmental context.

## Urban Pathways Living Labs

In the following paragraphs we summarize the different thematic fields, in which Urban Pathways is implementing pilots from a more general perspective. The concepts are of course adapted to the local contexts of our partner cities and summarized in the next chapter.

### 2.1 MOBILITY

Emissions from the transport sector are a major contributor to climate change — in 2018, a total of 24% of global CO<sub>2</sub> emissions from fuel combustion came from transportation. In terms of transport modes, 72% of global transport emissions come from road vehicles, which accounted for 80% of the rise in emissions from 1970-2010. The global transport sector could reduce 4.7 GtCO<sub>2</sub> e/year by 2030. Such a transition depends on cities that enable modal shifts and avoided journeys and that provide incentives for the uptake of improved fuel efficiency and changes in urban design that encourage walkable cities, non-motorized transport and shorter commuter distances.

Cities pursuing sustainable transport benefit from reduced air pollution, congestion and road fatalities and are able to harness the relationship between transport systems, urban form, urban energy intensity and social cohesion. Electrification is an important part of the solution to the challenge of growing transportation sector emissions because it eliminates tailpipe emissions and harnesses the potential to decarbonize the power grid.

Accordingly, Urban Pathways has been supporting cities in the development and implementation of sustainable urban mobility pilots with a strong focus on active and electric (public and shared) mobility embedded in their Sustainable Urban Mobility Plans (SUMP) with a high potential of being replicated in other areas of the cities.

#### Active mobility projects

Road traffic is not only the 10th leading cause of death worldwide, it is also the leading cause of death of children aged 10 to 19 in developing countries. This means that roads are a dangerous place for all, but especially for children and adolescents. Thus, adopting a safe system approach could have a positive impact not only in terms of road safety, but also in terms of public health, air pollution and climate change.

In this context, Urban Pathways has been supporting projects in several cities around the globe that improve walkability, road safety and public space, with a strong focus on school surroundings. A tactical urbanism approach has been used with the goal of reclaiming the space from cars to pedestrians and cyclists and providing them with safer spaces for walking and cycling, but also with the aim of raising awareness among children and adolescents about the environmental, health, social and economic benefits of non-motorised transport. As a result, Urban Pathways has supported and will continue supporting several cities in the implementation of Zones 30 and Low-emission Zones (LEZ).



Urban Pathways e.g. co-organised Africa's first ever exchange programme on "Open Streets", which brought together African government officials, representatives of NGOs and street enthusiasts to learn from and share experiences on the concept of Open Streets and Placemaking in Cape Town, South Africa, from 22-28 October, 2018. The Open Streets Exchange was co-organised by Open Streets Cape Town (OSCT), Urban Pathways through UN-Habitat and GIZ through the Transformative Urban Mobility Initiative (TUMI) Challenge.

The participants represented countries from the African continent including Angola, Egypt, Ethiopia, Ghana, Kenya, South Africa, Uganda and Zambia. The programme provided a combination of dialogue sessions, interaction and practice on topics around planning, facilitating and implementing Open Streets initiatives. The participation at the Open Street Exchange inspired various city participants to initiative placemaking and car free initiatives in their home cities, such as in Ethiopia, South Africa and Uganda.



Under the initiative 'environMENTALISE –co-creating safe, friendly and green neighbourhoods', launched by Urban Pathways in 2019, the project supported several actions happening in September and October during the Mobility Week, the Car-free Day and the Day of Walking and Cycling to School in cities in Latin America, Africa and Asia.

With the aim of monitoring the impacts of the implemented actions and collecting relevant data, Urban Pathways provided some of the participating cities with a low-cost air quality and noise-monitoring device, a 'Smart Citizen Kit'. environMENTALISE started in August with a series of webinars related to active mobility and waste management with a strong bottom-up focus.

Children have been selected as the main target group of this type of projects, as it has been shown that working with children and schools has the potential to transform patterns in the short term, as it impacts their parents, and in the long term, through changes in their future mobility choices and waste habits.

Implementation activities in UP partner cities:

- Belo Horizonte (Brazil)
- Hanoi (Vietnam) (planned 2020)
- Kochi (India) (planned 2020)
- Nairobi (Kenya)
- Kathmandu (Nepal)
- Pasig (Philippines) (planned 2020)
- Quito (Ecuador) (planned 2020)
- Addis Ababa (Ethiopia)
- Aguascalientes (México)
- Cuenca (Ecuador)





Belo Horizonte



Aguascalientes



Cuenca



Kathmandu



Nairobi



Addis Ababa

Some of the activities implemented under the EnvironMENTALISE Initiative in 2019

### Integration of e-mobility in public transportation and waste collection

The Urban Pathways project has developed pilot concepts to enable transformational change towards sustainable urban mobility through innovative and integrated electric mobility solutions in passenger and freight transport. They are now being implemented in partner cities with support from the European Union in the context of the SOLUTIONSplus project. SOLUTIONSplus: Integrated Urban Electric Mobility Solutions in the Context of the Paris Agreement, the Sustainable Development Goals and the New Urban Agenda is a UP partner project funded by the EU Research and Innovation Programme, Horizon 2020. SOLUTIONSplus (SOL+) 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.

Furthermore, the Urban Pathways project is currently working on project concepts regarding the integration of e-mobility solutions (e.g. electric three wheelers) in the waste collection system. While one use case can be to integrate it into municipal fleets and serve e.g. yet neglected areas (because of difficult access, narrow streets, etc.), another use case is testing for collection of new waste streams, such as organic waste from households.

### Implementation activities in UP partner cities:

- Belo Horizonte
- Kochi
- Dar es Salaam
- Quito
- Hanoi
- Pasig
- Kigali
- Montevideo

## 2.2 Waste Management

Current global Municipal Solid Waste (MSW) generation levels are approximately 1.3 billion tonnes per year and are expected to increase to approximately 2.2 billion tonnes per year by 2025. It is estimated that 1.6 billion tonnes of CO<sub>2</sub>e were generated from the treatment and disposal of waste in 2016 – representing about 5% of global emissions.<sup>1</sup> The largest source is landfill methane (CH<sub>4</sub>). There are large uncertainties concerning direct emissions, indirect emissions and mitigation potentials for the waste sector. These uncertainties could be reduced by consistent national definitions, coordinated local and international data collection, standardized data analysis and field validation of models.

GHG emissions from waste are directly affected by numerous policy and regulatory strategies that encourage energy recovery from waste, restrict choices for ultimate waste disposal, promote waste recycling and reuse, and encourage waste minimization. A wide range of mature technologies is available to mitigate GHG emissions from waste. Therefore, the mitigation of GHG emissions from waste relies on multiple technologies and practices, whose application depends on local, regional and national drivers.

Managing waste properly is essential for building sustainable and livable cities, but it remains a challenge for many developing countries and cities. Effective waste management is expensive, often comprising 20%–50% of municipal budgets. Operating this essential municipal service requires integrated systems that are efficient, sustainable, and socially supported.

Therefore, within the area of resources, the Urban Pathway Project focuses on the needs to implement and improve waste management services in partner cities. The activities include supporting the engagement between strategic stakeholders to catalyze partnerships focused on technical issues and funding mechanisms – according to each municipality needs; and capacity building in regard to implementing comprehensive waste management strategies on the municipal level, taking into account the informal sector and the need to integrate formal and informal waste management activities. The UP team has been working closely with the partner cities municipalities to address the main challenges and opportunities that Global South face when it comes to waste management, as follows:

### Source separation and decentralized solutions pilots

In order to increase separate collection and recycling of solid waste - and implement a circular economy approach - the Urban Pathways project supports local-level decentralized waste management initiatives with implementation of awareness raising programmes and neighbourhood-based pilot projects. These pilots range from community-based programs that promotes the recycling of electronic and electrical waste (“recicladrón”), incentives for collection of recyclables (e.g. “swap market” - where, partnering with businesses and local farmers neighbours bring their recyclables and get fresh products in return) or engagement of public schools on waste segregation, composting and urban gardens - as children play a critical role on awareness raising as young multiplying local agents.

Implementation activities in UP partner cities:

- Belo Horizonte (planned 2020)
- Hanoi (planned 2020)
- Kochi (planned 2020)
- Kigali (planned 2020)
- Quito (planned 2020)

### Reducing food waste pilots

In order to lift the potential for GHG emissions reduction of the food sector (contributing 15 to 31% of total GHG emissions) the Urban Pathways project is focusing on developing and implementing source-focused prevention strategy as one element of reducing organic waste. This includes awareness raising activities and small pilots with businesses and restaurants to incentivise consumers to take their leftovers, rather than throwing it away.

Implementation activities in UP partner cities:

- Belo Horizonte (planned)
- Kochi (planned)
- Kigali (planned)
- Quito (planned)

### Organic Waste Treatment pilots (household, businesses, communities)

Apart from reducing food waste (above) the Urban Pathways projects focus especially on organic waste - as this makes up for the biggest fraction of waste in most of the UP partner cities. Only few of the partner cities do have composting plants at all; those that do have plants are targeting big generators. This is why the Urban Pathways project plans to focus on household level composting, implement pilot programmes with schools, in neighbourhoods and also businesses - partnering with the municipalities and local NGOs, that recently started bottom-up initiatives for composting activities. Where possible it is planned to link the waste activities with the active mobility pilots, e.g. on placemaking (see EcoZone concept below)

Implementation activities in UP partner cities:

- Belo Horizonte
- Kochi (planned 2020)
- Kigali (planned 2020)
- Quito

## **2.3 Energy**

Global energy consumption grew by 2.3% in 2018, which is almost twice the average growth rate since 2010. This is driven by an increasing global economy and higher energy demand for heating and cooling in some parts of the world. Energy efficiency across the global economy seemed to improve but the improvement rate is slow (IEA, 2018). The study by IEA (2018) also indicates the impact of fossil fuel use on global temperature increase - over 0.3°C of the 1°C increase in global average annual surface temperatures above pre-industrial levels. Cities have potential to reduce energy through efficient technology development and use, integrated urban planning and enabling policies. Urban Pathways has developed various factsheets and webinars on topics such as building energy efficiency, the use of renewable energy, improved vehicle efficiency (EVs) and waste to energy generation.

Regarding pilot activities in the energy sector, Urban Pathway has addressed energy issues in a broader perspective, focussing on improved vehicle efficiency (EVs) (see section on mobility above) and reducing energy efficiency through building energy efficient housing. For the latter, demonstration projects on low cost housing (tiny houses) are developed and implemented, considering also slum upgrading intervention in the respective cities. Its design measures include passive measures (proper heating/cooling, lighting and natural ventilation) and installed PVs that saves operational energy use, as well as use of sustainable local materials contributing to reduced total life cycle energy cost. It is built on a self- build construction concept, supporting and increasing local capacities.

Implementation activities in UP partner cities:

- Nairobi
- Kigali (planned 2020)
- Kathmandu
- Pasig
- Kigali
- Dar es Salaam
- Montevideo
- Quito

## 2.4 Integrated Urban Design: EcoZones as cross sectoral framework

EcoZones have been developed as a framework to highlight the sectoral linkages and opportunities for synergies across key sectors. Urban Pathways is currently supporting small, low-cost projects that focus on neighbourhoods as the geographical scale, where an intersectoral approach is easily applicable, addressing simultaneously mobility, energy and waste issues through a series of activities that include tactical urbanism, awareness-raising, community participation and impact assessment.

Understanding that the transition to a sustainable urban development is not only about infrastructure, but that a mindset change plays a huge role, the involvement of the community in these projects is key. Thus, these pilots will use participatory methodologies to increase support for sustainable mobility modes, transform public spaces, promote clean streets and waste reduction and separation. Their approach seeks to empower neighbours to have an impact in the change in their community, raise awareness and increase the collective knowledge on sustainable urban development and environmental issues. Thus, these projects do not only carry out pilot sustainable mobility and/or waste projects (with a great potential of including further areas such as NBS); they also empower local communities, raise awareness and promote social cohesion. Within the EcoZone concept the Urban Pathways team together with the partner cities are combining the activities that are described above, e.g. on active mobility projects and public space and composting & separation at source pilots.

Implementation activities in UP partner cities:

- Quito (two neighbourhoods)
- Kochi - planned 2020
- Belo Horizonte
- Kigali - planned 2020

## 2.5 Capacity Building & Awareness Raising

Capacity building and awareness raising have been one of the pillars in the implementation activities of Urban Pathways. All projects have been accompanied by webinar series that provided the local counterparts with necessary elements for a successful implementation with a strong focus on peer-to-peer exchange between cities and local initiatives in similar contexts. UP has organised several webinars in English, Spanish, Portuguese and French with the aim of reaching a wider audience. Among the topics that have been addressed are:

- Low-carbon mobility solutions
- EcoDistricts
- Air quality monitoring
- Organic waste
- Active mobility
- Tactical urbanism
- Economic opportunities of waste

Moreover, since 2019 UP has been coordinating, in partnership with the Waste Wise Cities Campaign from UN-Habitat, webinar series which aim to address waste prevention, contribute to updating municipal staff with regards to state-of-the-art waste treatment technologies and to share to all interested stakeholders, successful study cases which can be replicated in different cities/countries. For 2020, It is planned at least two new webinar series on the waste stream on different waste treatment technologies (technologies were selected by the attendees of the last webinar series) as well as on funding schemes for decentralized waste management solutions. Besides 25 webinars that engaged more than 5,000 participants, from different sectors, UP has carried out several on-site trainings, workshops, peer-to-peer learning, among other capacity building events reaching an audience of almost 15,000 people between October 2017 and June 2020. The table below illustrates the capacity building offer that has accompanied the project implementation.

Type of event	Number of events carried out to date	Participants
Webinars	25	5,521
Workshops/ on-site trainings	26	4,060
Fora /Conferences	21	4,560



One such capacity building activity is the annual Academy of Sustainable Urban Mobility. In 2018 (in Germany and Austria) and 2019 (in Bolivia and Brazil), Urban Pathways co-organized the Academy of Sustainable Urban Mobility (AoSUM) – in collaboration with development banks, academia, private sector, NGOs and other knowledge partners. Each year, between 25-30 participants are being selected following a competitive application process. The aim of the Academy is to equip global decision-makers with knowledge and tools to assess the current mobility challenges and to prepare feasible strategies and actions towards more sustainable, safe, accessible, efficient, innovative, and clean mobility in their city. The Academy provides a combination of theoretical lessons complemented by field visits in cities with best practice examples of sustainable urban mobility.



## 2.6 Monitoring and Evaluation

One such capacity building activity is the annual Academy of Sustainable Urban Mobility. In 2018 (in Germany and Austria) and 2019 (in Bolivia and Brazil), Urban Pathways co-organized the Academy of Sustainable Urban Mobility (AoSUM) – in collaboration with development banks, academia, private sector, NGOs and other knowledge partners. Each year, between 25-30 participants are being selected following a competitive application process. The aim of the Academy is to equip global decision-makers with knowledge and tools to assess the current mobility challenges and to prepare feasible strategies and actions towards more sustainable, safe, accessible, efficient, innovative, and clean mobility in their city. The Academy provides a combination of theoretical lessons complemented by field visits in cities with best practice examples of sustainable urban mobility.

### KPIs

Impact assessment is key to measure the continuous improvement of the urban environment as well as the positive and negative impacts which will determine the need to improve, rethink and redesign the urban space in order to maintain its integrity and resilience. For each pilot and demonstration actions, cross-cutting KPIs were established, which will be consolidated after the implementation and therefore disclosed on the final report, highlighting the economic, social and environmental benefits/impacts.

The KPIs are suggested as follow:

- GHG emissions (tCO<sub>2</sub>e)
- Number of traffic accidents
- Cost efficiency
- Walkability
- Well-being (community assessments)
- Air quality and noise monitoring using low-cost and easy-to-use sensors
- Number of people/families/households impacted
- Number of community-based adaptation activities implemented
- Micro mobility (Bicycle and pedestrian counts / Vehicle counts /
- Waste disposal - landfills / composting (tonnes)
- Gender audits
- Traffic flow
- Costs reduction - waste disposal
- Number of schools/children - awareness raising

It's intended to set a common baseline for the KPIs, however, this will depend on the availability and quality of the information for each indicator category in the cities where the projects are being implemented.



## Perception Survey

## Vehicles and pedestrian counts

[illegible][illegible]

## Survey

Survey

## Urban Pathways before and after assessment tools

## GHG emissions calculations

In order to illustrate the impact potential of Urban Pathways with regards to climate change mitigation, this report includes the preliminary results of the estimated direct CO2 emissions reductions of the majority of implemented and planned projects - for Scope 1, considering the emission sources located within the cities boundaries. The accountability of reduced and avoided emissions observed the following criteria:

- Unit: tCO<sub>2</sub> / year
- Period: 1 year
- Local criteria: when available, city-level data were used to increase the accuracy, for instance: temperature, precipitation, waste composition, type of landfill (if methane is recovered from solid waste, the value for CH<sub>4</sub> fraction in biogas applied was the IPCC, 2006 default).
- Emission factors: it was considered a variety of local, national or default data to increase consistency. Moreover, when available, regional emission factors were applied.
- It's important to highlight that GHG emissions from waste disposal occur for more than 30 years after their disposal due to the degradation profile of organic matter in landfills. Therefore the projection considers the sum of the emissions up to 2048. Moreover, the emissions from low carbon solutions for the waste collection were not considered, as the pilots are still being designed.
- In the case of mobility-related activities, it is worth noting that only direct GHG emissions for the reduction of vehicle kilometers travelled (VKT) in the intervened area were taken into account. Modal shift potential as well as the rerouting of vehicles around the intervened area have not been considered in these calculations, but will be included in the next UP report.

As long as the projects are implemented, the UP team will collect the primary data needed to calculate the direct measurements, accounting the emissions reductions to contribute to climate change mitigation within the urban ecosystems.

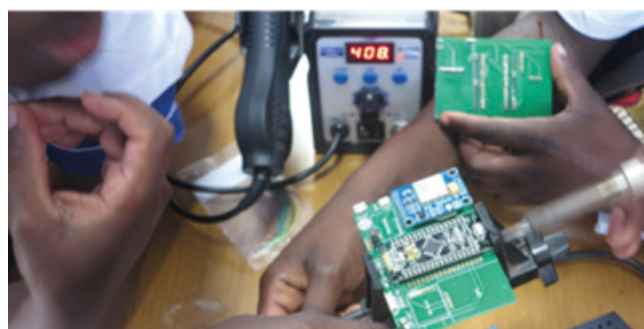
The table below illustrates the results of the preliminary GHG emissions reductions estimations per sector. These numbers are only illustrative and are subject to change when the assessment process finalises.

Activity	Emissions (tCO <sub>2</sub> )
Mobility	12,114
Waste management	7,105
<b>Total</b>	<b>19,219</b>

### Air Quality sensing powered by Citizen Science

Air pollution affects all regions of the world. However, populations in low-income cities are the most impacted. According to the latest air quality database, 97% of cities in low- and middle- income countries with more than 100,000 inhabitants do not meet WHO air quality guidelines. The associated health impacts of this reality are scary. As air quality declines, the risk of stroke, heart disease, lung cancer, and chronic and acute respiratory diseases, including asthma, increases for the people who live in them. However, most cities in developing countries have poor or inexistent air quality monitoring systems. This has been due mostly to the high prices and sophistication of air quality monitoring devices.

Low-cost and easy-to-use measuring devices for air quality determinants and noise have become available. Understanding the limitations of these type of devices in comparison to high-end exemplars regarding data accuracy and coverage, they could become an powerful way of collecting data and involving the local population while doing it.



In this context, a partnership with Open-seneca, a UK-based organisation, whose goal is to transfer knowledge on how to build open-source sensor hardware to raise awareness and initiate a behavioural change among local communities has been established. Open-seneca uses affordable, off-the-shelf particulate matter sensors, geo location, and wireless transmission modules for their devices. The collected data is displayed on dynamic maps on their online platform for identification of pollution hotspots. The sensor design is co-creation-based and tailored to local requirements to achieve a globally compatible and locally appropriate sensor.

The sensors monitor particles with a diameter of less than 2.5 micron (PM 2.5), which partly originate from the transport sector. The small particles impose a severe human health risk and affect the respiratory tract. The pollutant sensors are accompanied by a GPS module in order to correlate the air pollution data to a certain location.

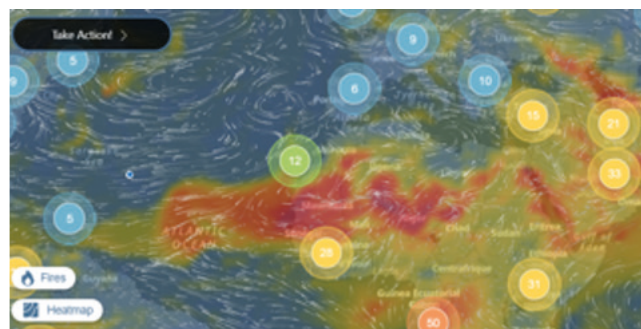
As local partners in UP cities, the UP team has identified Makerspaces and FabLabs. Makerspaces and FabLabs are small-scale workshops that provide widespread access to modern means for invention / digital fabrication. Activities range from technological empowerment to peer-to-peer project-based technical training to local problem-solving to small-scale high-tech business incubation to grass-roots research. FabLab and makerspace based innovations could be a source for solutions to connect to real problems in cities, opening opportunities for businesses, research and education through projects. Thus, makerspaces have been identified as potential local partners in UP cities that could carry out the assembly workshops on-site based on the knowledge transfer received from Open-seneca.

So far, AQ sensors assembly workshops have been carried out in Nairobi and Belo Horizonte. Urban Pathways plans to replicate these activities in at least 4 more UP cities with the aim to: 1) create capacities on site, 2) raise awareness and empower the community on topics related to air pollution and the environment, and 3) contribute to the decision making process related to air pollution reduction.



## Urban Air Action platform – the World’s largest platform for air quality data

The Urban Pathways partnership, through the United Nations Environment Programme (UNEP), together with UN-Habitat and IQAir, a Swiss air quality technology company, launched the world’s largest air quality data platform during the tenth World Urban Forum in Abu Dhabi in February 2020, bringing together real-time air pollution data from over 4,000 contributors, including citizens, communities, governments and the private sector to work towards healthier, more sustainable cities. This partnership – currently reaching over 15 million users and



covering more than 7,000 cities worldwide – aims to sustain and grow the world’s foremost air quality databank. The data, shared on a single, UN-coordinated platform, will empower governments to take action to improve policy, allow citizens to make more informed health choices and demand action from their governments, while giving businesses the ability to make investment decisions that promote a cleaner, greener environment.

The platform addresses the global air quality information gap by bringing together data collected by governments, NGOs, companies and local community groups and individuals.

Link to the platform: <https://www.unenvironment.org/explore-topics/air/what-we-do/monitoring-air-quality/urban-air-action-platform>

## Women’s Safety Audit (WSA)

Women account for 50% of the world’s population. Accordingly, not including women in decision making processes, design processes and understanding their needs, would continue to limit the potential of sustainability transitions. One key example of that is mobility. The use of NMT is definitely biased by gender. If we do not understand that women face other problems, have different needs than men when it comes to riding a bike or walking on the street, women will not be motivated to join the NMT community, limiting significantly the potential of modal shift and its related, social, economic and environmental benefits.

In this context, UP has introduced the Women’s Safety Audit (WSA) as one of the assessments to be conducted in its implementation activities, mainly related to active mobility and public space occupancy. WSA is a participatory methodology designed to: (1) provide detailed information on issues related to women’s safety within a given space; (2) generate recommendations for improvement; and (3) empower women to work with local decision makers for positive change in the community.



Women’s Safety Audit during the Confisco Zone 30 implementation in Belo Horizonte

### This methodology seeks to answer the following questions:

- Why do women feel insecure and/or excluded in the public space?
- In which public spaces do women feel more insecure and/or excluded?
- Which groups of women feel insecure and/or excluded in the public space?
- What types of exclusion / harassment / aggression do women generally face in the city?
- What actions can be taken to improve women’s safety and inclusion in the public space?

This methodology was implemented for the first time in the Confisco Zone 30 project in partnership with the SDSN Youth and the Local Pathway Fellowship and it will be implemented systematically in all UP projects related to active mobility and public spaces.

### 3. Past, present and future pilots in UP cities

After a short introduction to each Urban Pathways partner cities (1), we list the pilot projects that have already been or are being implemented within the project (2), followed by a section on future activities (3). Those include such projects, that are already designed and discussed and to be implemented in 2020; but also such projects, that have been discussed with the local counterparts but are still at an early stage and need further design and adaptation. Where possible, we include the preliminary results of the estimated GHG reductions for the pilots that have been or are being implemented already.

#### 3.1 Belo Horizonte

Since 2017 Urban Pathways has been supporting Belo Horizonte, the third largest metropolitan region in Brazil, in the implementation of active mobility projects. For this, UP has invited Belo Horizonte to participate in several international fora, training and peer-to-peer learning. Moreover, UP has provided technical assistance in the development of project proposals to be submitted to donors (UN-Habitat Public Space Call 2018, TUMI, TAP call 2019, IKI, etc.). As a result, in 2019 Belo Horizonte implemented four “Zones 30”, one of which counted with the support of UP from conceptualization to financing, the Zone 30 Confisco. The successful implementation of Zones 30 in Belo Horizonte has led to a great acceptance from citizens and political support. Thus, UP would like to continue supporting Belo Horizonte in the development of active mobility projects, awareness raising and cross-sectorial integration related to climate change mitigation. For the latter, several discussions and activities related to waste management have already been carried out with the city and will be integrated in the implementation of the EcoZone in the Santa Tereza neighbourhood.

#### Pilot and Demonstration Action

##### The Zone 30 implementation in the Confisco Neighbourhood

During September and October 2019, BHTRANS with the support provided by the Wuppertal Institute, UN-Habitat and WRI Brasil in the context of the Urban Pathways project and its environmentalISE Initiative carried out various activities for the implementation of a Zone 30 in the surroundings of the Anne Frank Municipal School in the Confisco neighbourhood. The Confisco neighbourhood is located in the Pampulha administrative region, a peripheral area of Belo Horizonte. The aim of the project was to increase the road safety around the school and raise awareness among the students and the local community about climate change related topics such as sustainable urban mobility and waste management.

The success of the project relies on 3 key elements, i.e., community participation, inter-institutional cooperation and before and after assessments, which included vehicles and pedestrian counts, surveys, AQ monitoring and . The overall results of the project are a low-cost Zone 30, where the safety around the school area and the social cohesion in the neighbourhood are increased.



Moreover, the positive perception from the public, 78% of the residents would like the intervention to become permanent, and the visibility that this and the previous zone 30 projects have achieved, have led to the institutionalisation of this type of interventions and its city-wide replication in Belo Horizonte. At present, BHTrans is in the process of elaborating a Zone 30 guide that will explain step by step all the elements and stakeholders that need to be considered for a successful implementation. For this purpose, the institution will create a dedicated team that will have the replication of Zones 30 in the city as its main task.

Budget: 8,363 EUR

#### Outcomes

- Number of direct beneficiaries: 1,000 students of the Anne Frank Municipal School
- Pedestrians increase in the area: 23%
- Estimated direct CO2 emissions reduction: 1.2 tCO2/year

### Air Quality sensing powered by Citizen Science

In October 2019 the FabLab Newton Paiva was identified as the best local partner to implement the AQ sensors assembly workshop. FabLAB Newton is a MIT-accredited laboratory with digital (computer-aided) manufacturing equipment for the design and prototyping located at the Newton Paiva University in Belo Horizonte. FabLAB Newton, launched in October 2015, is an academic FabLab and the first one in the city. The FabLab Newton is also part of the Fab City Strategy, a network of FabLabs that connects makers in more than 70 countries and 600 labs. With its inherent zero waste and carbon reduction goals, linked to education, innovation, skills development and the creation of employment opportunities and livelihoods through the relocation of manufacturing, the FAB City approach can contribute to sustainable urban development goals.

After several online meetings and the shipment of 6 assembly kits, in February 2020, open-seneca provided a virtual seminar to FabLab Newton to explain them step by step how to build the AQ measuring devices, so that they could replicate the workshop on site with the cyclist association BHemCiclo. The on-site workshop was planned for March 15th, but given the COVID-19 situation, the workshop was postponed. Moreover, the FCA Group, which has an assembly plant in Belo Horizonte has shown interest in purchasing additional 100 kits for local assembly as part of their community education program. Such a development could expand the city's AQ monitoring network significantly.

Budget: 655 EUR



### **Outlook Planned and/or possible future action**

#### Fleet renewal of diesel by electric buses

Understanding the importance of implementing sustainable mobility solutions in a city with one of the highest motorisation rates in Brazil and where 53% of the GHG emissions come from road transport, in 2010 Belo Horizonte approved an innovative Sustainable Urban Mobility Plan, called PlanMob-BH. The plan, which is permanently monitored and was recently updated, includes comprehensive measures related to TOD, BRT and bike solutions, 2 pedestrianized streets, Zones 30, among others. The plan also includes the replacement of the diesel bus fleet by electric buses by 2030, which will contribute to the achievement of the city's GHG emission reduction goal of 20% by 2030 in comparison to 2007 levels.

In December 2015, BHTrans tested a BYD electric bus on two routes of public transport. During the tests, BHTrans directors and technicians evaluated the safety and comfort aspects for users and drivers. The bus is 100% electric, powered by iron phosphate batteries, and can be charged in only five hours. The electric bus is already being manufactured in Brazil, where it has been tested in public transportation lines in many cities, including São Paulo (SP), Porto Alegre (RS) and Campinas (SP) (BHTrans, 2015).



In the first phase, the goal is to include at least 25 electric buses in the conventional bus service funded by international resources. This project, which was submitted with the support of UP, was one of the 20 finalist cities (from the 140 that submitted an application) of the Global Climate City Challenge, a joint initiative of the Global Covenant of Mayors (GCoM) and the European Investment Bank (EIB). Belo Horizonte was not selected for the next phase. Thus, it is actively looking for further financing sources to fund its 25 first electric buses.

Estimated budget: 3.6 million EUR

Estimated GHG emissions reduction: 1,888 tCO<sub>2</sub>/year

#### EcoZone Santa Tereza - Low-emissions and Zero waste in one of the most traditional neighbourhoods of Belo Horizonte

Using the example of the Confisco Zone 30 implementation, this project seeks to work with the community in Santa Tereza to promote local actions capable of generating changes in the mobility choices and public space occupancy, as well as including sustainable waste management practices in a more integrated and structured way. The development of a pilot EcoZone that merges the concepts of Low-emission Zone (LEZ) and Zero Waste could become a precedent for Belo Horizonte that could easily be replicated in other areas of the city and thus contribute significantly to GHG emissions reductions from the transport and waste sectors.

Santa Tereza, originally an informal settlement, is an important neighbourhood in the history of the city, being part of its construction in the 1890s. This led to an unequal integration of its population to the city, lacking conditions of mobility and accessibility. Thus, Santa Tereza has significant limitations related to non-motorised transport, with an extended use of private vehicles. On the other hand, it has great potential for reversing this scenario, since it is within a walkable distance to public transport options and services and has some use of bicycles. Moreover, Santa Tereza is a territory where residents, movements and associations have good neighborhood relations and a history of community engagement in defense of the neighborhood, its culture, history and ambience.

The neighborhood, located in the east of the city, and very close to the center, has about 6,330 households and 15,610 inhabitants. The estimate of total household waste generation in the neighborhood is 11,613.8 kg per day and 348,415.2 kg per month<sup>1</sup>. Until 2017 all this waste was collected in undifferentiated collection and sent to the landfill in Sabará, a neighboring municipality of Belo Horizonte. As of 2017, with the start of the actions of the Lixo Zero Santa Tereza Network, this reality has changed and continues to change ever since. Currently, the NGO is responsible for recycling more than 120 tonnes of dry recyclable waste and composting more than 20 tonnes of organic waste per year, making use of approximately 2% of the waste generated in the neighborhood, with no public investments.

In this context, the EcoZone Santa Tereza Project will carry out actions to improve the connectivity, walkability and road safety in the area through the implementation of Zones 30 in two schools surroundings and other important places of the neighbourhood, such as the main square. UP will work together with BHTrans, the Municipal Program Escola Segura, WRI Brasil and the local NGO NossaBH in the creation of Zones 30 in the selected areas and conduct the corresponding awareness raising activities with the students of the selected schools and the local community. Moreover, the project will cooperate with Lixo Zero and the Municipal Program EcoEscola to increase the amount of families and businesses in the neighborhood that separate at source. For four years, the EcoEscola BH Program has been developing actions to encourage and strengthen environmental education in municipal schools in Belo Horizonte. The program includes school environmental education (formal) and non-school environmental education (non-formal) on a permanent, continuous basis, articulated with the community, integrating the different sectors of the school, the government and society through educational processes. These are projects such as urban gardens, composting, tree planting, conscious use of water and gardening projects in schools. In 2019, there were more than 321 schools engaged.

Estimated budget: € 30,000

Estimated direct GHG emissions reduction: 42 tCO<sub>2</sub>/year

<sup>1</sup> According to the estimate of per capita generation in Belo Horizonte, which is 0.744 kg / inhab / day (PMGIRS -BH, 2017).

### Agroecology and Well Being: Waste Management and Urban Agriculture in Belo Horizonte/Brazil

The Agroecology and Well-being project aims to reduce GHG emissions and to contribute to the social cohesion, safety and liveability in neighbourhoods, through complementary solutions for decentralized waste management, developing social technologies that will provide better living conditions, as well as collaborative and innovative actions. This project is designed to integrate practically and effectively several local initiatives with a focus on sustainable development. Its implementation will enable integration of these groups and organizations with the communities involved for the creation of Eco-zones, to tackle two of the main problems in the urban context and significantly contribute to not only reducing GHG-emissions, noise and air pollution. With this, actions of the inclusive and circular local economy will be put into practice, expanding alternatives for more sustainable consumption in Belo Horizonte.

The main actions involved in the project will be coordinated by REDE (Rede de Intercâmbio de Tecnologias Alternativas), a local NGO working in the strengthening of agroecological initiatives in Belo Horizonte since 1986 and will entail: (i) improvement of four Composting Centers through physical improvements in spaces and restructuring of the collection dynamics, enabling effective waste management in 20 neighbourhoods of Belo Horizonte. It is expected a reduction of GHG emissions of roughly 30%, through the composting of organic waste, which will no longer be sent to the landfills/dumps; (ii) decentralized management of solid waste and implementation of low carbon solutions for its collection; (iii) the implementation of Agroforestry Systems (AFSs) and urban gardens through training in poor communities in Belo Horizonte and nearby municipalities, together with urban farmers and partner organizations, minimizing food waste in distribution, management, storage and in food processing; (iv) training and integration of local communities, where materials will be produced for the dissemination and diffusion of experiences of positive and participatory transformation of public spaces, as well as educational and training activities customized to the target audience and the implementation of agroforestry through workshops and communities-based planning and actions.

Residents of the target neighbourhoods of Belo Horizonte, which together have a population of more than 320 thousand inhabitants, will be beneficiaries of the project and will actively participate in the project by: taking or delivering their recyclable organic and dry residues to the groups; consuming agroecological foods produced by urban farming groups and family members; and participating in training and communication actions. It is estimated that 300 people will participate in training activities, including urban women farmers, waste pickers, students and teachers, entrepreneurs, traders, representatives of the government and civil society.

The concept was submitted to the IKI small grant call in the beginning of 2020.

Estimated budget: 60,000 EUR

Estimated direct GHG emissions reduction for waste management: 6,928 tCO<sub>2</sub>

## Building Green Infrastructure: Restoration of Landfills in Public Parks

The scope of this project is the rehabilitation and restoration of an area that was used to dispose of solid urban waste, becoming a large ecological park, promoting the inclusion of communities directly affected by landfill operations in the revitalization project, contemplating what was advocated in the environmental perception study.

The project aims to: (i) contribute to improving the quality of life and microclimate and (ii) effect cultural rescue; for the surrounding population, as well as for native fauna and flora.

The transformation of the area into a public park, which will have spaces for equipment, leisure areas, green areas and environmental education areas, to be appropriated by the community - safeguarding the rules and restrictions for their use. Its development is in line with the policies and plans that guide the solid waste sector, which include: the National and State Solid Waste Policy (Federal Law No. 12.305 / 2010) and its regulation, the Comprehensive Urban Plan of the Municipality of Belo Horizonte (Law No. 7,165 / 1996), and the Municipal Plan for Integrated Solid Waste Management of Belo Horizonte - PMGIRS-BH.

The project is divided into 9 main programs grouped by theme: Maintenance and Structural Works; Risk Monitoring and Management; Urban infrastructure; Mobility and Active Transport; Equipment, Recreation Areas and Public Spaces; Green Areas and Environmental Control; Modernization of Urban Solid Waste Treatment Solutions; Permanent Management and Monitoring; and Environmental Education, Communication and Social Mobilization.

The protection and effective management of natural ecosystems within and beyond city boundaries is critical to ensuring that urban environments are buffered from the effects of climate change and that vital services such as clean air, clean water and opportunities for outdoor recreation that are essential to human health and well being can continue to be provided to an increasingly urban population. The project aims to boost the dialogue, policy and action plans and the integration of biodiversity and natural ecosystems in urban and regional planning and development, addressing this at the level of neighborhoods, cities and the wider landscape.

The project will benefit about 100,000 inhabitants, in a region where the situation of social vulnerability is worse than the municipality average - it is a population mostly in condition of high social vulnerability and low per capita income. This scenario is complemented by the restricted or non-existent presence of public leisure and entertainment facilities in most neighborhoods.

The proposed project concept was submitted in January 2020 as a part of ICLEI - Transformative Actions Program (TAP).

Estimated budget: 2.8 million EUR

Estimated direct GHG emissions reduction for waste management<sup>3</sup>: 1,066,058 tCO<sub>2</sub>

### 3.2 Hanoi

In the city of Hanoi, Urban Pathways has been engaged so far in the promotion of sustainable mobility. Public transport in Hanoi is only estimated to account for 10% of the trips as passenger transport demand is met primarily by private motorized two-wheelers. Therefore, the project concept on E-mobility project (shared e-2 wheelers) was developed together with a local partner – University of Transport Technology. The project tried to find the synergies with on-going IKI project on e-2 wheelers named 'Integrating electric 2&3 Wheelers into Existing Urban Transport modes in Developing and Transitional Countries', led by UNEP. The feasibility study, technical assessment, standards and policy support for e-2 wheelers from the on-going IKI project will be considered in the shared e-2 wheeler demonstration project. Moreover, Urban Pathways also plans to explore to support Hanoi on waste reduction activities and promote active mobility.

#### Pilot and Demonstration Action

##### E-mobility for last-mile connectivity

The demonstration project in Hanoi focuses on boosting the ridership and effectiveness of the currently running BRT and the forthcoming metro rail with shared E-2 wheelers as last-mile connectivity. The shared E-scooter/E-mopeds system will be equipped with state-of-the-art docking-cum-charging stations and contactless payment that provides a hassle-free experience of e-mobility and clubbing it with longer trips on public transport. The project will be a win-win for both public transport and e-mobility. As the city of Hanoi intends to ban the use of motorcycles in the inner city by 2030 responding to vehicle emission, this project will support the plan to phase out conventional ICE 2-wheelers. The demonstration also supports promotional activities to raise awareness on EVs, strengthen local capacity on EV manufacture, develop appropriate business models and enhance vehicle integration. The demonstration project will have a high potential to not only make e-mobility attractive but also reduce the GHG emissions from transport and increase the share of public transport use.

The proposed demonstration project concept was submitted on 25 April 2019 as a part of EC H2020 proposal for funding. It is being implemented by SOLUTIONSplus project (project duration 01/2020 – 12/2023) together with local partner – University of Transport Technology (UTT) in Hanoi.

Budget: 500,000 EUR

Estimated direct GHG emissions reduction: 48 tCO<sub>2</sub>/year

#### Outlook: Planned and/or Possible Future Action

##### EcoZone at Trieu Khuc, Hanoi

Trieu Khuc street in Hanoi is located in the growing district of Thanh Xuan district, Hanoi city. The street is busy from early morning till night time. The place is surrounded by 4 big universities, condominiums and new towns. The street has mixed transport including bikes, pedestrians, motorbikes, cars. The transport participants are mostly the young including students and the commuters renting a house nearby. While there are a great number of students walking to the University (UTT) after hopping off the buses on the main street. On household level waste source separation and/composting are not practiced well and are all mixed together.

The concept of Eco-zone development is necessary for Trieu Khuc street. This pilot project developed under the Urban Pathways project will promote and facilitate the participants to feel comfortable, green and safe during their trips everyday. This will include the pavement marking for pedestrians and bikes. The pilot will also raise awareness on the zero waste concept. For example: Training programmes for green cadets (selected groups) on supporting the community zero waste. Innovative concepts on waste to wealth, green job creation would also be explored with stakeholders engagement. This will also support green recovery locally after the pandemic.

This will integrate the Eco-school concept, following the example of Belo Horizonte's EcoEscola municipal program, that aims to raise awareness among school kids to protect the environment, including energy saving and waste collection, separation and reduction. Besides some activities to demonstrate the importance of energy conservation and waste reduction in the kids friendly way, the program will also integrate the environment aspects into the school lectures/curriculum. Urban Pathways has been in contact with the city identifying the schools and local engagement.

Budget: 25,000 EUR

Estimated direct GHG emissions reduction: 12 tCO<sub>2</sub>/year



### 3.3 Kochi

Urban Pathways has been supporting Kochi since 2017 in the implementation of sustainable mobility projects (mainly electric mobility). To strengthen the city's capacity, Urban Pathways has invited Kochi to participate in several international fora, training and peer-to-peer learning. Moreover, UP has sought the collaboration with other similar active projects in the city, to find the synergies. For example: Collaboration with GIZ SMART-SUT project on Electric 3-wheelers and TUMI project named reimagining Fort Kochi with WRI India on promoting active mobility. The deployment of e-three wheelers in the city is at the final stage, some foreseen delay due to COVID-19 pandemic. On promoting active mobility, Urban Pathways has collaborated with WRI India to support Tactical Urbanism activity in the city by conducting webinar series in Feb 2020 and provided an air quality monitoring device 'Smart Citizen Kit' to measure the impact of such activities and raise awareness. Moreover, Urban Pathways plans to continue supporting Kochi in the development of sustainable mobility projects, awareness raising and cross-sectorial integration related to climate change mitigation. As waste management is also an important sector in Kochi, several discussions and activities related to this sector have been planned on ground. Kochi has also participated in several webinars on waste management - showcased the innovative activities in Kochi and also learnt from other cities.

#### Pilot and Demonstration Action

##### Electric 3-Wheelers (E-autorickshaw)

Urban Pathways project is engaged with Kochi Municipal Corporation (KMC) and Centre for Heritage and Environment Development (C-HED) in introducing 100 electric autorickshaws in the city to enhance last mile connectivity, together with GIZ funded SMART-SUT project. The key agency for the project implementation is Kochi Municipal Corporation (KMC) in close collaboration with Cochin Smart Mission Limited (CSML) and Kochi Metro Rail Limited (KMRL). The project aims to contribute on zero street-level emissions of air pollutants (cleaner air), CO2 emission savings of 30-50% compared to diesel 3-wheelers on a life-cycle basis and also support green economy (generate jobs and augment income to auto-drivers by switching from diesel to e-autorickshaw).

The project implementation planning and the selection of appropriate e-rickshaw and parking and charging area have been finalised. The engagement of the relevant stakeholders (public organisations including municipality, local industry, auto society and drivers) supported the development of an appropriate business model. This pilot project has a huge potential to scale up in various locations in the city. The phasewise scale-up plan is also identified in the project and the city is proceeding accordingly.

As e-autorickshaws are quite new in the city, the project focuses on training auto drivers too. Due to the COVID-19 lockdown in the city, there has been a bit delay in bringing e-auto rickshaws on the ground and training activities.

Budget: 80,000 EUR (Urban Pathways contribution 10,000 EUR and remaining from GIZ SMART SUT and city)  
Estimated direct GHG emissions reduction: 300 tCO2/year

#### Outlook: Planned and/or Possible Future Action

##### EcoZone at Kadavanthra, Kochi

Kadavanthra is one of the fastest growing areas of Kochi. It is a commercial centre and is close to the city's biggest railway station 'Ernakulam Junction'. The traffic demand is high in the area and the last mile connectivity is weak. The residential areas show that the waste footprint has been increasing. The municipal waste management and door-to-door waste collection (e.g. CREDAI Clean City movement) have been in place. Very few households have a complete organic waste management system.

In cooperation with Kochi Municipal Corporation, Urban Pathways has developed a pilot project concept on EcoZone at Kadavanthra area in Kochi. This includes promoting active mobility (increase bike lanes and prioritise public space for pedestrians). Tactical Urbanism events will be carried out. The pilot will also raise awareness on the zero waste concept. For example: Training programmes for green cadets (selected groups) on supporting the community zero waste. Innovative concepts on waste to wealth, green job creation would also be explored with stakeholders engagement. This will also support green recovery locally after the pandemic.

Budget: 10,000 EUR  
Estimated GHG emissions reduction: 12 tCO2/year

### 3.4 Nairobi

Urban Pathways has been supporting Nairobi since 2017 in the implementation of sustainable mobility & placemaking projects. Moreover the Urban Pathways team is working on waste related activities (SDG Data Assessment, identifying intervention options) with the city as well as on energy efficient housing solutions.

#### Pilot and Demonstration Action

##### Placemaking, pedestrianization and impact on public health – Luthuli Avenue Transformation

Nairobi is facing complex and interconnected challenges attributed to uncontrolled urbanization and its associated impacts: vibrant street life is often choked by traffic congestion; economic opportunities are rife, but local resources and capacities are not always sufficient; and informal and private sector activities have outpaced planned development. This is exacerbated by a high urbanization rate of 4.1 per cent per annum. The current population of the city is estimated to be 4.07 million and is projected to rise to 7.14 million by 2030 (UN DESA, 2016).

In Nairobi, 40% of residents make their daily trips on foot, 40% by matatus (a type of public service vehicles) and 14% by private vehicles (JICA, 2014). In other words, the majority of people living in Nairobi rely on walking, however, roads are often dangerous by design. They lack adequate pedestrian facilities such as safe crossing and allow for high speed of vehicles. Despite have an NMT Policy since 2016, large proportions of the infrastructure investments are allocated to car focused infrastructure that is hostile for pedestrians and cyclists.

It is against this background that the city embarked on a journey towards transforming Luthuli Avenue, one of the most vibrant commercial streets in downtown Nairobi. The street is part of a larger pedestrian desire-line that connects downtown Nairobi with its Central Business District. The street is home to wholesale and retail shops for various merchandise, particularly electronics. Over the last few years, the street has deteriorated into a congested area, where different transport users are fighting for space and high levels of noise and air pollution are the reality.

Under Urban Pathways, UN-Habitat supported Nairobi in the transformation of Luthuli Avenue by providing technical advice on placemaking and re-design, as well as support for the urban furniture. In 2018 it started with a placemaking week, that was repeated in 2019 and extended to a re-design of existing infrastructure.



The street was selected by the city county team, considering Luthuli avenue's potential role in accelerating the regeneration of downtown as envisaged in the Nairobi Integrated Urban Development Masterplan (NIUPLAN). The Luthuli Avenue Transformation illustrates an exemplary project that moved from participatory planning and design to actual implementation on the ground. Various partners supported Nairobi County Government and were involved in different phases of the project incl. the Implementing Creative Methodological Innovations for Inclusive Sustainable Transport Planning (i-CMiiST) project, Stockholm Environment Institute, Naipolitans, University of York, Placemakers, UN-Habitat, the Safer Nairobi Initiative, the Architectural Association of Kenya, the Technical University of Kenya's Centre for Creative and Cultural Industries and the Critical Mass Nairobi among others.



The final design distributes space more equitably, creating more space for pedestrians, introducing street trees, a bike lane and bicycle parking facilities - and seating among other street furniture. Overall, the design has transformed the busy electronic street into a successful retail corridor that is welcoming and safe for all.

Following the transformation of Luthuli Avenue, the Kenyan Government was inspired to roll out further NMT infrastructure in Nairobi. Through the Nairobi Metropolitan Services (NMS) project, Nairobi is currently implementing NMT infrastructure in the CBD, and has plans to roll out to walking and cycling infrastructure in other areas as well.



In addition to the physical transformation, UN Environment, through the Urban Pathways project, also supported air quality monitoring in a before-and-after analysis at Luthuli Avenue. In collaboration with Nairobi City County Government, three air pollution sensors were installed along Luthuli Avenue that collected data on PM2.5 and PM10.

Based on preliminary observations, the recommended WHO values, both for PM2.5 and PM10 are regularly exceeded with high peaks of around 70  $\mu\text{g}/\text{m}^3$ . Following the pilot project at Luthuli Avenue, additional sensors were installed around the wider Nairobi. Through the engagement with Urban Pathways, the county took leadership in setting up this wider network and also in engaging with industry and schools. Following the air quality monitoring control and inspection efforts, the National Environment Management Authority closed down an Oil Refinery Plan which caused heavy ambient air pollution that was causing harm to public health.

Similar efforts have been conducted in Addis Ababa, Ethiopia, where the Urban Pathways project (UN Environment) set up 7 air pollution monitoring sensors to collect and analyze data. This data resulted in the city banning medium sized trucks to lower the peak of pollution levels in rush hour.

Budget: 135,800 EUR

- Urban Pathways (through UN-Habitat) contribution: 8,800 EUR (co-financing by other development partners)
- UNEP (Nairobi and Addis Ababa): 35,000 EUR (air pollution sensors for Nairobi and Addis Ababa)
- Co-Financing for physical infrastructure by Nairobi City County Government for Luthuli Avenue: 92,000 EUR

Estimated direct GHG emissions reduction: 1,400 tCO<sub>2</sub>/year



### Cycling promotion and advocacy

Complementary to the technical advice on placemaking and physical implementation of pedestrian zone (Luthuli Avenue), the Urban Pathways project supported various cycling and advocacy events including high level participation.

Greater awareness and acceptance of cycling as a sustainable mode of transport by government officials in Kenya is necessary to integrate cycling as an essential part of transport plans and investment decisions. Many public officials have not cycled for many years and have lost the feeling and enthusiasm for cycling, which they might have experienced during their childhood days. There is limited understanding of cycling among the government officials, particularly with a view to the cyclists' vulnerability on the roads and at intersections.

Therefore, a high-level bicycle ride with public officials in Kenya was organized to revive the interest for cycling, direct policies and to create an understanding of the opportunities and challenges of cycling in Nairobi. Nairobi Governor, Mike Sonko, participated in addition to other high level government officials.

News article: <https://www.nation.co.ke/dailynation/counties/nairobi/bicycles-walking-ideal-for-kenyan-cities-un-habitat-boss-228522>



In addition, in March 2019, UN-Habitat in collaboration with partners launched Nairobi's first Bike Train, where a group of people commute using bicycles to cycle to their offices. The event brought together diplomats, government officials, the cyclist community, people who may not have cycled for a while and media to promote the concept of "Bike Trains" among the Nairobi working class, as a way of safely commuting together. Since then, there has been monthly bike trains being organised by the United Nations – and the concept is currently being rolled out to different neighborhoods in Nairobi, in collaboration with the Critical Mass Bicycle Movement.

Video on the event: <https://www.youtube.com/watch?v=wX3u07oxKlk&t=19s>

Budget: EUR 1,000

### Inclusive Mobility

The Urban Pathways team, together with partners, supported the production of a film on accessible and low carbon public transport in Dar es Salaam and Nairobi. This film presents the contrast between the capitals of Tanzania and Kenya, in respect to implementation of an inclusive, low carbon transport system. Whereas the Bus Rapid Transit system in Dar es Salaam caters for specific needs of vulnerable groups, public transport in Nairobi exhibits significant challenges to persons with limited mobility. Run by commercial entities with limited public infrastructure, the Kenyan 'matatu' (mini-bus) system does not yet sufficiently account for people confronted with mobility difficulties, resulting frequently in long waiting times, physical discomfort and excessive pricing for such commuters. This is aggravated by the lack of strong policy frameworks or incentives for the creation of inclusive public transport infrastructure.

UN-Habitat in collaboration with the National Gender and Equality Commission of Kenya therefore implemented a pilot project in Kenya to promote the development of a human rights-based transport system which is inclusive of and accessible to all, including persons with mobility challenges. Bringing together the Ministry for Transport, Infrastructure, Housing and Urban Development (MoTIHUD), the matatu sector organizations, parliamentary committee responsible for transport, public works and housing, the county governments and their transport-coordinating organs, human rights organizations, investors, car manufacturers, regulatory bodies and, importantly, representatives from vulnerable population groups, there is great potential for the establishment of a comprehensive, inclusive urban transport system. This will enhance the quality of life, dignity, independence and productivity of those members of society previously experiencing mobility related discrimination. The project has sensitized the governmental actors in Nairobi, who have committed to adjust some of the transport and road features and services to facilitate persons with limited mobility to enjoy movement

in the city. To showcase possible adjustments to the exiting transport system, UN-Habitat has designed a pilot matatu that is accessible to a wheelchair user. The matatu is equipped with a ramp as well as 4 foldable seats that make space for a passenger in a wheelchair on board.

Estimated budget: 2,000 EUR



### Air Quality Sensing powered by Citizen Science

Pollution in the Kenyan capital Nairobi is on the rise - and there is no escape from it. With Nairobi's predicted rise in population - and a constant inflow of cars due to the high motorization rate - an urban health crisis is anticipated if no action to lower pollution levels is taken. In an effort to measure air pollution, the Urban Pathways project spearheaded by UN-Habitat has joined hands with the University of Nairobi's Maker Space Lab in a project called "Open Seneca Nairobi - Air Quality Monitoring powered by citizen science".

In a collaboration between the University of Nairobi Science and Technology Park - Maker Space Lab, Open Seneca, the University of Cambridge and UN-Habitat, a pilot project has started in Nairobi to build low cost mobile sensors in order to map out air pollution in Kenya's capital city.

During the workshop, participants did not only learn how to build sensors with open-source hardware and software, but also how to interpret the air quality data that will be collected over the next 30 days. A total of 10 devices were mounted on different transport modes: 3 on Uber taxis, 2 on matatus (Nairobi's minibuses), 2 on BodaBodas (motorcycle taxis) and 3 on bicycles. The drivers/ riders were flagged off in the afternoon - and the mapping of the air quality levels around Nairobi at different times of the day has started.

Building on the initial efforts, another round of devices was mounted with support from Urban Pathways, this time on BodaBodas only to extend the data collection outreach and period. Data collection is currently ongoing and the results are analyzed by the students' team at Cambridge University.

Budget: UN-Habitat contribution EUR 3,000







## COVID-19 related interventions (II): Using creative methods to spread key messages on COVID-19 and low carbon services

All regions of the world are now facing the COVID-19 pandemic. People in cities, crowded public spaces and streets, or in public transport are particularly at risk of being infected due to the reduced social distance among individuals.

The COVID-19 crisis is showing us the vulnerabilities of cities, mobility systems and urban form. The pandemic is illustrating that physical connectivity can be both a drawback and an asset. On the one hand, overcrowded public transport, dense housing, or crowded streets, market places are accelerating the transmission of COVID-19. This is particularly severe in informal settlements, where densities are high and open spaces limited. On the other hand, in other contexts, connected places with appropriate levels of density and mixed uses, ease people's livelihood i.e. by having a shop nearby. Cities started to reflect on the future design of our cities, mobility systems, streets and public spaces, on urban service delivery, density and land uses. The future planning of our cities will definitely have to take public health considerations more into account. The design of our cities and mobility systems will continue to influence how, and how well, they will overcome the pandemic's effects and how to prepare for a better and more resilient future.

The pandemic is hitting the world's most vulnerable people the hardest – particularly the ones living in informal settlements. More than 60% of people in Nairobi reside in such areas, which are densely populated, with overcrowded public transport systems, little or no waste management, an absence of basic services and poor housing. In Kenya, the economic consequences for those in informal settlements will be long-lasting. As daily activities are suspended and movement is increasingly restricted, day labourers and those in informal employment are losing their income.

UN-Habitat's engagement with local authorities and public transport operators has revealed that the level of awareness of the pandemic's risks and impacts, as well as on required behaviour changes, is low, particularly in informal settlements, where access to information and research (through internet, TV, radio) is limited. Residents often cannot access relevant COVID-19 updates as many have no television and radio sets for information purpose and on appropriate behaviour.

Communities need to be supported in accessing full information about the impacts of COVID-19 – also the ones that are less digitally connected. Creative methods such as graffiti, painting and photography can be used to raise awareness of low carbon basic services. Under the Urban Pathways project, in June 2020, UN-Habitat started working with local youth and artists on the development of key messages that help to educate the public – and at the same time empower local communities by providing youth / artists with an opportunity in a time where many might have lost their jobs due to COVID-19. The project is enhancing community awareness, mitigates health risks and adverse socio-economic impacts of the pandemic, while at the same time informs longer-term low carbon strategies in Nairobi. In collaboration with the Matatu Welfare Association, the National Transport and Safety Authority (NTSA), and the Kenya Urban Roads Authority (KURA), the matatus were launched in a small event and send off to the roads to serve their customers.

News coverage: <https://www.youtube.com/watch?v=IH13KFVYT0k>



In addition to the minibuses, murals were painted on walls in informal settlements of Kibera and Mathare in collaboration with local artists to reach slum dwellers that otherwise might not have regular access to any form of digital media.

Budget: 5,750 EUR





## COVID-19 (II): Supporting Start ups – Urban Tech Innovations as emergency response for COVID-19

The Africa Urban Tech Summit digital edition took place from 26-29 May 2020 with more than 2000 viewers online. It was co-organised between Pangea Accelerator and UN-Habitat through the Urban Pathways project and other partners. The summit brought together Tech Entrepreneurs, Corporates, Investors, NGO's, Government Agencies and other organizations working towards livable, inclusive and environmentally sustainable cities across Africa to have vibrant and engaging conversations including cutting edge technologies in Urban Tech in the sectors of mobility, energy, waste management and housing. The digital summit aired on Youtube Live via the Pangea Accelerator platform with follow up Facebook Live sessions happening on the UN-Habitat Facebook page on the topics of "Urban Mobility" and "Emergency Response for Covid-19".

UN-Habitat's Executive Director provided a keynote speech on smart cities, which was followed by high level discussions with influential speakers looking at: Emergency Response During Covid-19; Responsive Technology and Data for cities in Africa; Innovation and Startup resources for urbanization in Africa; Supporting Young Innovators in Housing during Covid-19. Complementary to the summit, an innovation challenge took place awarding young innovators for their ideas in urban tech. Selected solutions were Doctors Live and KLINBERA Waste Management Service. Doctors Live is an app that enables patients to have video and phone visits with doctors, rather than visiting the hospitals. KLINBERA seeks to reduce the poor waste disposal in Kibera by providing the households with an efficient and reliable waste collection service through their Klinbera containers.

Link to the videos: [https://www.youtube.com/channel/Uck6v-VFJhy1Grv\\_hl5sjpSg](https://www.youtube.com/channel/Uck6v-VFJhy1Grv_hl5sjpSg)

Budget: 6,200 EUR



## Outlook: Planned and/or Possible Future Action

### Mainstreaming green housing in an incremental and self-build context

With support from Urban Pathways, UN-Habitat has unveiled a house prototype for affordable green building aimed at addressing housing shortage in densely populated urban areas – showcased during the UN-Habitat Assembly in May 2019. Dubbed Tiny House, the model is expected to address the problem of affordable housing in Kenya and tackle climate change.

Related Video: <https://www.youtube.com/watch?v=gXzqqCzmNU>



The proposed project builds up on the pilot concept of the UN-Habitat's Tiny House and explores its adjustability in the context of incremental construction in low-income neighbourhoods in Kenya (with living-lab possible within a slum upgrading intervention in Nairobi). The Tiny House includes various design solutions minimising direct solar radiation, ensuring natural ventilation, use of sustainable local materials, promoting rainwater harvesting, vertical greenery and similar. The whole costs of a housing unit incorporating these elements sums up to \$18,500. While in the long run these costs should be covered thanks to savings on energy usage, not many low-income households are able to make this kind of up-front investment. In order to mainstream the approach it is necessary to develop, document and demonstrate green building solutions, which can be applied in conditions of extreme precariousness, over an extended period of time characteristic for incremental and self-build construction. The project involves testing of possible design components proposed within Tiny Houses in on-the ground realities of an incremental housing construction. This demonstration activity should go hand in hand with building capacity of local multipliers such as small-scale builders, local administration or NGOs working directly with community groups. Finally, the financially viable model specifying anticipated returns from the investment needs to be developed as a clear guideline and incentive for replication of the demonstrated solutions in the post-project phase.

Estimated budget: 120,000 EUR

### Waste Management: Inter-counties consultation for improved municipal solid waste management in Nairobi Metropolitan Area

With a population of 4 million, Nairobi's municipal solid waste generation is estimated around 2,500 - 3,000 t/day and expected to increase to 4,000 t/day by 2030 with rapid urbanization and population growth to 6 million. Given the peculiarity of Nairobi city, addressing solid waste management issues in a holistic approach, also from a geographical perspective, it is an essential step. Building on the support from Urban Pathways on the solid waste data collection exercise, Nairobi City County is boarding with Kajiado, Kiambu and Machakos County. While the law states that waste generated in one county shall be disposed of in the same county, in reality, because of logistic and costs issues, it does not always occur. Therefore, coordination among neighbouring counties (Nairobi, Kajiado, Kiambu and Machakos) is a necessary step to set up sustainable and legal practices for solid waste management.

Given the fact that waste is already flowing from one county to another, although in an uncontrolled and unregulated manner, and a new waste treatment plant will be built in Kajiado County (recovering resources and energy from waste), this might be the right time for Nairobi City, Machakos, Kiambu and Kajiado Counties to tackle municipal solid waste management with a metropolitan approach. An agreement to share waste management facilities including landfill sites, transfer stations, resource and energy recovery facilities, as well as to regulate waste disposal among these counties is urgently needed. The picture below shows metropolitan approach taken in the transport sector, which includes cities of NCC neighbouring counties, such as Kiambu, Ruiru, Thika, Mavoko and Ngong.

To take a metropolitan approach for municipal solid waste management, careful stakeholders' engagement and awareness raising for citizens are needed. UN-Habitat has been working with NCC, Kiambu and Kajiado County on waste disposal improvements and is willing to facilitate an inter-counties dialogue to improve municipal solid waste management in the Nairobi Metropolitan Area. This will be achieved through the establishment of a Municipal Solid Waste Management Metropolitan Plan. The goal of the project is, therefore, to establish a Municipal Solid Waste Management Metropolitan Plan (MSWMP) among Nairobi City, Kajiado, Kiambu and Machakos County Governments to improve municipal solid waste management in the Nairobi Metropolitan Area.

The proposal was submitted in June 2019 to a funding institution, but not yet accepted.

Estimated budget: 276,850 EUR

### 3.5 Kathmandu

Urban Pathways has supported Kathmandu since 2018, the capital city of Nepal, in the Mobility and waste sectors. Besides the support on project concept development (e.g. on E-mobility explained below), Urban Pathways organised capacity building events in which various stakeholders participated in international training events, online webinars and peer-to-peer learning. To raise awareness on active mobility and air quality improvement, the city was provided with an air quality measuring device 'Smart Citizen Kit', to measure the effectiveness of the events, such as car-free days and facilitate dialogues between city authority and locals. The city Mayor was invited to an exchange and peer-to-peer learning event in the 'Intergovernmental Twelfth Regional Environmentally Sustainable Transport (EST) Forum in Asia' in Hanoi, Vietnam. Further cooperation possibilities on Urban Pathways' focus sectors are being explored.

#### Pilot and Demonstration Action

##### Scale-up E-mobility

The vehicle emission is a major cause of the air pollution in Kathmandu. The promotion of electric public transport is one of the best ways to address this problem. Kathmandu Valley currently has around 700 Electric three-wheelers (named Safa Tempos with 10 seater) that were introduced over 20 years ago. While the Safa Tempo are providing a valuable feeder service, they need improvements both in terms of their technical performance and their looks and comfort. The improved system would have a higher upfront cost, which many Safa tempo owners were hesitant to carry out. The lack of enough local capacity (e.g. maintenance and repair) is also hindering scaling up e-mobility in the city.

Urban Pathways has supported Public transport operators to develop a project concept to improve/redesign Safa Tempo with appropriate business models together with various stakeholders. A contact with a local bank was done and a provision of soft loan was planned within the project which was given to Safa Tempo owners to cover part of the capital costs of newly designed vehicles. The initial loan would be provided to 15 Safa Tempos for technical improvement and then the revolving fund was planned till all Safa Tempos are converted. Developing standards for EVs and charging infrastructure and building local capacity of EV operation and maintenance was also planned.

The project concept was submitted in December 2018 to the 2019 TUMI Global Urban Mobility Challenge for the award of financial support/grant by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. However, it could not pass through. Therefore, the concept was resubmitted for another grant.

Budget: 144,000 EUR from TUMI (+ city budget 175,000 EUR)

##### E-mobility in public transportation

In Kathmandu, a demonstration action will create an ecosystem for electric mobility in the city by enhancing EVs in public transport, as well as suitable charging solutions and related services. To introduce E-buses and slowly replace diesel buses in the public transport sector, a pilot research project on conversion of diesel bus to e-bus will take place by local manufacturers/start-ups. Several existing E-3-wheelers (named Safa Tempo) will be remodelled or redesigned using Valeo Powertrain and Li-ion batteries (instead of lead-acid batteries) and refurbishing the chassis, assembling the vehicle parts locally. This will increase the quality, efficiency and comfort compared to existing one. This will provide better services for E-3-wheelers as public transportation in the city. E-scooters/e-bike sharing systems will also be explored, that reduce the dependence on owning private vehicles. A suitable business model for the demo activities will be developed within the project. As charging infrastructure is poor or non-existent in public, suitable options for charging EVs and batteries will be suggested. The demonstration also supports promotional activities to raise awareness on EVs, enhance vehicle integration with the introduction of digital application for smart ticketing and payment and fleet management. The proposed demonstration project concept was submitted on 25 April 2019 as a part of EC H2020 proposal for funding. It will be implemented by SOLUTIONSplus project (project duration 01/2020 – 12/2023) together with local public transport operator 'Sajha Yatayat'.

Budget: 1,500,000 EUR

Estimated direct GHG emissions reduction: 300 tCO<sub>2</sub>/year

### Car-free day in Kilagal

During the time of mobility week (on 16th Nov. 2019), a local event car-free day was organised in a small stretch (around 516m) of congested but historic street of Kathmandu in Kilagal, together with Kilagal ward no. 18 and local NGOs. The event (named Kilagal Festival) showcased the ward officials and locals - the effect of active mobility, such as reduced air pollution and increased pedestrian safety as well as local businesses. The data collected by an air quality monitoring device, provided by Urban Pathways project, showed that PM 1/ 2.5/ 10 was the lowest compared to the average seven days. The survey (total respondent 189) carried out on the day also showed that most of the respondents were convinced about making the street pedestrian friendly. However, the street has not been converted yet. Urban Pathways is still in contact with the local NGOs and is providing support on policy advice and case examples from other cities, to push for converting the street pedestrian friendly.

Budget: 350 EUR (Device cost) + City's own budget  
Estimated direct GHG emissions reduction : 800 tCO<sub>2</sub>/year

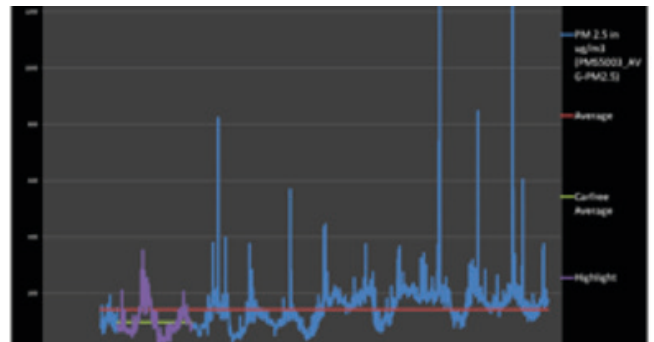
### **Outlook: Planned and/or Possible Future Action**

#### Portable Air Quality Monitoring device

Air quality is a prime concern in Kathmandu. According to the 2016 Environmental Performance Index (EP) ranked Nepal 117th out of 180 countries. Kathmandu is ranked one of the most polluted cities in Asia (7th position so far). The main sources are the vehicles and dust particles, affecting citizen's health. On the other hand, the data regarding air quality is also inadequate and poor. The placement of low cost monitoring devices at several locations would generate data easily and cost effectively.

Urban Pathways will support Kathmandu on capacity building to develop or assemble such low cost air quality monitoring devices (e.g. similar to Smart Citizen Kit by Fab Lab). A local NGO (G.D. Lab) in Kathmandu has been identified, who are working on developing devices locally. The involvement of Open Seneca (as in the previous activities under Urban Pathways) will be sought to guide and explain the locals in Kathmandu the stepwise method to build the air quality measuring devices. On the pilot phase, the project will seek to assemble 10 devices locally.

Budget: 5,000 EUR





### 3.6 Pasig

Urban Pathways has been working with the City of Pasig, a highly urbanized city in Metro Manila, Philippines since 2019. Together with local partners in the city, project concepts on sustainable mobility (mainly e-mobility and charging infrastructure) has been developed. The uptake of e-mobility in the country (and the city) has been slow, considering the fact that there have been several initiatives in the last decade to promote the adoption of e-mobility. Systems-based innovations that bring together new technological concepts with business models centered around local empowerment are much needed in the city. The project also aims to strengthen local capacities in relation to the different aspects of e-mobility. Moreover, Urban Pathways plans to continue supporting Pasig on public EV charging infrastructure.

#### Pilot and Demonstration Action

##### Locally Developed/Assembled E-Cargo Quadricycles

Urban Pathways has developed a demonstration project concept in Pasig on E-Cargo Quadricycles. It will focus on integrated and shared urban logistics solutions, as well as investigate the potential for public charging solutions. The activities on-the-ground will also include those that aim at improving the enabling conditions for e-mobility, and enhancing local capacities related to e-mobility. Locally appropriate solutions addressing urban logistics are deemed to be quite important, as conventional vehicles that are currently being used are not particularly effective in conducting efficient movements considering the local conditions in the urban areas. The demonstration project will aim at producing and testing urban cargo quadricycles that are suited to the local conditions and can potentially transform how urban deliveries are done in the country. A “shared vehicle use” concept will be investigated for feasibility in the pilot project. This concept would center on the shared use system that would feature the use of the vehicles by PHLPost during the normal delivery hours of the day, and the conduct of last-mile deliveries for the Pasig City public market during the early hours of the morning (e.g. 3 am to 5 am).

The proposed demonstration project concept was submitted on 25 April 2019 as a part of EC H2020 proposal for funding. It is being implemented by SOLUTIONSplus project (project duration 01/2020 – 12/2023) together with Pasig City Government and Philippines Postal Corporation – Pasig branch (PHLPost Pasig).

Budget: 1,500,000 EUR

Estimated direct GHG emissions reduction: 13 tCO<sub>2</sub>/year

#### Outlook: Planned and/or Possible Future Action

##### EV charging as a public space and commercial area component

One of the key components for the mainstreaming of e-mobility in Pasig is the identification of appropriate location and installation of EV charging facilities. These locations are selected based on a set of various criteria including roads hierarchy, the intensity of traffic flow, residential densities and availability of space. On one hand the charging location can emerge in attractive locations and can stimulate development of a specific area through attracting different transport operators or stimulating trading activities. On the other hand, the required space and increased movement resulting from installation of EV facilities may not be incentivized in specific residential zones. In order to off-set the negative aspects of the construction and capitalize on its potentials the project includes a demonstration intervention, in which EV charging facilities will be developed. It will be realized as a component of visually attractive and multifunctional public/commercial space including urban greenery, small architecture and landscaping measures. Based on the pre-selected list of locations identified by City of Pasig in collaboration with the Technical University of Berlin a specific location with high commercial and design potential will be selected for the intervention. Except of immediate spatial intervention the project will also define long-term vision for the development of the surrounding space and liaise with private sector investors to secure space and leverage potential co-funding opportunities.

Budget: 35,000 EUR

### 3.7 Kigali

#### Introduction

Urban Pathways has been working with the City of Kigali, the country's commercial and administrative hub, since 2019. Kigali is rapidly urbanizing as a result of a growing population and increasing economic activities (World Population Review, 2019). Consequently, the city's major economic sectors are challenged with issues ranging from congestion, pollution, deteriorating infrastructure, among others. Together with local partners in the city, project concepts on sustainable mobility (e-mobility for last-mile connectivity) have been developed. Activities on waste issues, such as implementing EcoZones, organic waste pilots and integration of e-mobility in the waste collection fleet are currently being discussed with the municipality.

#### Pilot and Demonstration Action

##### e-mobility for last-mile connectivity

The demonstration action in Kigali focuses on e-mobility for last-mile connectivity. It will have a systemic approach integrating the Public Bus System with electrified feeder-services provided by 30 e-moto taxis (20 new and 10 remodelled) and 100 e-bikes that support first/last mile connectivity. With support from city authorities, transport operators and bus manufacturing companies, a suitable business model for e-Buses for the city's current bus transport administration will be explored. Expectedly, the project will create a good precursor to public transport electrification in Kigali. The business model for e-moto taxi will also be developed in the demonstration project. Together with riders, transport associations and other relevant institutions, 10 existing motorcycles will also be remodelled into e-motorcycles – with the possibility to easily swap and charge batteries (Lithium-ion) and considering local-EU prototypes with Valeo 48V. The demonstration project will also test the establishment of an e-Bike sharing scheme along the most widely used bus corridors with charging points fitted with solar power energy to provide seamless charging service to riders and patrons. For the wider use of E-Moto taxis and E-Bikes, smart services applications will be explored that support eco-routing.

The proposed demonstration project concept was submitted on 25 April 2019 as a part of EC H2020 proposal for funding. It will be implemented by SOLUTIONSplus project (project duration 01/2020 – 12/2023) together with local public transport operator.

Budget: 1,500,000 EUR

Estimated direct GHG emissions reduction: 87 tCO<sub>2</sub>/year

#### Outlook: Planned and/or Possible Future Action

##### Integration of e-mobility in the waste collection fleet

The Urban Pathways team has initiated the discussion with the Department of Public Health and Environment, responsible for waste collection, to integrate a pilot e-vehicle in the fleet. This would mean converting a diesel pick-up into an electric vehicle. This project could be supported by SOLUTIONSplus project through the provision of an electric drivetrain from the SOLUTIONSplus consortium member, Valeo. Urban Pathways' contribution could be geared towards financing the residual value of the vehicle conversion.

Estimated budget: 20,000 EUR

Estimated direct GHG emissions reduction: 11 tCO<sub>2</sub>/year

EcoZone pilot: integrating mobility and waste issues

Together with local partners, the Urban Pathway team is currently designing an EcoZone pilot for Kigali, where traffic calming measures as well as source separation and/or composting pilots will be initiated.

Estimated budget: 10,000 EUR

Estimated direct GHG emissions reduction: 12 tCO<sub>2</sub>/year

### 3.8 Dar es Salaam

Since 2019, Urban Pathways has been working with the City of Dar es Salaam which has a population of 4,3 million inhabitants. Due to rapid urban growth and growing individual motorisation, the transport system in Dar Es Salaam suffers from chronic congestion. This has led Dar es Salaam City Council to introduce a Bus Rapid Transit (BRT) scheme in 2016 (named DART). Apart from the BRT, public transport predominantly depends on a large fleet of privately-owned minibuses (so-called dala-dala), which are often not roadworthy and contribute to congestion and air pollution. Also, in areas not served by buses, motorised two- and three-wheeler taxis (Boda boda and Bajaji respectively) are the only publicly available mode of transportation that offer a de-facto public transport service filling a gap in the transport system. Despite these obvious benefits for people's mobility, the two- and three-wheelers have contributed to increased pollution in the city with the transport sector contributing 57% of the total CO<sub>2</sub> emissions from fuel combustion. In this light, Urban Pathways has focused on e-mobility pilots so far, but is aiming to incorporate waste pilots in the future as well. In February 2019, a city representative participated in the e-mobility planning workshop, where the pilot project below was developed and is currently being implemented. Further cooperation possibilities related to the Integration of e-mobility in the waste collection fleet and EcoZone or Organic Waste Treatment pilot would be explored.

#### Pilot and Demonstration Action

##### Integrating e-mobility for last-mile connectivity

The demonstration project in Dar Es Salaam will focus on e-mobility for last-mile connectivity. The demonstration aims at integrating 60 electric feeder/e-3-wheeler and distribution services with Dar es Salaam's BRT (DART) to support first/last mile connectivity. The e-3-wheelers (newly built 50 imported/provided by DART and 10 newly built with Valeo components), will be an integral part of public transport. The deployment of e-3 wheelers will happen at 5 DART stations considering urban locations: a) in the city centre, where fossil-fuelled 3-wheelers are currently banned for environmental reasons and where accessibility to/from the BRT stations can be limited due to longer distances; b) in peri-urban areas where combustion-fuelled 3-wheelers are currently very common as feeder-modes. Also, a feasibility study on the electrification with respect to vehicle specifications (range, speed), charging infrastructure (type and location) will be carried out. As part of this, state-of-the-art data collection methods using geo-localization devices will be applied for a detailed derivation of the systems specifications. Subsequently, an implementation plan for the introduction of e-3-wheelers will be developed. This will follow a systemic approach and include the development of business models (vehicle ownership, rental schemes, and maintenance), the charging infrastructure and localisation.

Further aspects to be assessed under the demonstration relate to the battery type (fixed vs. battery swapping), ownership models (leasing/pay-per-use model), the use of existing telecom and power distribution boxes to accommodate vehicle charging, fleet bundling, and eco-routing. Interaction with the passengers and the system will be fostered through a Mobility-as-a-Service (MaaS) application that will consider the growing smartphone ownership of Dar es Salaam's population, to allow a maximum spread of the use and increase smart metering services. An open Application Program Interface (API) will be made available to allow 3rd-parties/software programmers to develop further services. The demonstration project will furthermore include local stakeholders as much as possible to increase the acceptance of the system. The current 3-wheeler market employs many people in Dar and the inclusion of current drivers will be a crucial target of the project. Furthermore, capacity building on sustainable maintenance of the vehicles will be carried out, building on the current structures of OEMs in Tanzania. Tanzania has already a high share of renewable energies through hydropower which will be used for the services.

The proposed demonstration project concept was submitted on 25 April 2019 as a part of EC H2020 proposal for funding. It is being implemented by SOLUTIONSplus project (project duration 01/2020 – 12/2023).

Budget: 1,500,000 EUR

Estimated direct GHG emissions reduction: 180 tCO<sub>2</sub>/year

#### Outlook: Planned and/or Possible Future Action

##### Integration of e-mobility in the waste collection fleet

For Dar es Salaam, the Urban Pathways team, would like to discuss the options of integrating a pilot e-vehicle in the waste collection fleet.

Estimated budget: 20,000 EUR

##### EcoZone pilot: integrating mobility and waste issues

An EcoZone and Organic Waste Treatment pilot are currently being explored in close cooperation with the local partners.

Estimated budget: 5,000 - 10,000 EUR

Estimated direct GHG emissions reduction: 12 tCO<sub>2</sub>/year



### 3.9 Quito

Urban Pathways has been working with Quito, the capital and largest city of Ecuador, since 2018. City officials participated in a series of capacity building events including the Academy of Sustainable Urban Mobility (AoSUM) 2018 and 2019. Direct support has been provided in topics related to EcoDistricts and nature-based solutions (NBS). In the Cities Forum on Sustainable Urban Infrastructure, organised jointly by Urban Pathways, the Sustainable Intermediate Cities Program of GIZ Ecuador and the local authorities in January 2019 in Quito, city officials from 10 Latin American cities including UP pilot and replication cities (Belo Horizonte, Aguascalientes, Quito, Cuenca and Ibagué) were invited to share their experiences on mobility, energy and resources. Finally, in February 2019 a city representative participated in the e-mobility planning workshop, where the pilot project below was developed and is currently being implemented. Further cooperation possibilities related to the development of EcoZones in three neighbourhoods of Quito, as well as waste management activities have been identified.

#### Pilot and Demonstration Action

##### Multimodal e-mobility hub

The multimodal e-mobility hub to be implemented in Quito will be carried out in the Historic Centre of Quito (HCQ), a UNESCO World Heritage Site, which aims to become a low- emission zone (LEZ), primarily accessed by clean public transport vehicles, pedestrians and bicycles. In order to improve passenger connectivity and last mile deliveries in the area, small electric vehicles (2-, 3-, and 4-wheelers) will be assembled locally with European components provided by SOL+ industry partners such as Valeo. In this context, the multi-modal e-mobility hub to be established will contribute to the consolidation of the planned LEZ in the HCQ and the integration of the existing mass transit lines (BRT and subway). The hub will take advantage of the existing electric infrastructure of the trolleybus and the subway systems in the area to create multimodal charging points / stations. A distribution centre and a logistics plan that identifies the best routes for deliveries will also be outcomes of the demonstration activities.

The proposed demonstration project concept was submitted on 25 April 2019 as a part of EC H2020 proposal for funding. It will be implemented by SOLUTIONSplus project (project duration 01/2020 – 12/2023) together with local public transport operators.

Estimated budget: € 1,500,000

Estimated direct GHG emission reduction: 3,000 tCO<sub>2</sub>/year

#### Outlook: Planned and/or Possible Future Action

##### An inclusive Low- emissions Zone (LEZ)

Understanding that the Historic Centre of Quito (HCQ) has always been a disputed space with a high social complexity, the proposed project recognises that the promotion of bike-lanes, pedestrian areas and e-mobility corridors that will be embedded in the LEZ also requires increased social acceptance of various interest groups and an inclusive allocation of different uses of spaces in the centre of Quito. The project will develop a demonstration solution of an adaptive design, which transforms a delimited area (street/surroundings of a metro or BRT station) into a space where transportation, leisure and trading functions are shared. The key component of the project includes the engagement with street vendors through a co-productive process with an intention of their gradual integration and regularisation in these kinds of multi-functional spaces.

The project outcomes will include:

- Increased social acceptance for the transformation of public spaces in the HCQ into zones of non-motorised transportation,
- Engaged street vendors into redevelopment process,
- Increased livelihood opportunities for vendors and set regularisation mechanism
- Increased commuters' safety
- Proposed adaptive design solution for shared urban spaces

Estimated budget: 70,000 EUR

### Comparative EcoZones

Three neighbourhoods in Quito have been identified jointly with local counterparts as possible pilots for the implementation of EcoZones.

### **On-going activities in the mobility and waste sectors**

#### Improving walkability, road safety and public space

The Territory and Housing Secretariat (STHV) in collaboration with the Mobility Secretariat (SM) of the Municipality of Quito (MDMQ) are working on the regulations necessary to implement traffic calming measures, including Zones 30, citywide. Moreover, the STHV is working on the urban design of the surroundings of the subway stations to improve the walkability and multimodality of them before it starts operations at the end of 2020. Thus, the MDMQ has identified neighbourhoods, which can serve as pilots to showcase the measures, raise awareness and gain the necessary visibility and public acceptance to implement them citywide.

#### Composting & separation at the source

The capital of Ecuador produces more than 2000 tons of waste per day. Understanding that most of the collected waste goes untreated to landfills and that organic waste accounts for more than 60 % of the produced waste in Quito, the need to implement measures to separate at source, recycle, reuse and compost is huge. In this context, discussions with the Environment Secretariat (SA) and the local Fundación Epicentre and ReciVeci have been held to work at the neighbourhood level and thus complement and boost the measures that the SA is currently implementing. Four key actions have been identified that could be implemented depending on the neighbourhood: 1) Composting boxes for the residents, 2) Community composting facilities, 3) Composting at schools, 4) Separation at source pilots.

#### The selected neighbourhoods

##### 1. Iñaquito Neighbourhood

The Iñaquito neighbourhood is located in the core of the Central Business District (CBD) of Quito, also home to La Carolina Park. The Architects Association (Colegio de Arquitectos), one of the neighbours of the area in partnership with the Municipality are willing to turn the area into a traffic calming zone using the tools of tactical urbanism. Urban Pathways will - together with the NGO Epicentre - integrate to this launch of the ZONE 30 a training and educational programme on recycling practices and composting in neighborhood offices. In order to make the circularity of composting visible, the participating company will sponsor a public space, which will be recovered as an urban green patch for the city, using the compost generated as input. The participation of grassroots recyclers will be integrated into the project by integrating them as qualified managers of the compost produced, working hand in hand with Reci Veci. They will be in charge of handling the product generated. The Chamber of Commerce has been approached already and is highly interested to join the pilot.

Estimated budget: 10,000 EUR

Estimated direct GHG emissions reduction: 16 tCO<sub>2</sub>/year

##### 2. San Enrique de Velasco

The San Enrique de Velasco Neighbourhood is located in the North West area of Quito. It is a peripheral neighbourhood, originally an informal settlement, where low-income households live. Due to its highly engaged community and its geographic location, this neighbourhood has been selected by the SA for the implementation of the EU-funded project CLEVER Cities: Co-designing Locally tailored Ecological solutions for Value added inclusivE Regeneration in Cities. The implementation of a Zone 30 could complement the work in the area very well. As in the Iñaquito neighbourhood (above) Urban Pathway seeks to build local capacity in recycling and composting practices by providing training and educational workshops in the neighborhood. In order to make the circularity of composting visible, a green space is being recovered as a community park, which will be recovered as an urban green patch for the city and as a collection point for recyclable waste and neighborhood composting for organic waste. This space will also serve to strengthen the social fabric of the neighborhood, building a strong identity of community and belonging.

Estimated budget: 15,000 EUR

Estimated direct GHG emissions reduction: 13 tCO<sub>2</sub>/year

### 3. La Tola Neighbourhood

La Tola is located on the eastern side of HCQ and it is mainly a residential neighborhood with several local commercial activities, a tourist area and nearby a public market and it is a passage area for people going to the HCQ. Thus, the Tandem Foundation and Aves & Conservación, two local NGOs, in cooperation with the neighbours association aim at implementing a pilot EcoZone in La Tola neighborhood as an area of reduced emissions and waste through active neighbors participation and urban biodiversity conservation. These activities will consider nature based solutions using native plants and recycled materials to increase green spaces to mitigate the impact of high temperatures, capture pollution, and act as carbon sinks, while enhancing urban biodiversity.

Estimated budget: 15,000 EUR

Estimated direct GHG emissions reduction: 15 tCO<sub>2</sub>/year

#### Development of "Circular Quito" Strategy

Quito is planning to develop a Circular Economy Strategy. The Urban Pathway project will assist with strategy and action plan development and support proposal writing in order to get the needed funds for the strategy development.

The circular roadmap will be a framework to be downscaled to a city level. It aims to meet specific targets such as the national NDC, as well as to reach an efficient waste management and recycling system. The holistic vision of a CE applied model is a tool to catalyse the transition to a biobased economy, enabling the ecosystem management in urban regions.

Estimated budget: 2 - 5 million EUR

#### E-waste management in Quito: an Extended Producer Responsibility (EPR) pilot

With an annual growth of 2 million tonnes, e-waste is one of the fastest growing waste streams globally. Latin America faces several challenges toward an integrated sustainable e-waste management. The most relevant are the lack of specific regulatory frameworks, inappropriate activities performed by the informal sector, and weak e-waste management systems. Some countries have aligned their regulatory frameworks with the principle of extended producer responsibility (EPR). However, the adoption of the EPR principle as state policy has faced difficulties due to particularities of the countries, varying in terms of scope, range, type, and funding mechanisms. As for Ecuador, it counts on constitutional dispositions about environmental issues, a specific environmental law which incorporates a normative of EPR, and ministry agreements on e-waste.

To address these challenges, the project aims to implement a pilot EPR scheme for e-waste in the City of Quito, embedded in the Circular Quito Strategy developed under the Urban Pathways Project. The pilot will have the support of strategic partners all along the e-waste supply chain (from policy formulation to waste disposal), engaging the municipality, local private sector, informal sector.

The concept will be submitted to the PREVENT Waste Alliance Call for Solutions in June of 2020.

Estimated budget: 100,000 - 200,000 EUR

#### Food Waste Reduction

In order to also initiate activities that do start at an earlier stage (not waste treatment but waste prevention) the Urban Pathways project would like to support the City of Quito to implement some measures for food waste reduction. This includes awareness raising activities and small pilots with businesses in e.g. Inaquito neighbourhood (where one of the EcoZones will be implemented) and restaurants to incentivise consumers to take their leftovers, rather than throwing it away.

Estimated budget: 3,000 EUR

### 3.10 Montevideo

Urban Pathways has been working with Montevideo since September 2018, when city and national officials joined the Transport and Climate Change Week 2018 in Berlin and it was clear to the UP team that Montevideo could be a great partner city for the implementation of sustainable urban mobility projects. As a result of these initial discussions, a representative of the Public Transport Department of the Municipality of Montevideo joined the UP Action Planning Days in February 2019, where the first ideas for sustainable mobility solutions were discussed, which led to the e-mobility pilot project now being funded by SOL+. Moreover, more than 10 start-ups working on passenger and freight 2- and 3-wheelers have been identified and will participate in the SOL+ call for innovators. All this building on the work conducted by the MOVÉS project (GEF 7 project) that has been promoting the integration of e-buses, e-cargo-vehicles and e-taxis in Montevideo's transport system. Finally, with regard to waste, the team is working jointly with Compost Ciudadano, a local NGO devoted to organic waste collection at the neighbourhood level, to fund the conversion of a diesel waste collection vehicle to electric. The Intendencia of Montevideo has participated in a webinar Organic waste treatment.

#### Pilot and Demonstration Action

##### Installation of charging infrastructure for e-buses

The demo action consists of assisting Montevideo with the installation of charging equipment in a high-capacity bus depot to charge the existing 30 e-buses overnight, taking advantage of the electricity oversupply and a reduced electricity price at night. The high-capacity bus depot will integrate efficient and cost-effective smart charging solutions compliant with Combined Charging Standard (CCS) and Open Charge Point Protocol (OCPP). This will allow charging of up to 3 buses with 1 charger, i.e., 3 compact boxes powered by one charge cabinet that will charge 3 buses sequentially (up to 150 kW per bus) with all buses being charged within 6 hours. The main advantage of implementing this type of equipment is that the required grid connection is smaller, reducing initial investments and operational costs. Moreover, the possibility of installing fast chargers in the most travelled streets for buses to charge for 3-6 minutes on-route will be explored. These solutions can easily be integrated in existing operations by installing inverted pantographs and chargers at terminals and intermediate stops. Finally, a real-time platform for reliable and secure operation of electrical power networks, ranging from generation, transmission and distribution to e-buses will be developed to improve the system management. In addition to e-bus charging equipment, SOL+ will support local start-ups and SMEs to assemble electric 2- and 3-wheelers locally with Valeo and Bosch drivetrains. Besides enhancing local capacities and generating economic opportunities, the locally produced vehicles will serve to decarbonise last mile deliveries and passenger transport.

The proposed demonstration project concept was submitted on 25 April 2019 as a part of EC H2020 proposal for funding. It will be implemented by SOLUTIONSplus project (project duration 01/2020 – 12/2023) together with local public transport operators.

Budget: 1,500,000 EUR

Estimated direct GHG emissions reduction: 2,300 tCO<sub>2</sub>/year

#### Outlook: Planned and/or Possible Future Action

##### Integrating e-mobility in waste collection (pilot with composting NGO)

Compost Ciudadano is a local initiative that started in 2018 in order to reduce the amount of organic waste that ends in landfills, raise awareness and promote urban agriculture. At present, Compost Ciudadano collects the organic waste from 50 families in Montevideo's Old Town once a week. The families are given a 6 liter container, where they are supposed to collect all the organic waste produced at home. After 3 months, each household receives a bag of compost and the rest is commercialized. Their short-term goal is to increase the number of households to 100, with the potential of up to 2,000 homes that have shown interest in participating in the initiative. In order to reach their goal and at the same time maintain the project's emissions as low as possible, Compost Ciudadano is looking forward to hiring a local company to convert a diesel pick-up into an electric vehicle. This project will be supported by SOL+ by the provision of an electric drivetrain from the SOL+ consortium member, Valeo. Urban Pathways aims to support this Compost Ciudadanos by financing the residual value of the vehicle conversion.

Estimated budget: 20,000 EUR

Estimated direct GHG emissions reduction: 3 tCO<sub>2</sub>/year



### Food waste reduction campaign

As in other partner cities, Urban Pathways would like to initiate activities that start at waste prevention and thus support the City of Montevideo to implement some measures for food waste reduction. This could include awareness raising activities and small pilots with businesses in different neighbourhoods and in cooperation with restaurants to incentivise consumers to take their leftovers, rather than throwing it away.

Estimated budget: 3,000 EUR

## 4. OTHER REPLICATION CITIES

### 4.1 Honduras

#### **Pilot and Demonstration Action**

##### Sustainable Urban Mobility Plan (SUMP) and a Low-emission Zone in Comayagua

In the context of the cooperation agreement between the Municipality of Comayagua (Honduras) and the Andalusian Agency for International Development Cooperation (AACID for its Spanish Acronym), Ciudad Emergente, a Chilean NGO, has been commissioned to develop the first phase of the Sustainable Urban Mobility Plan (SUMP) of the city. The SUMP, based on a detailed analysis of the current stand of mobility, will propose a series of measures to be implemented in the Historic Centre of Comayagua in order to promote the use of public and non-motorised transport (NMT), as well as to reduce car dependency in the area. One of them was the implementation of a pilot Zone 30 using the tools of tactical urbanism with the goal of replicating it later in several areas of the city.

With the aim of assisting in the elaboration of the SUMP, Urban Pathways established an advisory board that has been following up the process and providing the necessary technical assistance. Mobility experts from the Wuppertal Institute have been meeting Ciudad Emergente's team virtually in the different stages of the SUMP construction process. Moreover, the UP team supported Ciudad Emergente in the elaboration and submission of a proposal for the implementation of the SUMP in Comayagua that includes: 1) Low-emission Zone (LEZ), 2) bike sharing system, 3) BRT to connect the city centre to the new airport, among others. The proposal was selected by the Transformative Action Programme (TAP) of ICLEI to develop the project further and identify possible financing sources.

Budget:

- SUMP elaboration and pilot interventions: 200,000 EUR (funded by AACID)
- SUMP implementation: 1 million EUR (submitted and approved by TAP - ICLEI)

#### **Outlook: Planned and/or Possible Future Action**

##### Democratising disaster risk management and ecosystem-based adaptation

Honduras ranks very high – 33 out of 180 countries – in the World Risk Index. As for most cities in Honduras, the cities of Tegucigalpa and Comayagua face a series of events such as flooding, strong rains, pollution, collapse of infrastructure, which are increasingly stronger as a result of climate change effects. In addition, the population living in these cities present high levels of population vulnerability, as stated in the National Adaptation Plan (PNA) established in 2018. Despite the exposure to these hazards, it is estimated that, out of the 60 cities with more than 10,000 inhabitants in the country, only as few as 10 have a somewhat operational disaster risk management (DRM) plan in place. The limited local capacity to implement these plans is also recognised in the PNA in its situational assessment, which states that only 5 cities have a local risk management unit.

In recognition of the urgency of the matter, in 2019, the national government issued a directive urging that cities to develop and implement their DRM plans – and those that fail to do so might face restrictions in accessing funds made available for DRM purposes.

This project, developed by the University Observatory for Spatial Planning (OUOT by its Spanish acronym) in partnership with CIUrb, aims at building the capacity of city officials and communities in applying innovative institutional and low-cost technology-based approaches in order to be better prepared for, respond to and recover from disasters, with the speed and scale that the subject requires. UP will support the project by providing capacity building and technical assistance in the implementation of nature-based solutions to respond to these challenges.

Budget: 20,000 EUR

## 4.2 Santiago de Chile

### Outlook: Planned and/or Possible Future Action

District integration through the development of an EcoZone in Santiago

In the context of the cooperation that Urban Pathways has established with the Chilean NGO Ciudad Emergente (CEM), the possibility of building on the activities that will be carried out by CEM under the Street for Kids Project from NACTO by combining them with the UP EcoZone approach has been discussed. CEM plans to improve the connectivity between 3 neighbouring districts (Comunas) in Santiago, i.e., Independencia, Renca and Recoleta, with a focus on schools by improving sidewalks, public spaces and implementing pilot bike lanes between the districts. UP is currently in the process of identifying local NGOs that could contribute to the intersectoral approach and the awareness raising activities related to both mobility and waste that UP wants to promote through the EcoZone concept.

Budget: 30,000 EUR (20,000 EUR funded by NACTO)

Estimated direct GHG emissions reduction: 36 tCO<sub>2</sub>/year

## 4.3 Hai Phong, Vietnam

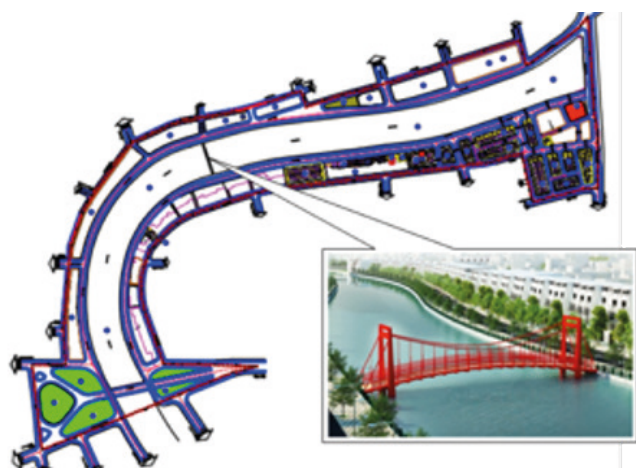
### Pilot and Demonstration Action

Pedestrian Street along Tam bac River

Hong Bang District is Hai Phong socio-economic centre with historical, cultural and recreational importance. Due to tourism flows and commercial activities in the area, vehicular movement is very high with huge risks to pedestrians. Pedestrian safety is also low due to the lack of allocated walking space, further evident with frequent and high volume of traffic accidents. The urban renewal demonstration project concept was an initial step towards a larger urban transformation in Hai Phong city to provide access to a safe, green and inclusive urban space. It includes redesign and develop an existing area along the Tam Bac river in Hai Phong city - making it a tourist attraction centre, and maintaining historical and cultural importance; demonstrate the activity to citizens that attract urban public spaces have the potential to increase active mobility and can be well integrated with public transport; create convivial and pedestrian only public space to promote public health and increase the safety of pedestrians from fast moving motorised traffic; influence the urban planning paradigm and shift it towards a people focussed policy; integrate the project with other sectors such as energy and resource management to amplify the climate mitigation potential.

Urban Pathways supported the city in the project concept development, together with local partner- Hai Phong Department of Transport. It was submitted to the UN-Habitat call on 'Small public space implementation projects' in 2018. However, the funding was not successful through the same call.

Budget: 171,400 EUR



#### 4.4 Birendranagar, Nepal

##### Pilot and Demonstration Action

Sustainable Urban Mobility Plan (SUMP) Formulation for Birendranagar Municipality, Surkhet, Nepal

With the increase in population and the number of vehicles, Birendranagar is starting to face a lot of problems such as (but not limited to) traffic congestion, air and noise pollution, vehicle accidents, etc. The problems can mostly be attributed to the fact that the policy and infrastructure provisions have not been able to keep up with the rise in population, and thus urbanization, and motorization. Birendranagar is getting swept up in the vicious cycle of motorized vehicle-centric development, resulting in rampant road widening and continued congestion.

Urban Pathways supported the city together with local NGOs (Sano Paila, Cycle City Network Nepal, Story Cycle and G.D. labs and research) to develop the project concept on SUMP formulation in the city. This project aims to intervene on the conventional transportation development plans in place for the city by providing an alternative action plan and making policy interventions for the development of non-motorized people-centric transportation by fostering walkability, public transportation and cycling inside the city and also building the capacity of the municipality and the people to implement the plan while also awarding the people on their roles and benefits of effective sustainable mobility plan. The project will also focus on the design of cycle infrastructure, public-private participation in design (Tactical Urbanism), Campaigning for awareness on sustainable mobility and institutionalizing it in the urban masterplan of Birendranagar City.

The proposed project concept was submitted on 5 March 2020 in IKI Small Grants under Capacity Building and Finance for National and Local Action on Climate and Biodiversity (awaiting for the response).

Budget: 53,200 EUR



## 4.5 Mombasa, Kenya

### Pilot and Demonstration Action

#### Easing movement and logistics of small-scale businesses in Mombasa through adoption of Electrical Handcarts (E-Handcarts)

The small scale traders, peri-urban farmers or street hawkers living in urban fringes of Mombasa have difficulty due to inadequate urban services and the situation is more difficult due to poor economic condition. Using minibuses for goods transportation to the urban market from the fringes is costly for small businesses. Therefore, manual handcarts are widely used for cargo services by small businesses in Mombasa. However, they are labour intensive, provide poor productivity and the infrastructure does not support its ease in movement.

Urban Pathways supported developing demonstration project which aimed at introducing electric handcarts to slowly replace manual handcarts in order to increase the efficiency in cargo services by small businesses which requires less labour and provide better services. The Government of Kenya has identified the importance of the use of handcarts by the informal sectors for the movement of goods by small scale businesses, mainly women and citizens with the poor economic state. Therefore, the government is keen to support them on their economic development considering health benefits and ease in movement too. National Youth Service being a Government of Kenya agency has partnered with Auto-Truck E.A Ltd to support, develop and mass produce electric handcarts as a local solution to the menace created by the conventional manual handcarts. The project intends to pilot 10 electric handcarts to provide services to small business entrepreneurs together with the identification of a micro-finance business model. The 10 recipients/ recipient groups of the electric handcarts will be identified considering user needs assessment criterion and also to the eventual impact assessment will be carried out during the project period.

The project concept was submitted in December 2018 to the 2019 TUMI Global Urban Mobility Challenge for the award of financial support/grant by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. However, the funding was not secured though the call.

Budget: 195,000 EUR from TUMI (+ city budget 70,000 EUR)

Budget: 53,200 EUR





## 4.6 Addis Ababa

### Pilot and Demonstration Action

#### Car Free Days in 2019

The aim of the project “Scaling up safe street design in Ethiopia” is to strengthen the capacity of Ethiopia to better design and implement policies that prioritize the needs of pedestrians and cyclists. The project is on-going and will provide technical support to officials in Addis Ababa in their ongoing efforts to upgrade over the coming year more than 50 km of footpaths and introduce new bicycle lanes; to build on the government’s ongoing focus to better design and implement policies and make investment decisions that prioritize the needs of pedestrians and cyclists.

The project is funded through the UN Road Safety Trust Fund. Urban Pathways supported the proposal in October 2018.

Budget: 200,000 USD



## 5. OVERVIEW - BUDGETS FOR UP PILOT ACTIVITIES

This table provides an overview of the budgets for the different pilot activities that were developed and/or implemented within the Urban Pathways project. It also lists the estimated budgets of pilot activities, which have been developed jointly with the partner cities and which were submitted for funding. This overview only serves as a rough estimate, based on pilot and demonstration actions so far.

Concept /pilot	UP budget per pilot
<b>Mobility</b>	
Car-free day	350 EUR
Cycling Advocacy (Bike Train, High Level Bike Ride)	1,000 EUR
Inclusive mobility pilot (pilot matatu)	2,000 EUR
Covid-related intervention (Graffiti on Matatus, walls, African Urban Tech Summit)	5,000 - 6,000 EUR
Active mobility: Zones 30 / traffic calming zones / placemaking (e.g. around schools)	8,000 - 15,000 EUR
Integrating e-mobility in waste collection (pilot vehicle)	20,000 EUR
EV charging and public space integration	35,000 EUR
Low-emission Zones, integrated e-mobility concepts (first/last mile)	70,000 - 1,500,000 EUR
E-mobility solutions for public transport, SUMP integration	1 - 3,000,000 EUR
<b>Resources / Waste</b>	
Source Separation and decentralized solutions pilots	3,000 - 5,000 EUR
Reducing Food waste pilots	3,000 - 5,000 EUR
Organic Waste Pilots (households, businesses, communities)	5,000 - 8,000 EUR
Solid Waste Generation and Collection Assessments	6,000 EUR
Nature-based solutions for Disaster Risk Management	20,000 EUR
Inter-County Consultation for SWM	200,000 - 300,000 EUR
Converting a landfill to a public park	2 - 3,000,000 EUR
<b>Energy</b>	
Mainstreaming green housing (several tiny housing unit & capacity building)	120,000 EUR
<b>Monitoring pilots</b>	
Air Monitoring Device	350 - 700 EUR
Citizens-sciences / Air Quality measuring pilots	3,000 EUR
EcoZones (combining different small-scale pilot activities of different sectors)	10,000 - 30,000 EUR



# Urban Pathways

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