

EcoLogistics Handbook

Unlocking Sustainable
Urban Freight

ECOLOGISTICS HANDBOOK

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About the EcoLogistics project

Supported by the German Federal Ministry for Economic Affairs and Climate Action (BMWK) through the International Climate Initiative (IKI), ICLEI's EcoLogistics project (2017 - 2022) aims to increase the capacity of governmental and non-governmental stakeholders to build strategies and policies to promote low carbon and sustainable urban freight in Argentina, Colombia and India, involving nine cities and regions:

- Argentina: Córdoba, Rosario, Santa Fe de la Vera Cruz (Santa Fe)
- Colombia: Capital District of Bogota (Bogota), Metropolitan Area of the Aburrá Valley (AMVA), Manizales
- India: Kochi, Shimla, Panaji

For more information, please visit: sustainablemobility.iclei.org/ecologistics

About ICLEI - Local Governments for Sustainability

ICLEI – Local Governments for Sustainability is a global network of more than 2,500 local and regional governments committed to sustainable urban development. Active in 100+ countries, we influence sustainability policy and drive local action for low emission, nature-based, equitable, resilient and circular development. Our Members and team of experts work together through peer exchange, partnerships and capacity building to create systemic change for urban sustainability.

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Introduction

Using This Handbook

Urban freight is a necessary part of socio-economic city development. The freight sector creates numerous job opportunities; two of the biggest companies in freight employ about 3 million people worldwide. And many developing economies also have an informal workforce working in the urban freight space. At the same time, urban freight has a high decarbonization and optimization potential. For example, our research found that around 35% of the delivery vehicles are not fully loaded when making deliveries.

In 2017, ICLEI - Local Governments for Sustainability, together with [Despacio](#), [Smart Freight Centre](#), and [Zaragoza Logistics Center](#), launched EcoLogistics, a trailblazing global initiative dedicated to sustainable urban freight. The project highlighted the significance of urban freight in sustainable development.

The EcoLogistics Handbook is a comprehensive guide that equips stakeholders with powerful strategies for sustainable urban freight solutions. Urban freight is a challenging sphere, where no one stakeholder has ultimate jurisdiction. If local and regional governments are to be successful in implementing sustainable urban freight strategies, they will have to engage with many different types of stakeholders.

This handbook is for all types of stakeholders: Local and regional governmental technical staff; policy-makers; politicians; state and national government officials; business leaders; researchers; non-governmental organization and civil society organization representatives; and community members.

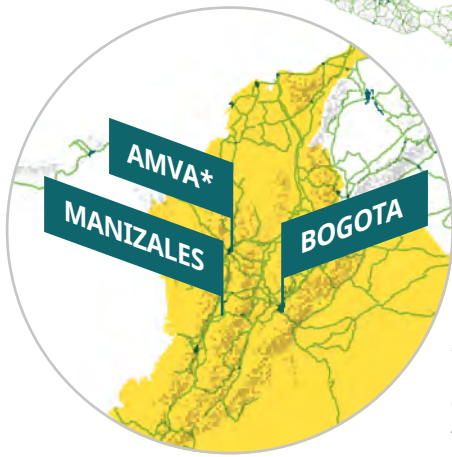
Developed through evidence-based approaches and close collaboration with local governments and their stakeholders, the EcoLogistics Handbook paves the way towards sustainable urban freight through breaking down the components of EcoLogistics including:

- City baselines for urban freight.
- Stakeholder engagement, and creating local working groups to facilitate policy development.
- How to foster urban freight innovation.
- Local and national policy recommendations.

Using the [EcoLogistics Principles](#) as a foundation, stakeholders can tailor their own approach to EcoLogistics, supported by the [EcoLogistics Self-monitoring Tool](#) enabling measurement of the right indicators, and the model of the [Low Carbon Action Plan for Urban Freight](#) to take action in their city. **With the EcoLogistics Handbook, cities now have a guide for how to unlock sustainable urban freight.**

Introduction to the EcoLogistics Project

- Cities
- Roads
- Nine cities in three countries participated in the EcoLogistics project



* Area Metropolitana del Valle de Aburra - AMVA

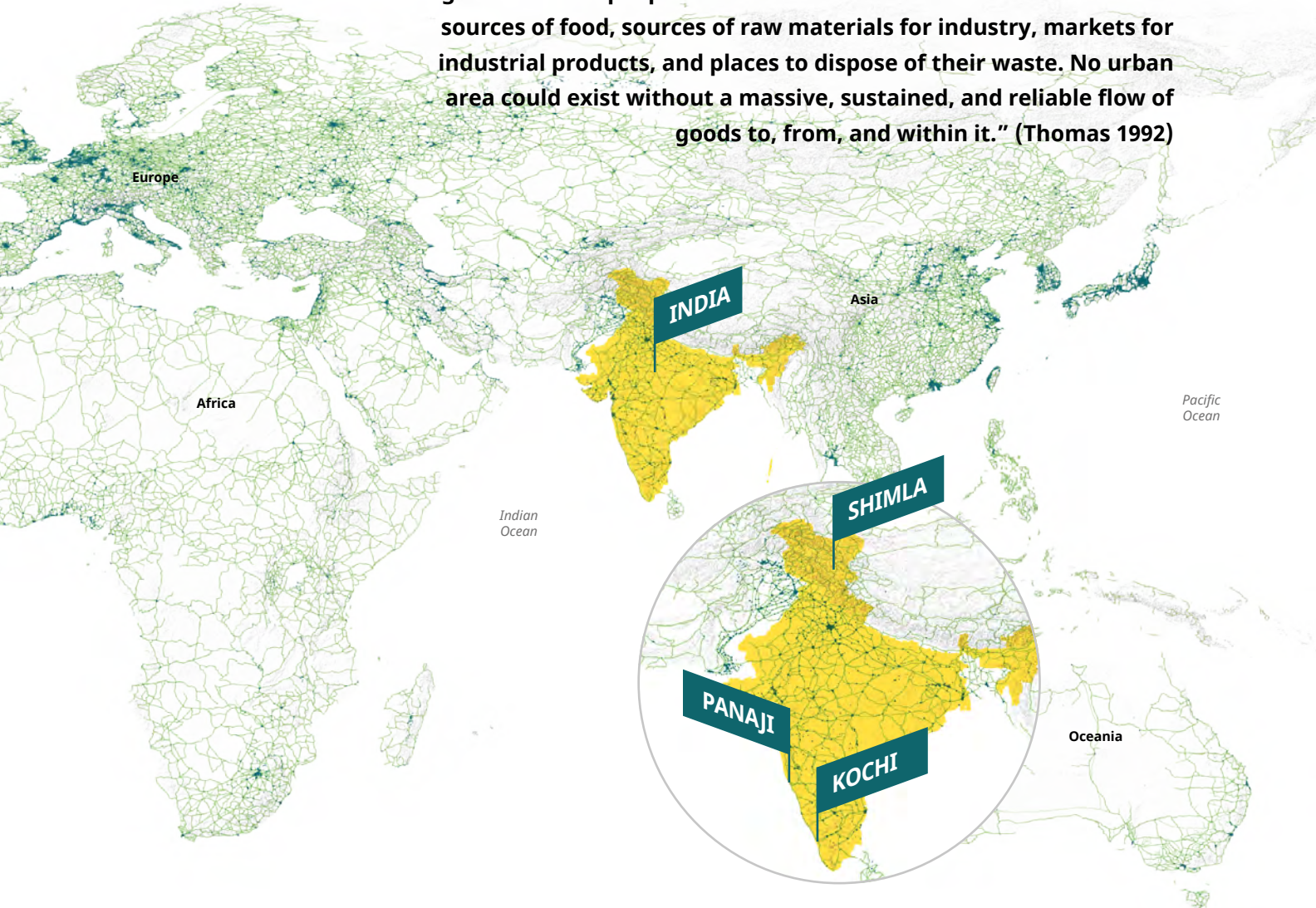


The development of new technologies and the climate crisis has motivated the development of shared and on-demand mobility. And customers, companies and governments interactions evolved. Cities much change from focusing exclusively on passenger transport to understanding that urban freight is a key part of their societal and economic systems.

To face this new situation, cities need to manage the transport of freight in a way that ensures economic prosperity. Today, global freight accounts for 37 percent of greenhouse gas (GHG) emissions from end-

use sectors; if unchecked, freight transport demand is expected to triple, and its associated GHG emissions to more than double by 2050, according to the International Transport Forum (ITF 2019).

“Freight transport, essential to modern urban civilization, has been a concern in cities for more than 30 years. The concept of urbanization requires a freight system to sustain it, since urbanization means that large numbers of people are accumulated in areas remote from their sources of food, sources of raw materials for industry, markets for industrial products, and places to dispose of their waste. No urban area could exist without a massive, sustained, and reliable flow of goods to, from, and within it.” (Thomas 1992)



According to the International Energy Agency (IEA), in 2021, global GHG emissions from the transport sector rebounded, growing by 8% after 2020, as pandemic restrictions began to subside. Therefore, actions are needed to anticipate growth in transport demand and follow the net-zero scenario to reduce emissions by about 45% by 2030.

ICLEI’s “EcoLogistics: Low carbon freight for sustainable cities” project (EcoLogistics project) plays a critical role in bridging the

knowledge gap and in leading efforts to raise the profile of freight transport in policy arenas. Supported by the German Federal Ministry for Economic Affairs and Climate Action (BMWK) through its International Climate Initiative (IKI), the project aims to increase the capacity of governmental and non-governmental actors to build strategies and policies to promote low carbon and sustainable urban freight in Argentina, Colombia, and India, involving nine cities and regions.

Uncovering Challenges in Urban Freight

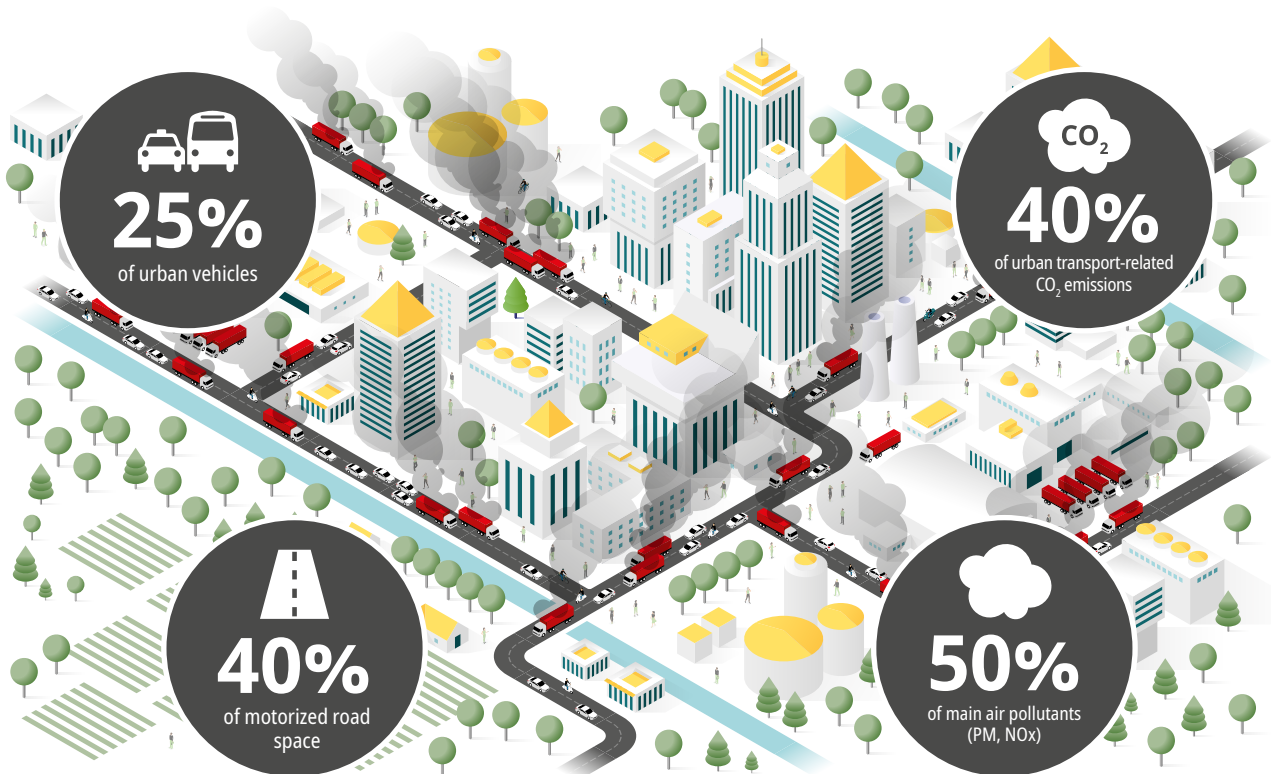
Globally, before Covid 19, urban freight represented up to 25 percent of urban vehicles, took up to 40 percent of motorized road space and contributed to up to 40 percent of urban transport-related CO₂ emissions and up to 50 percent of main air pollutants (PM, NOx). The growth of urban freight has been unprecedented in the last decade, skyrocketing after the previous two years (OECD, 2022).

The trend in e-commerce has further exacerbated the load on existing infrastructure. The COVID-19 pandemic meant many people shifted to online shopping, and despite

some reductions, this boost to e-commerce appears to be permanent.

To satisfy customers' increasing desire to buy products online, the number of delivery vehicles in the global top 100 cities will increase by 36 percent by 2030. Consequently, emissions from delivery traffic could increase by 32 percent and congestion could rise by over 21 percent, equaling an additional 11 minutes of commute time for each passenger every day (World Economic Forum, 2020). Thus, a strong set of measures is required to curb the potential emission growth from the freight sector.

Figure 1. The urban freight mobility challenge.



The London Freight Plan (2008) defines freight as "the physical carriage of goods by any mode. This includes the provision of services and utilities and the movement of waste." Hence, the need to have urban freight in city policy planning.

Only about 21 percent of the Nationally Determined Contributions (NDCs) that highlight transport refer to freight transport.

Nonetheless, general understanding and awareness of sustainable freight have grown exponentially in recent years.

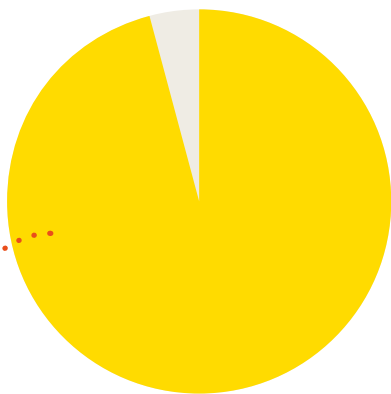
As cities continue to grow at an unprecedented rate, increasing freight movements present unique urban challenges, including congestion, air pollution, traffic accidents and a host of other negative impacts on the mobility system.

Figure 2. Nationally Determined Contributions (NDCs) in transport.

Source: German Environment Agency, 2021

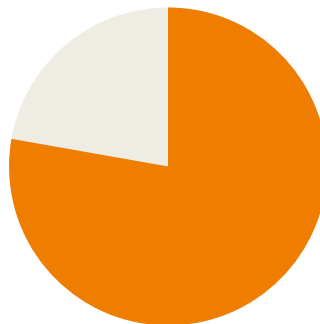
96%

of NDCs mention transport



78%

of NDCs include transport measures



16%

of NDCs set transport CO₂-reduction targets



21%

of the NDCs that mention transport refer to freight transport

“ The quality of life that cities strive for is directly affected by the congestion and environmental impacts of freight vehicles, the backbone of urban freight systems. To this end, cities can no longer afford to ignore freight and how it interacts with the built environment. As part of the low carbon Action Plan - urban freight developed with support from EcoLogistics Project, Panaji had prioritized strategies for a resilient, sustainable and low-carbon urban logistics system.”

Agnelo Fernandes

Commissioner, Corporation of the city of Panaji, India

Barriers for sustainable urban freight

Greening urban logistics has been on the rise and many cities in developed countries have trialed implementing innovative solutions. However, success on the ground is limited, and while many cities have developed policies, they are yet to start transition at any scale in practice.

The following challenges have been identified through the interchange and stakeholder engagement as part of EcoLogistics. These restrict cities' ability to transition to sustainable urban freight.



Adoption of new technologies

- Unavailability of data and methodologies to assess freight sector performance
- Limited penetration of technologies
- High cost of safer and cleaner freight vehicle fleets
- Lack of motivation from the industry and support from the public administration for vehicle technology upgrades



Engagement with stakeholders

- Lack of collaboration between the industry and the public administration
- Lack of alignment across different levels and governments
- Stakeholders conflicting interests and objectives



Freight operation

- Historically fragmented sector
- Shift to decentralized and global industrial production
- Lack of integrated planning
- Inefficiencies such as low vehicle load factors and empty running due to customer and sourcing inefficiencies
- Limited and/or unattractive offer of logistics services
- Lack of specialized infrastructure



Freight trends

- A rise in E-commerce and just-in-time deliveries
- Rising prices of real estate in the city center caused urban sprawl
- Crowdshipping and last-mile delivery strategies are getting more interest from retailers, as a way to gain customers and increase service levels and profits, and from governments to improve efficiencies (operational, economic, environmental, social)



Urban Freight Overview

Urban Freight Operations

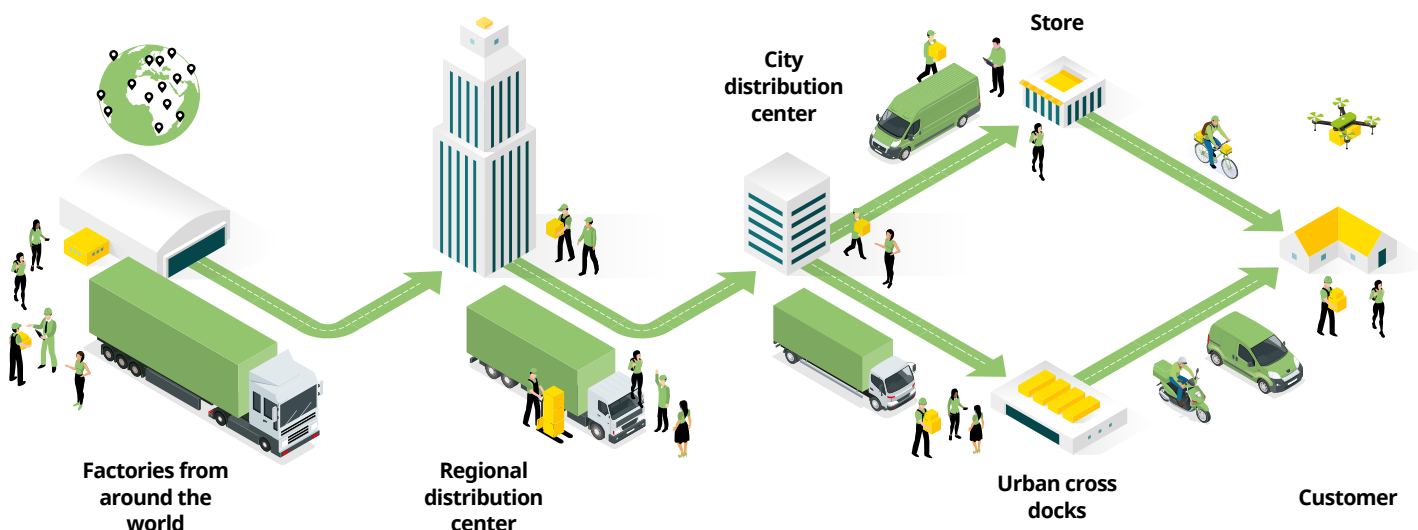
In global supply chains where goods and services can move thousands of kilometers from the suppliers to customers, the urban supply chain is often the shortest of all transport stages. However, its impact on the costs of goods is disproportionately large and the externalities created cannot be overlooked.

Urban freight is focused on the movement of goods and services in the urban area, including warehousing, routes, vehicles, and

modes. Goods typically enter the urban core either on the way from a distribution center to a retail store, factory, business, café or restaurant or staged for final deliveries to the final residential or business customer.

While each urban supply chain is unique, broad observations of how different supply chains function and are structured can enable cities to understand the overall flows and patterns of goods' movement and consequently, help inform policy-making and infrastructure provision.

Figure 3. Freight operations scheme toward urban supply chains.



Types of freight vehicles

The types of vehicles used to move goods are closely related to the layout of urban supply chains. Understanding the profiles of freight vehicles can help formulate policies and maximize freight traffic flows.

Vehicle classification schemes vary from country to country based on vehicle size, gross vehicle weight, horsepower, number of axles, fuel type, and a wide range of other local factors. In general, road freight vehicles can be broadly classified into two categories.

Heavy goods vehicles (HGVs)

A large vehicle used for the delivery and collection of goods defined as having a gross vehicle weight (GVW) of over 3.5 tonnes.

HGV/truck can cover a wider range of large commercial vehicles including articulated and rigid trucks, and specialist vehicles, such as cement mixers and car transporters.



Type 1



DUMPERS OR TANKERS

Heavy bulk freight, liquid or solid, in dumpers or tankers.

Type 2



HEAVY TRUCKS OR TRACTOR-TRAILERS

Manufactured goods or pallets traveling long distances to and from distribution centers or factories.

Type 3



MEDIUM OR LIGHT TRUCKS (NON-PERISHABLE GOODS)

Non-perishables moving from distribution centers or wholesale markets to points of sale in the urban core.

Light goods vehicles (LGVs)

A smaller vehicle used for delivering and collecting goods with a gross vehicle weight

(GVW) of less than 3.5 tonnes. They are typically used for small-scale urban deliveries and include vans, cargobikes and tricycles.



Type 4



LIGHT OR MEDIUM TRUCKS (PERISHABLE GOODS)

Perishable goods may be transported in similar vehicles or in light or medium duty refrigerated or climate-controlled ones.

Type 5



LIGHT TRUCKS AND SCOOTERS

Transportation within the urban core using light trucks and scooters.

Type 6



WALKING AND CYCLING

Final mile using non-motorized modes like walking and cycling.

Type 7



AUTONOMOUS SOLUTIONS

Vehicles used for a special purpose in a remote area work as last-mile solutions: transport medicines, emergency products, and regular couriers.

Types of goods



Parcel and express



Waste logistics



Temperature-controlled



Facility logistics



General cargo and retail



Construction logistics

The type of goods being moved has influenced the layout of many urban supply chains (e.g., wholesale produce) and understanding these supply chains and the share of goods moved can help stakeholders identify the right mix of vehicles.

“ Moving goods in a hilly city like Shimla is complex and challenging. The COVID-19 pandemic has highlighted the gaps in the urban logistics system. Moving forward, cities need to ensure that logistics solutions work for all. With support from EcoLogistics Project, Shimla is trying to enhance the resilience of the essential goods supply chain by adopting sustainable and integrated planning for urban logistics.”

Ashish Kohli

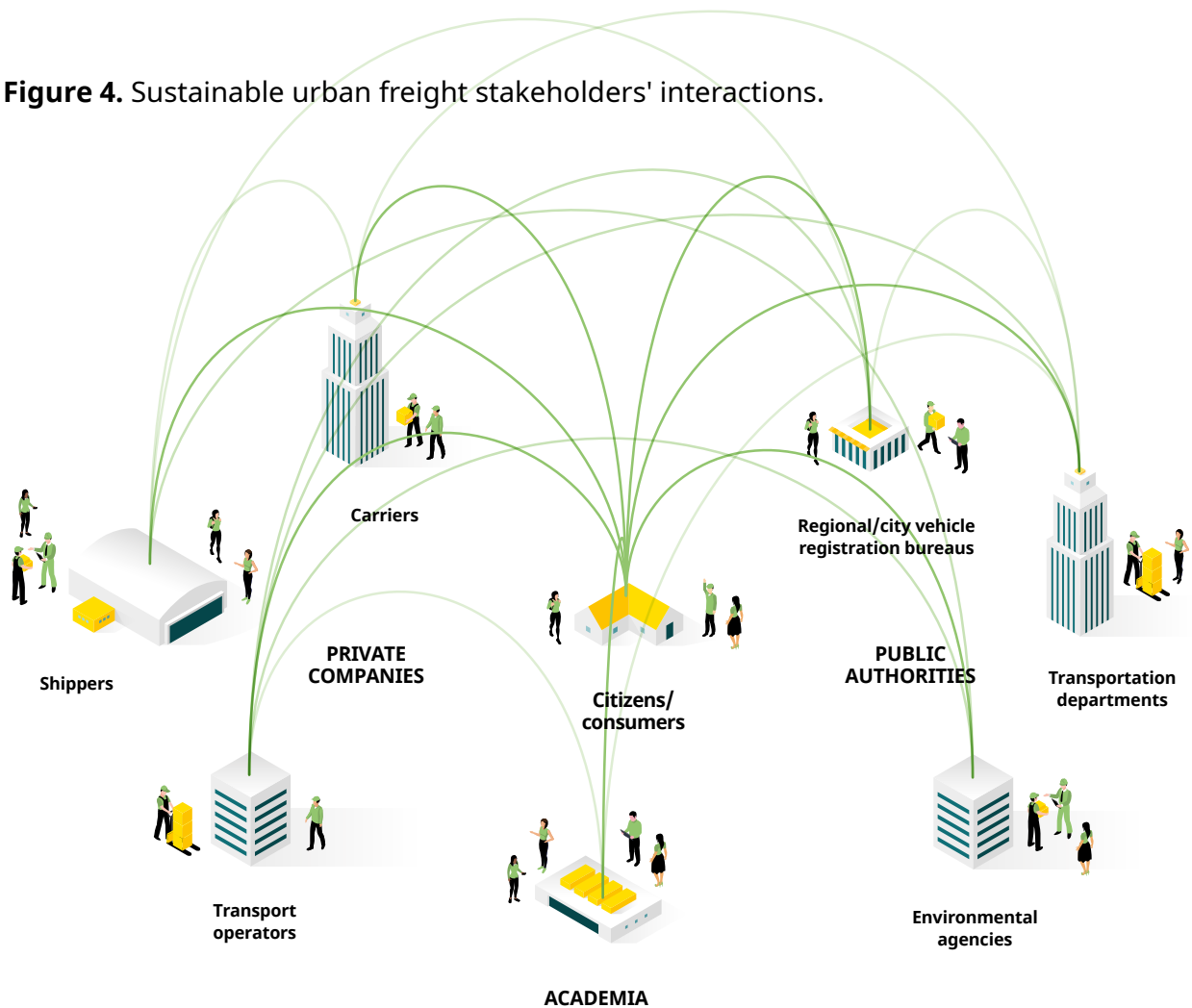
Commissioner, Shimla Municipal Corporation, India

Urban Freight Stakeholders

Freight activity can be difficult to understand because it is fragmented and involves many actors. The success of urban freight strategies and solutions requires the involvement of multiple stakeholders- policymakers, public agencies, private companies, communities, trade groups, individuals and academia (see Figure 4).

The challenge is that very often, the interests and needs of these diverse stakeholder groups are paradoxical. A city's goal of providing unobstructed and open city space for all, counteracts freight operators desire for efficient deliveries and the hopes of the city community for low-cost delivery with the lowest externalities. Therefore, city governments must convene and identify solutions that meet the logistics operators' needs and coincide with the city's sustainability goals.

Figure 4. Sustainable urban freight stakeholders' interactions.



Stakeholder interests and needs

While the public sector is traditionally required to enact transport strategies and policies, the private sector has become increasingly active in implementing and developing innovative solutions.

Driven by commercial profit and competition, new technologies or businesses emerge to meet customer needs more efficiently. Table 1 presents the general interests and needs of the stakeholders in the logistics system.

Table 1. Description of objectives and actions from stakeholders to answer interests and needs.

INTEREST/ NEEDS	SHIPPER	LOGISTICS SERVICE PROVIDER	CUSTOMER / CITIZEN	GOVERNMENT
High-quality operation and delivery service	High-quality service to the receiver for the agreed price	Efficient pick-up service from shippers and drop-off at receiver	High-quality service (Just-in-time deliveries, door-to-door, reliable, accessible, punctual) at an agreed price Efficient pick-up/ delivery	Efficient urban distribution system and network optimization
Cost-effectiveness	Low cost of delivery to maximize profit for agreed service level	Maximizing profit while providing receiver-defined levels of service at the lowest operational cost	Low-cost delivery for high level of service Cost-efficient investments	Light-touch measures A stable regulatory framework that ensures the balance of cost-efficiency and quality of freight transport and logistics services
Business environment	Customer satisfaction	Competitiveness Employee satisfaction to attract and retain drivers and warehouse staff Shipper and receiver satisfaction	Economic vitality	Business climate and economic vitality Stable regulatory framework and business environment for shippers and logistics operators
Environmental concerns	Sustainable operations that create value, do not harm their revenues and increase their business recognition (avoiding instruments like paying per green services)	Environmental concerns (ISO certification) Greening operations to reduce cost and enhance the standard Sustainable operations that create value, do not harm their revenues and increase their business recognition (avoiding instruments like paying per green services)	An attractive urban environment Minimize air and noise pollution, and incidents No impacts on quality of life and health	Minimize negative externalities (GHG emissions, noise, air pollution, incidents)
Urban accessibility	Inclusive labor and equal conditions for all stakeholders in freight transport	Loading and unloading area available, accessible and free to use Consolidation areas or pick-up/drop-off points	Attractive urban environment (no vehicle obstruction or illegal parking) Easy access for pedestrians, cyclists and micro-mobility	Provision of safe space for deliveries and road users Universal access to policy and legal framework that foster inclusion, diversity and equity in all stakeholders of the supply chain
Safety and Security	Security for the operations of freight vehicles	Driver safety Goods security Safer conditions for the operations of freight vehicles	Goods safety Minimize traffic congestion Efficient urban distribution with minimal nuisance	Reduce traffic incidents Safer conditions for all the stakeholders of mobility system, especially the most vulnerable parties (pedestrians, cyclists, micro-mobility and motorcycles drivers)
Livability			Quality of life, economically viable, with low noise and good environment	Ensure the well-being of all stakeholders and users

Table 2. Stakeholder roles.

ROLES	LOCAL GOVERNMENTS	PRIVATE COMPANIES	CITIZENS	RESEARCH & ACADEMIA	OTHER AGENCIES
Political support & advocacy	✓	✓	✓		✓
Facilitate collaboration & partnership	✓	✓		✓	✓
Plan regulation & enforcement	✓	✓	✓		
Research & capacity building	✓	✓	✓	✓	✓
Innovative/ generated solutions		✓		✓	✓
Support innovation	✓	✓	✓	✓	✓
Communication	✓	✓			✓

Although exactly who must be involved in what role may vary based on the strategy or the city context, each identified stakeholder will likely play an important role in the urban freight scene. Key private stakeholders - large and prominent shippers, carriers, receivers, and trade groups - representing key freight agents, such as trucking associations and

warehouse associations operate the freight system and each has a role in developing industry solutions. Researchers play a role in investigation and outreach, identifying bottlenecks, barriers, and gaps to generate possible solutions. Local communities and residents are impacted by freight issues and could potentially contribute to local solutions.



Left: Inauguration of demonstration project, Shimla, India. Right: Meeting with potential stakeholders, Bogota, Colombia.

The roles of local government

Current regulations may cover air quality, parking and loading management, and controls on delivery timings imposed on land use (e.g., a supermarket). Such city regulations can lead to perverse outcomes; for example, banning overnight deliveries increases daytime activity, adding to congestion.

Public agencies play a key role in creating an environment and a management process, whereby all stakeholders can participate and be heard. Cities should work to develop and facilitate transparent partnerships with freight stakeholders to exchange information, share good practices, and ensure industry engagement in regulation consultations.

Such engagement by the government (at both the local and national level), coupled with a stable legal and policy framework and a clear timeline of any future changes will generate trust among all stakeholders in

the supply chain. Greater trust and certainty will ensure faster and earlier take up. These practices allow reducing GHG emissions, without negatively affecting private parties and business models.

The alternative approach would require the public sector to alleviate the negative impacts of freight activity by imposing regulations. This costs money and time, and to be effective, the regulations would have to set a fairly low level of compliance and gradually increase this until the desired outcome is reached. Any such regulations would be likely to impact smaller businesses more severely and any costs are likely to be passed onto the consumer. In an extreme case, it could reduce the number of operators or suppliers willing to deliver within the city.

Finally, cities should frame the need for emission reductions based on the most relevant issues to the public and local communities to garner greater understanding and buy-in.



“ The Urban logistics sector in Indian cities is dominated by informal private operators, which makes coordination difficult. Therefore, an effective framework, such as the multi-stakeholder working group as formulated under the EcoLogistics project in Kochi, could assist cities in integrating, planning and regulating freight as part of urban mobility and development.”

Adv. M. AnilKumar
Mayor, Kochi, India



“ EcoLogistics help to consolidate the city's vision through the District Development Plan. “A New Social and Environmental Contract for the Bogota of the 21st Century”, which includes two purposes closely related to the challenge of carbon neutrality in the transport sector. First, the greening of Bogota and its adaptation to mitigate climate change from the decarbonization of mobility and transform Bogota - Region into an inclusive and sustainable model of mobility, creativity, and productivity.”

Claudia López
Mayor of Bogota, Colombia

Kick-off and implementation of pilot projects, Panaji, India.



Implementing EcoLogistics

The EcoLogistics Principles

The EcoLogistics Principles aim to inspire and support governments at all levels to transform their urban freight systems through collaborative efforts in stakeholder engagement, accelerating the uptake of practical technol-

ogies, and developing and implementing relevant policies and land use planning. Local governments can review the following 8 foundational principles by looking at the different implementations in different cities.



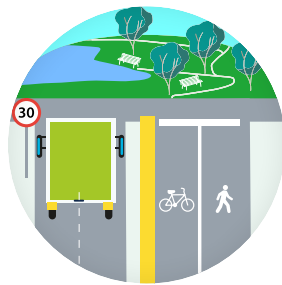
Principle 1

SHIFT TO ALTERNATIVE OPTIONS

Kochi, India. Ernakulam market traders are shifting to 3-wheel electric vehicles.

Panaji, India. Supermarkets are shifting towards electric bikes for last-mile delivery.

Bogota, Colombia. The city implemented the [BiciCarga pilot](#) using electric bicycles for last first mile deliveries.



Principle 2

COMMIT TO SAFER URBAN DELIVERY VEHICLES FOR SAFER STREETS

Bogota and AMVA, Colombia. Have developed a [Vision Zero initiative](#), which promotes Road Safety and reduces deaths and severe injuries on the roads. The actions include changes to the designs of streets and intersections and a Road Safety Plan for Motorcyclists, among others. [Vision Zero](#) is a global approach to Safe Mobility and these cities have included freight since 2019.

Panaji and Kochi, India. As part of their Low Carbon Action plans, they will address reducing road fatalities in the freight sector. The focus areas include behavior and physical changes to reduce the likelihood of incidents occurring.



Principle 3

INTEGRATE LAND USE PLANNING FOR FREIGHT DELIVERY

AMVA, Colombia. Developed the Medellin Territorial Land Use Plan (MTLUP). With strategies in the regional and metropolitan areas for the execution of projects infrastructure for mobility and equipment for support for competitiveness, strengthening the economic base of regional logistics centers.

Kochi, India. The city is planning to revise the comprehensive mobility plan, focusing on urban logistics and its integration with land use.

Santa Fe, Argentina. They are improving the current regulations and development of new ones, to manage the activity and include urban freight transport logistics in urban planning.



Principle 4

SUPPORT CONSOLIDATION STRATEGIES FOR URBAN DELIVERIES

Kochi, India. Plans to develop a multimodal logistics hub near Kalamassery railway station. The multimodal hub includes a consolidation center which should result in improved logistics efficiency.

Santa Fe, Argentina. The city will adapt and build cargo consolidation centers, where heavy vehicles partially store their shipments to leave last mile logistics to lighter and greener vehicles. The first planned center is a parking establishment located west of the city.



Left: Santa Fe, Argentina. Center: Manizales, Colombia. Right: Area Metropolitana del Valle de Aburra, AMVA, Colombia.



Principle 5

OPTIMIZE THE EFFICIENCY OF DELIVERY OPERATIONS

AMVA, Colombia. Volqui: A new app for dump truck drivers to choose the service for construction companies. The app indicates vehicle traceability, capacity and load.

Panaji, India. The Panaji Action plan includes several actions to improve freight vehicle load, resulting in efficiency improvements. The city is validating the concept of load pooling through digital technology.



Principle 6

PROMOTE MULTI-STAKEHOLDER DECISION MAKING STRUCTURES

Bogota, Colombia. The EnCargaTe strategy enabled the setting up of a stakeholder engagement forum which has assisted in implementing the EcoLogistics project.

Kochi and Shimla, India. NITI Aayog and RMI work on fast-tracking freight in India by clearing the stakeholder roadmaps at national levels for the future of freight in Indian cities.



Principle 7

CREATE FRAMEWORKS FOR CLIMATE-FRIENDLY BUSINESS MODELS

Rosario, Argentina. To agree on specific long-, medium- and short-term actions, the city engaged with multiple stakeholders, including a strong group of policymakers, officials, academics, manufacturers, freight operators and unions. As a result, the city implemented and incorporated 20 cargo bikes into the current public bike system, distributed in 8 stations in the city center, with integration of fleet management and data collection software.



Principle 8

EMBRACE THE FUTURE OF SUSTAINABLE LOGISTICS

Argentina, Colombia and India. Bogota, Medellin, Manizales, in Colombia, Rosario, Santa Fe, in Argentina, and Shimla, Kochi, Panaji, in India frame the future actions for Sustainable Logistics in their Low Carbon Action Plans for Urban Freight.

“The Valle de Aburrá Metropolitan Area is part of Ecologistics and the Low Carbon Action Plan, which proposes actions and join forces to increase the efficiency of urban logistics, reduce greenhouse gas emissions and promote sustainability throughout the production chain. I celebrate our alliance with ICLEI because I believe the only way to materialize positive changes is through joint work between the various social actors. Listening, building, and not dividing is my premise to achieve the transformation of the territory and a sustainable future.”

Juan David Palacio | Director of AMVA, Colombia

Approach to EcoLogistics

EcoLogistics promotes the low emission transportation of goods that prioritizes public health and safety, following human centered urban development approach. It will enable circular and regional economies to limit the growth of freight transport.

EcoLogistics follows the strategy of Avoid-Shift-Improve, well established in consideration of energy efficiency in passenger transport. While it is relatively unknown in the freight sector, EcoLogistics partner SFC (Smart Freight Centre, 2017) recommends

the approach to Avoid (and reduce) the freight volume and haul distance, Shift (and maintain) to more sustainable modes of freight transportation, and Improve the logistics operations by use of technologies of operation and better management of logistics.

EcoLogistics: Low carbon freight for sustainable cities focuses on increasing the capacity of governmental and non-governmental stakeholders to build strategies and policies to promote low-carbon and more sustainable urban freight through local action and national support.

Figure 5. EcoLogistics components.



Engaging multiple stakeholders in working groups

A Multi-stakeholder Working Group provides a platform for various stakeholders to come together and discuss issues on freight movement in the city and find solutions. It can also facilitate a long-term partnership between public and private stakeholders, analyzing strengths, weaknesses, opportunities and threats in the freight sector.

EcoLogistics identified the stakeholders relevant to urban logistics, including transport operators, retailers, and courier companies. They were invited to work towards the Low Carbon Action Plan for urban freight, including side strategies for energy use, pollution, waste, food security, economic development, infrastructure, transportation, and planning.

Manizales, Colombia

ICLEI has engaged with the city of Manizales, Colombia, to include EcoLogistics as part of the discussion topic of an existing working group. This working group is called the Territorial Council for Environmental Health (COTSA), formalized by Decree No. 0564 of 2017, within the Climate Change Committee. Representatives from different ministries, public companies, universities and local associations participate, and the group has been engaging with EcoLogistics project activities since 2020.

Benefits

- ✓ Partnership building
- ✓ Inclusive decision making
- ✓ Identification of challenges & opportunities
- ✓ Discussion Forum
- ✓ Transparent dialogue
- ✓ Align stakeholders conflicting interests

Kochi, India

The designated committee for freight is formed in Kochi. The stakeholder group is either anchored at the KMC or KMTA. It comprises different freight stakeholders and serves as a forum where best practices and problems are discussed, and feedback is given. A freight and logistics expert (with an understanding of the local issues) is appointed at the agency to act as a focal point of communication between stakeholders (public and private sectors).

Bogota, Colombia

Created a working group in 2017 called the Urban Logistics Network (RLU- Red de Logística Urbana). The RLU is made up of an alliance between the District Mobility Secretariat of Bogota and the private sector through the strategy called EncargaTE. ICLEI is part of the RLU, a link officially established in 2020.

The RLU seeks to make the circulation of cargo vehicles and the loading and unloading of goods more efficient through regulating, improving and optimizing the use of infrastructure, reducing the negative externalities created by cargo transport in the territory.

Shimla, India

Municipal Corporation Shimla - MCS was approached to play the role of nodal agency in executing the EcoLogistics Project. Given Shimla's conditions on agriculture for India, this group includes transport operators regulating small, medium and large companies, pick-up unions (small owners) including farmers, truck unions and porters. Shimla worked with the regional and national government through the national highway authorities and transport ministerium.

Rosario, Argentina

The Municipality formed an internal technical working team for Urban Freight Transport through decree 2147 in 2019. This team is made up of personnel from different secretariats of the municipality and several private stakeholders that are considered valuable for the consolidation of low-carbon urban logistics.

Santa Fe, Argentina

The city of Santa Fe, Argentina, formed its Local Working Group (LWG) through a Commitment Act in 2019, which was signed by local and regional representatives, academia, the private sector, associations, chambers, carriers and other freight transport and logistics institutions. The established objectives are intersectoral dialogue, guidelines

for decision-making processes, and efficiency in implementing the EcoLogistics project in the city.

AMVA, Colombia

AMVA leads the environmental and sustainable actions in Colombia with the Antioquia Leader Regional Logistics Alliance -ALRA-. They communicate with different stakeholders, allowing the AMVA to obtain new variables and economic items in the study of new measures. This committee will be able to support the management of cargo transportation.

Panaji, India

The stakeholder associated with urban freight governance in the city of Panaji. Include decision-makers in local economic development, regional and national traffic and transport management, urban environment, and civil society groups. GOA sets main goals to influence a reduction of logistics emissions.



Workshop with stakeholders, Bogota, Colombia.

Assembling a baseline

Baseline information outlines existing urban freight movement characteristics across the nine project cities in Argentina, Colombia and India. It provides an account of baseline GHG emissions from urban freight and helps to identify possible interventions to minimize negative freight impacts.

The **baseline** is a result of extensive desktop research, multi-stakeholder discussions, close consultation with public officials, surveys and interviews with logistics companies and freight transport operators in each city. Verified city-specific data was collected and used by stakeholders to ensure robustness and credibility.

Following are the most representative trends in EcoLogistics Cities.

Figure 6. Distribution of vehicle distance traveled (VKT)* by vehicle type in the cities.

Source: ICLEI / Despacio / The Urban Lab / SGArchitects

* VKT measures the total distance traveled by a fleet and is crucial for assessing its impact on the urban road network and environment

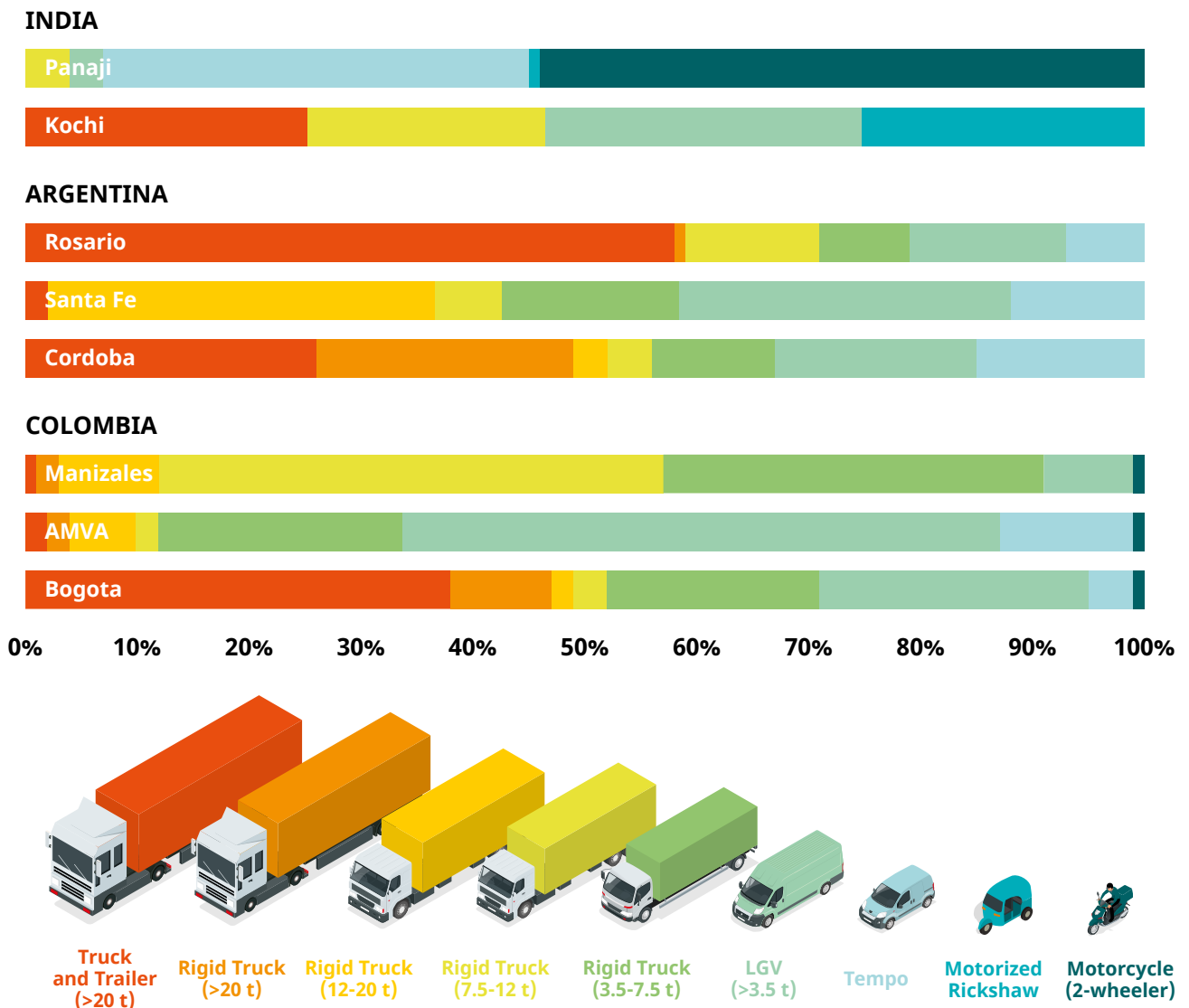


Figure 7. Share of baseline CO₂e emissions by vehicle type baseline.

Source: ICLEI / Despacio / The Urban Lab / SGArchitects

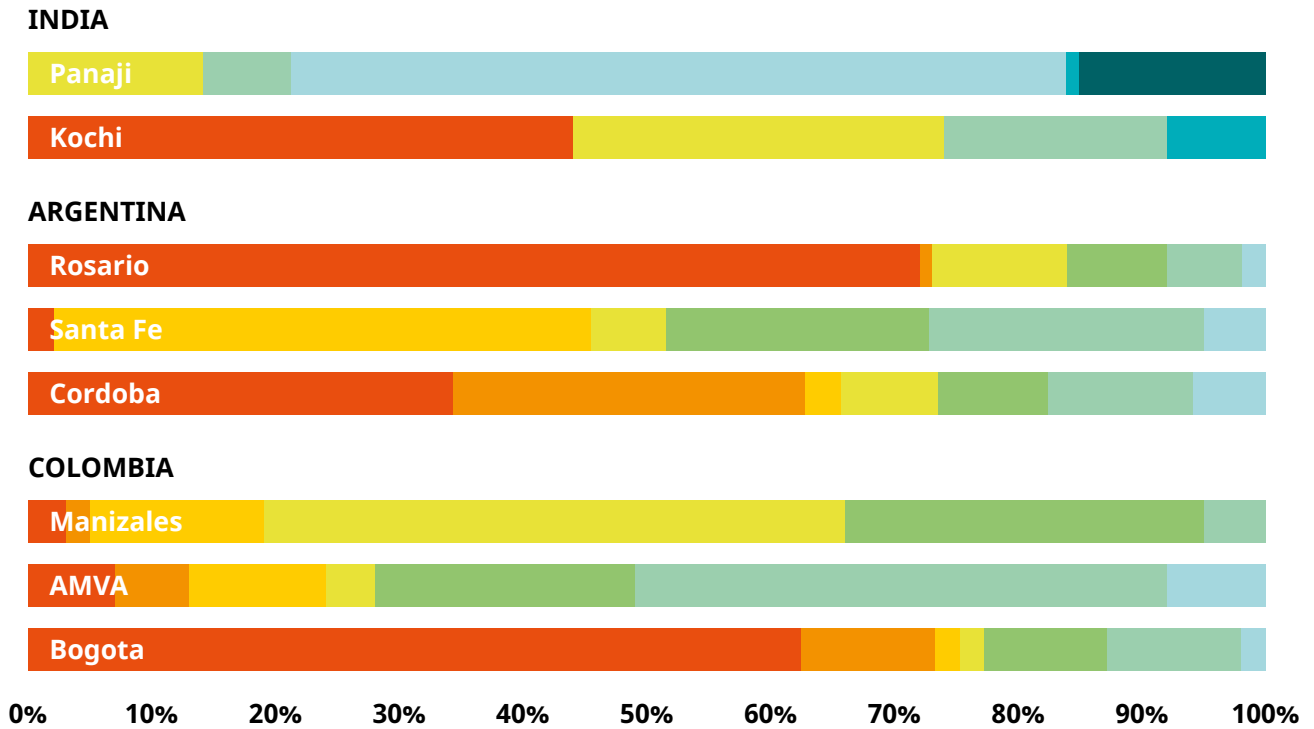
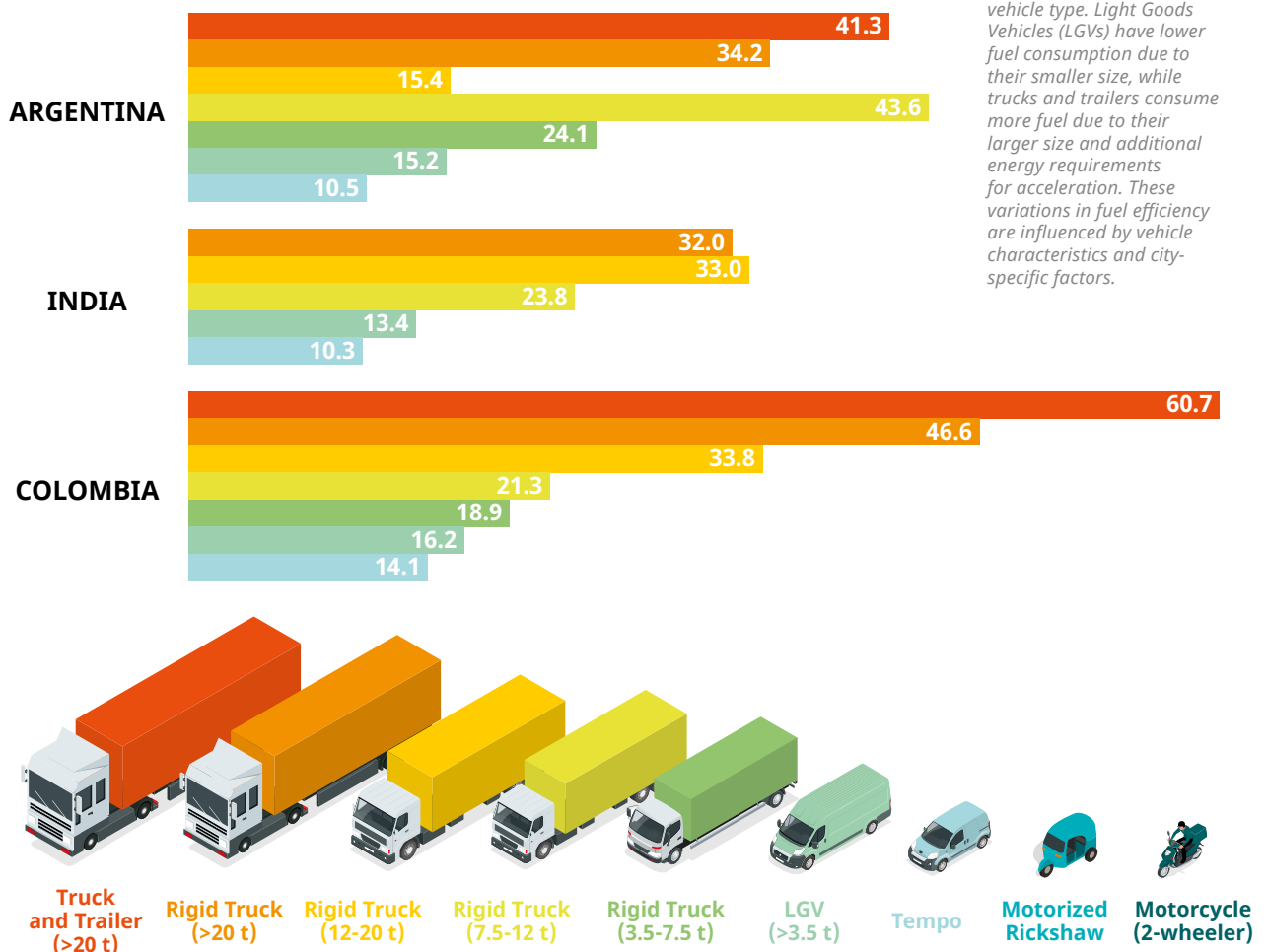


Figure 8. Average fuel consumption* (kg/trip) of the sample by vehicle type for loaded vehicles in Argentina, Colombia and India.

Source: ICLEI / Despacio / The Urban Lab / SGArchitects



* Fuel consumption values vary based on fuel type and vehicle type. Light Goods Vehicles (LGVs) have lower fuel consumption due to their smaller size, while trucks and trailers consume more fuel due to their larger size and additional energy requirements for acceleration. These variations in fuel efficiency are influenced by vehicle characteristics and city-specific factors.

Figure 9. Share of baseline CO₂e emissions by fuel type from the surveyed vehicle fleets*.

Source: ICLEI / Despacio / The Urban Lab / SGArchitects

* Heavy vehicles, such as rigid trucks and truck trailers (>20t), make a significant contribution to CO₂e emissions in freight transportation. Despite their smaller share compared to light goods vehicles, their higher annual mileage and fuel consumption result in substantial emissions. The surveys indicate that over 80 percent of emissions are attributed to diesel-fueled vehicles.

INDIA



ARGENTINA



COLOMBIA



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%



Diesel



Gasoline



CNG



Electricity

Using the EcoLogistics Self-monitoring tool

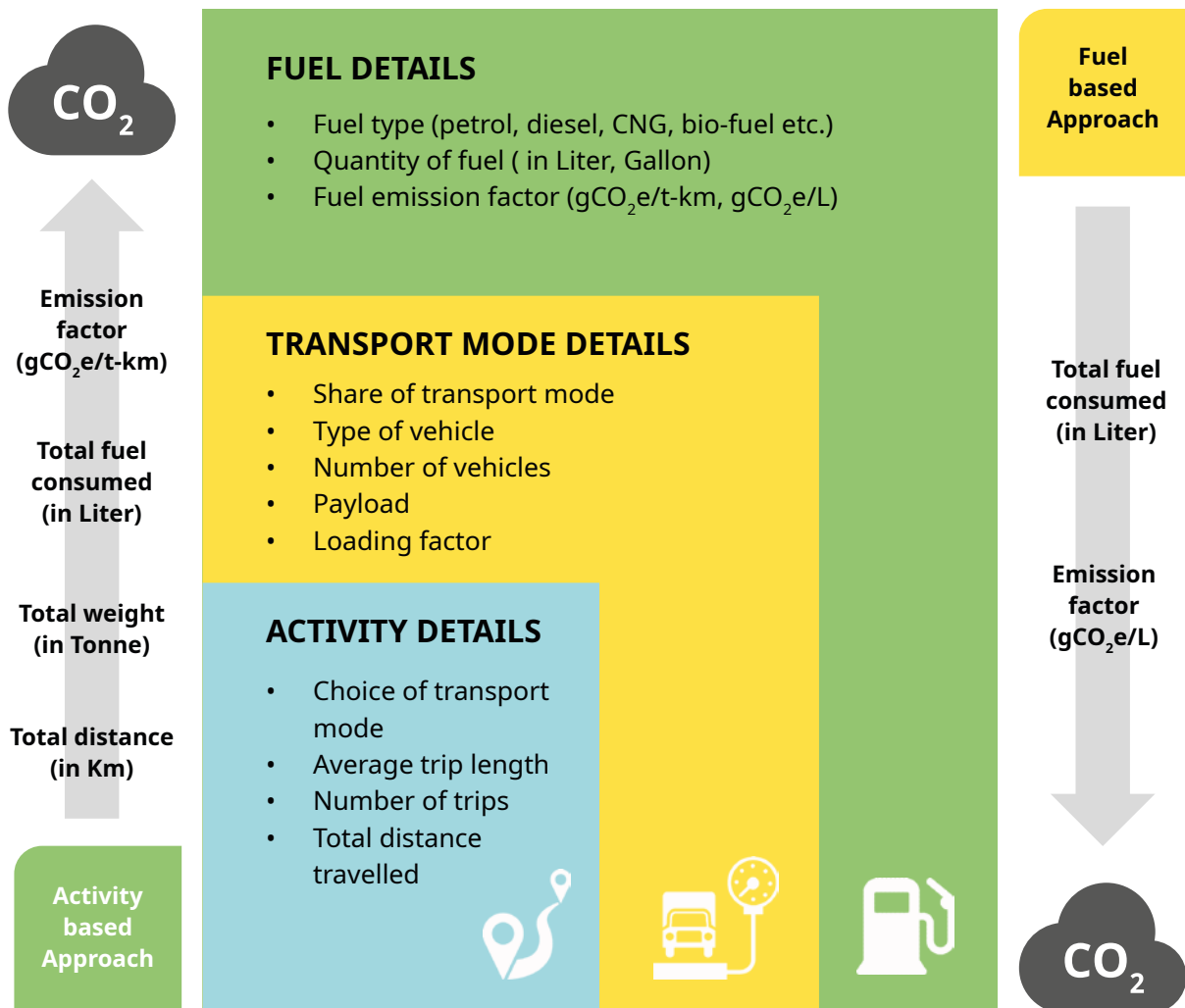
The EcoLogistics Self-monitoring tool has been developed for cities to estimate their GHG emissions from urban freight transport. The tool enables an assessment of baseline and target scenarios where specific solutions or strategies are hypothetically implemented.

Benefits

- ✓ Baseline creation
- ✓ Provides a format for new data collection
- ✓ Allows for scenario building and testing
- ✓ GHG emission estimation

Figure 10. Calculation approach for freight transport emissions*.

* Figure 10 summarizes the methodologies for estimating transport emissions, which can be categorized as fuel-based and activity-based approaches (Smart Freight Centre, 2019). The fuel-based approach utilizes actual fuel consumption data to estimate emissions, while the activity-based approach aims to quantify emissions based on vehicle activity information, such as vehicle kilometers traveled (VKT) or tonne-kilometers (tkm) moved.



The [EcoLogistics Self-monitoring tool](#) provides a calculation tool for local governments to estimate, evaluate and track their urban freight emissions over time. The benefits of a city using the tool include:

- Providing an estimate of city-wide GHG emissions from urban freight transport and a high-level understanding of the emission contributions of different logistics activities
- Using the data collected to establish a baseline and set targets in line with a city's climate change goals
- Encouraging the use of emissions and carbon intensity as performance indicators in target-setting and to track progress over time
- Assessing the potential emission savings of various scenarios and help city leaders to make informed decisions and take actions that lead to emission reductions
- Making meaningful comparisons with other cities in terms of urban freight emissions and sharing experiences
- Contributing to the knowledge base and providing good practice examples
- Becoming a source of inspiration to other cities.

BiciPack (formerly known as BiciCargo) cargo bike station, Rosario, Argentina.



Developing a Low Carbon Action Plan for Urban Freight (LCAP-UF)

After each city identified short, medium, and long-term actions, the low carbon action plans for urban freight (LCAP-UF) were created as policy guidance to improve and evaluate urban freight infrastructure. These plans address key focus areas and policies agreed upon by cities in Argentina, Colombia, and India, including policy and governance enhancements, infrastructure improvements, technology adoption, and traffic management.

Benefits

- ✓ Opportunities for stakeholder engagement and recognizing activity by the private sector
- ✓ Improvement of local understanding of urban freight
- ✓ Creation of a vision of sustainable freight in the city
- ✓ Development of policy for urban freight management, enabling integrated, long-term planning

LCAPs-UF brought the roadmap to the city desktop to ensure sustainable freight action development. This includes current or new actions towards improving stakeholders' involvement in city and logistics planning. Good LCAPs-UF have clearly defined vision and set of goals and detail policies, actions and implementable measures to achieve these goals. Based on the experience of the EcoLogistics Project, these are some of the areas that can be developed for an LCAP-UF.



Policy & Governance

- Develop programs to recognize companies that fulfill environmental regulations and encourage companies to compete and join the different actions. Mapping, monitoring and formalization of informal transport and urban freight logistics.
- Keep and create space with different stakeholders, including unions.
- Renovate freight vehicles with low, ultra-low and zero emissions through management instruments (financial, regulatory, among others).
- Define a cross-sectoral institutional structure working on the subject.
- Develop state-level urban freight policy using building code regulations for off-street delivery areas.
- Integrate urban freight into the city and regional development plan.



Infrastructure

- Improve and manage infrastructure for transit, parking, loading and unloading.
 - Create and implement load consolidation centers or distribution nodes at the local level and their accessibility.
 - Boost last-mile infrastructure and services implementation and add electric mobility infrastructure and services implementation.
 - Multimodal integration, especially for transporting goods from larger to smaller vehicles for last-mile delivery.
 - Installation of freight signage in the city, including a new design for the junctions considering the turning radius of heavy trucks.
-



Technology

- Implement Intelligent Transportation Systems (ITS): GPS, road cameras, real-time vehicle monitoring, logistics technologies, and clean transportation projects.
 - Generate digital tools for the distribution of goods. Use of dynamic routing, ITS for demand aggregation/Load pooling, and real-time information related to loading and unloading areas.
-



Traffic management / Integrated Planning

- Encourage behavioral change. When planning freight with all other modes of transport, businesses and consumers, consider the impacts of their ordering and purchasing of goods and services.
- Zoning areas of the city to define the type of cargo allowed.
- Establish and promote night loading and unloading and off hours.
- Identify areas for micro hubs for developing cross-docking activities in areas with transit regulations for freight transport, low emission zones, or difficult urban access.

Engaging at the national level

Once local governments agree on specific policies within the LCAP-UF, it is essential to scale them up to the national level to foster alignment and harmonization of indicators. This process facilitates a better understanding and ensures the potential replication of successful actions among peer cities. The National EcoLogistics Policy Recommendations (NELPR) are reviewed by the national government and serve as a guiding framework for cities seeking to enhance their urban freight situations.

Benefits

- ✓ Vertical integration
- ✓ Strengthening institutional structure
- ✓ Including urban freight in national planning
- ✓ Promoting wider multi-stakeholder collaboration
- ✓ Setting targets for GHG emissions reductions for urban freight transport
- ✓ Accelerating change in other cities

The NELPR have been developed to increase the opportunities for vertical integration of actions by highlighting the potential issues and solutions to reduce the negative effects from urban freight. The recommendations also suggest changes to appropriate framework conditions that could accelerate and strengthen local actions in other cities in India, Colombia and Argentina to improve urban freight.



NATIONAL RECOMMENDATIONS

India ([visit](#))

- Promote multi-stakeholder collaboration through institutional reforms and make it part of the decision-making process.
- Develop a dynamic information collection framework related to urban freight.
- Develop a long-term vision for sustainable urban freight in the cities.
- Integrate urban freight as part of urban mobility and city development plans/master plans.
- Formulate state-level urban freight policy.
- Focus on multimodal integration between regional (intercity) and urban (intracity) freight.
- Focus on integration between urban freight and land use planning and demarcate low emission zones where appropriate.
- Embrace the use of relevant and proven technology to improve the efficiency of urban freight vehicles.
- Institutionalize eco-driving training to encourage behavior change.



* Area Metropolitana del Valle de Aburrá - AMVA

Colombia ([visit](#))

- Develop a policy framework to encourage operators to acquire a cargo fleet with low and zero-emission technologies.
- Develop incentive programs for changing freight transport behavior and encourage the uptake of relevant technology in cities.
- Develop locally protected air zones incorporating zero-emission last-mile solutions in cities or regions where appropriate.
- Include freight logistics in the mobility plans of all cities or regions.
- Develop an institutional figure in charge of innovation and emission reduction projects for cities or regions.
- Behavior change and driving training are important to control the curbside and retiming (off-hours) deliveries.



Argentina ([visit](#))

- Develop a space for planning, management and articulation of Urban Logistics policies within the organizational structure of the National Public Administration, with a comprehensive and participatory vision.
- Increase the knowledge and understanding of technical personnel in the municipalities and provinces regarding developing and incorporating low-carbon Urban Logistics plans within their urban mobility plans, articulating these actions within local planning strategies and instruments.
- Create an Urban Logistics Observatory as a space for consolidating information at the national level, which manages statistical data for formulating sectoral policies, becoming a strategic tool.
- Develop a national program of incentives for companies of different scales that promotes the fleet's renewal and facilitates the incorporation of less polluting vehicles into urban logistics.
- Encourage the promotion of innovative and integrated local experiences in logistics and urban freight transport to create solutions based on collaborative working. Ensuring urban logistics is included in regional agendas and making sure the implications and impacts are visible is a challenge. Hence, experimentation and implementation of pilot projects are key tools.
- Create awareness, training and communication programs aimed at the different stakeholders involved in defining and implementing policies and investments in Urban logistics.

Demonstrating how EcoLogistics can work in a city

Demonstration projects showcase the potential of implementing feasible strategies identified by a project city with active multi-stakeholder participation. Such projects will introduce innovative concepts, raise awareness, demonstrate commitment from both the public and private sectors and build trust. An initial pilot can create further opportunities and provide the justification to unlock resources for implementing more complex low-carbon UF initiatives on a much larger scale.

Benefits

- ✓ Demonstrate commitment and build trust between the public and private sector
- ✓ Promote multi-stakeholder collaboration
- ✓ Easier demonstration of costs and impacts from projects of limited scale and duration
- ✓ Initial project or pilot can
 - Spur new ideas
 - Allow refining of solution before a major expense
- ✓ Unlock resources

Using project resources, the EcoLogistics Project lead collaborative pilot projects in Rosario, Bogota, Kochi, Shimla, and Panaji to decarbonize urban freight transport. By adopting zero-emission vehicles and implementing sustainable practices, these cities are making significant strides in reducing greenhouse gas emissions. The aim is to scale up these initiatives and involve various stakeholders in the process.

New loading demarcation for freight management in Shimla central market, Shimla, India.





“BiciPack” Bicycles for Sustainable Logistics

Rosario, Argentina

After the engagement with the mobility office, public operators, and small businesses, ICLEI, with the municipality, pushed innovation in Rosario, working with startups to deploy 20 cargobikes with geo-fencing technology and the associated infrastructure into the public bike hire scheme.

Potential benefits

- An online monitoring tool, to measure GHG emissions reductions, and logistics operation indicators.
- Reduction of GHG emissions due to modal shift for the distribution of goods.
- Improvement of local air quality.
- Increased efficiency in distribution (time, fuel reduction, among others).



Proofing alternatives for fleet replacement and consolidation for last mile freight in Bogota

Bogota, Colombia

The project aims to showcase the fleet replacement for last-mile logistics by agreeing with the city and different freight operators. EcoLogistics supports the inclusion of cargo bikes, electric vans, and electric tricycles to the operation in one of the areas identified by the city with low air quality.

Potential benefits

- Mitigation of air pollution and associated diseases.
- Reduction of GHG emissions.
- Better levels of service and efficiency in distribution.
- Proofing the scalability of fleet transformation.
- Less congestion and road accidents due to the use of smaller vehicles.



Introduction of electric loaders in the prominent market centers and develop charging infrastructure

Kochi, India

Introduction of electric three-wheel freight vehicles in a prominent market center and the development of relevant charging infrastructure in Kochi.

Potential benefits

- Introducing electric LCVs to replace fossil fuel-operated vehicles and showcase their feasibility and viability to goods vehicle operators and shop owners.
- During the monitoring period, the project aims to save consumption of diesel, resulting in an emission reduction of more than 20 tons of CO₂e.



Ongoing freight packing & loading zones

Shimla, India

By selecting 17 of Shimla's highly dense traffic zones, the city authority, with help from ICLEI EcoLogistics, will manage and transform the curb into an order zone for freight parking, and loading and unloading. The city will introduce new signalization and implement time frames for operations. During this work, the city drivers will receive instructions on eco-driving.

Potential benefits

- Reduce traffic violations, congestion and distance traveled, and improve mobility and environmental sustainability.
- Address the congestion and emissions caused by the freight sector on identified road stretches through short-term interventions.
- Develop the capacity of city staff and other stakeholders in working with the freight sector through training and workshops.



Promotion of collaborative last mile delivery (load pooling) through electric freight vehicles

Panaji, India

Promotion of collaborative last mile delivery (load pooling) using electric freight vehicles while keeping an equal level of services on current operations.

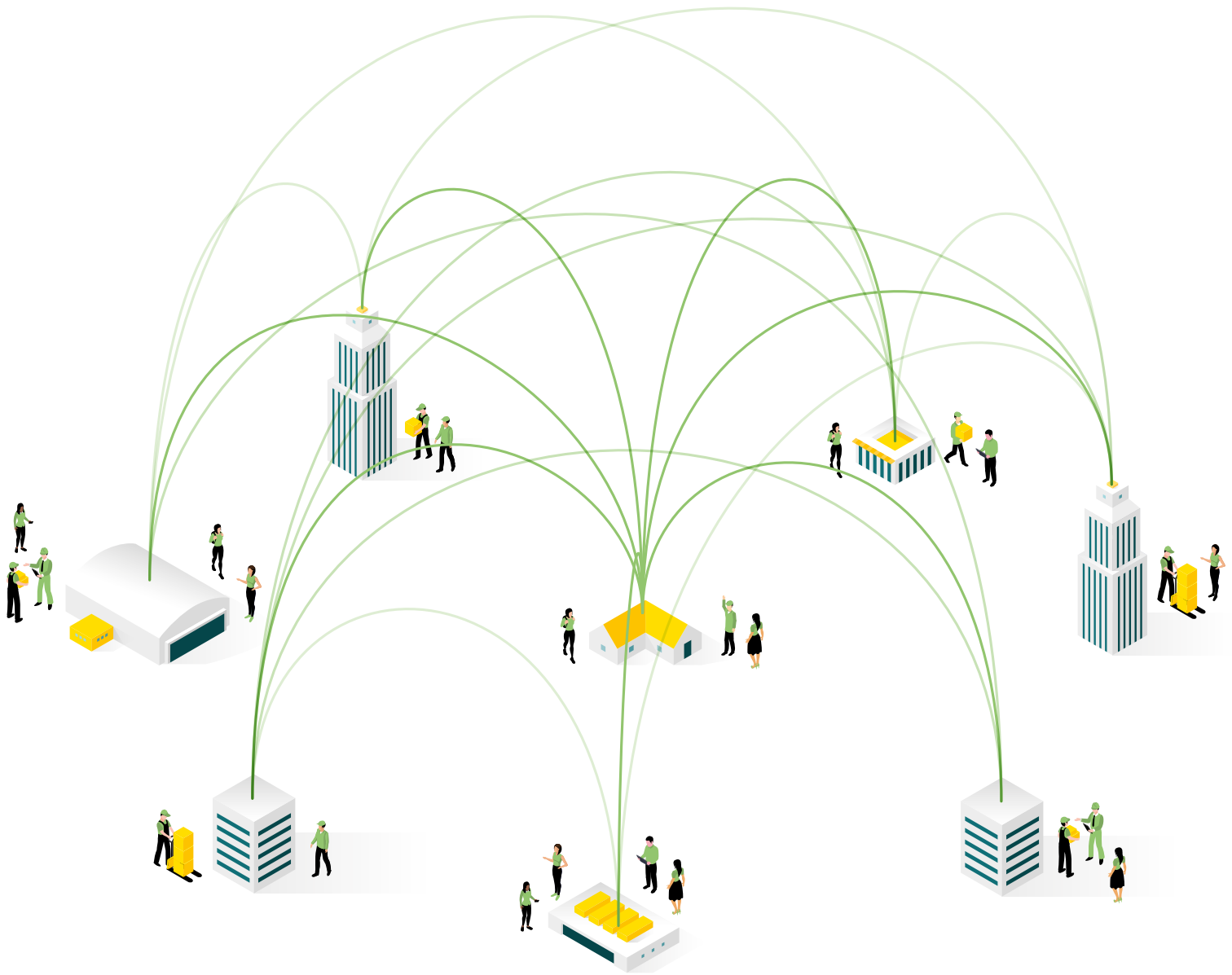
Potential benefits

- Introducing a fleet of electric freight vehicles to assist in accelerating the phase-out of the ICE-based LCV and 2 wheelers fleet.
- Testing the concept of load pooling through electric freight vehicles.
- The estimated shift of 10,000 deliveries into electric vehicles (over 100 days of monitoring).
- Evaluating the potential of scale and reduce emissions in the mid and long term.

“EcoLogistics initiatives are real pathways for transformation, action and consensus, allowing us to move towards the city we want: an integrated, nearby, resilient, caring and sustainable city.”

Emilio Jatón

Mayor, Santa Fe, Argentina



The Future Outlook for Sustainable Freight

Looking Ahead

Estimates suggest that growing demand for e-commerce delivery could result in 36% more delivery vehicles in inner cities by 2030 (World Economic Forum, 2020). As the demand for urban freight is rising, so is the case for sustainable freight.

To combat air pollution and reduce GHG emissions, there is a policy focus on electrifying the urban transportation system, but the use of big data and electrification could drive even more consumer demand for e-commerce. There is also a trend towards automation, and while the use of autonomous vehicles could improve operational efficiency, the cost of the technology and the energy requirements are yet to be fully understood.

How quickly these changes occur will be critical, especially when compared to world

events and changes to our climate that appear to be having increasingly serious impacts on more and more people across the world.

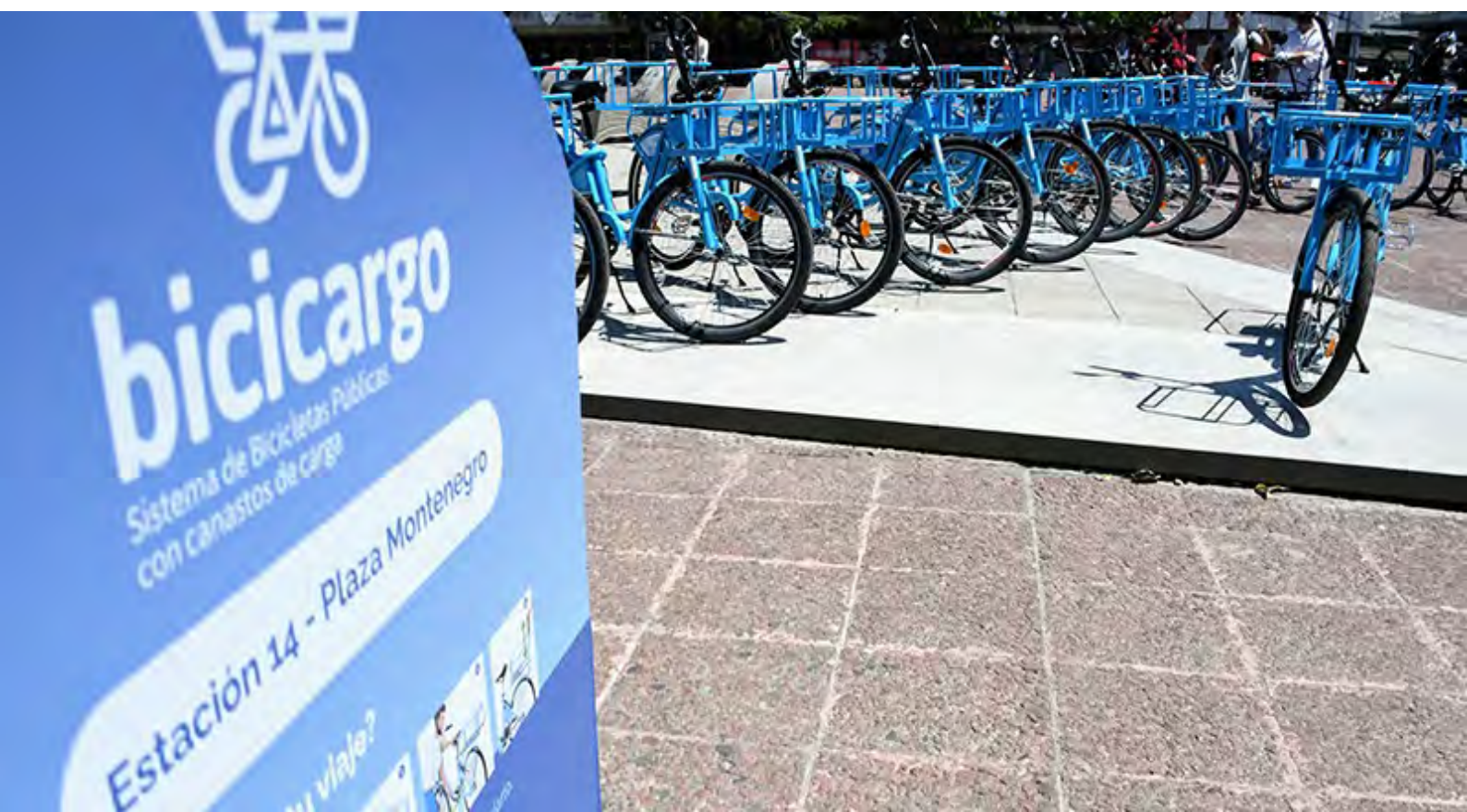
While the private sector is developing smart and digital platforms for business operations and to increase consumer-friendly services, local governments need to be more dedicated to regulating and planning sustainable urban logistics, to ensure equitable and livable cities.

“ *The EcoLogistics project allows the city to adopt mobility policies for sustainable logistics, to respond to environmental, economic and social needs.*”

Pablo Javkin

Mayor of Rosario, Argentina

BiciPack cargo bicycles (formerly known as Bicicargo) deployed in the city, Rosario, Argentina.



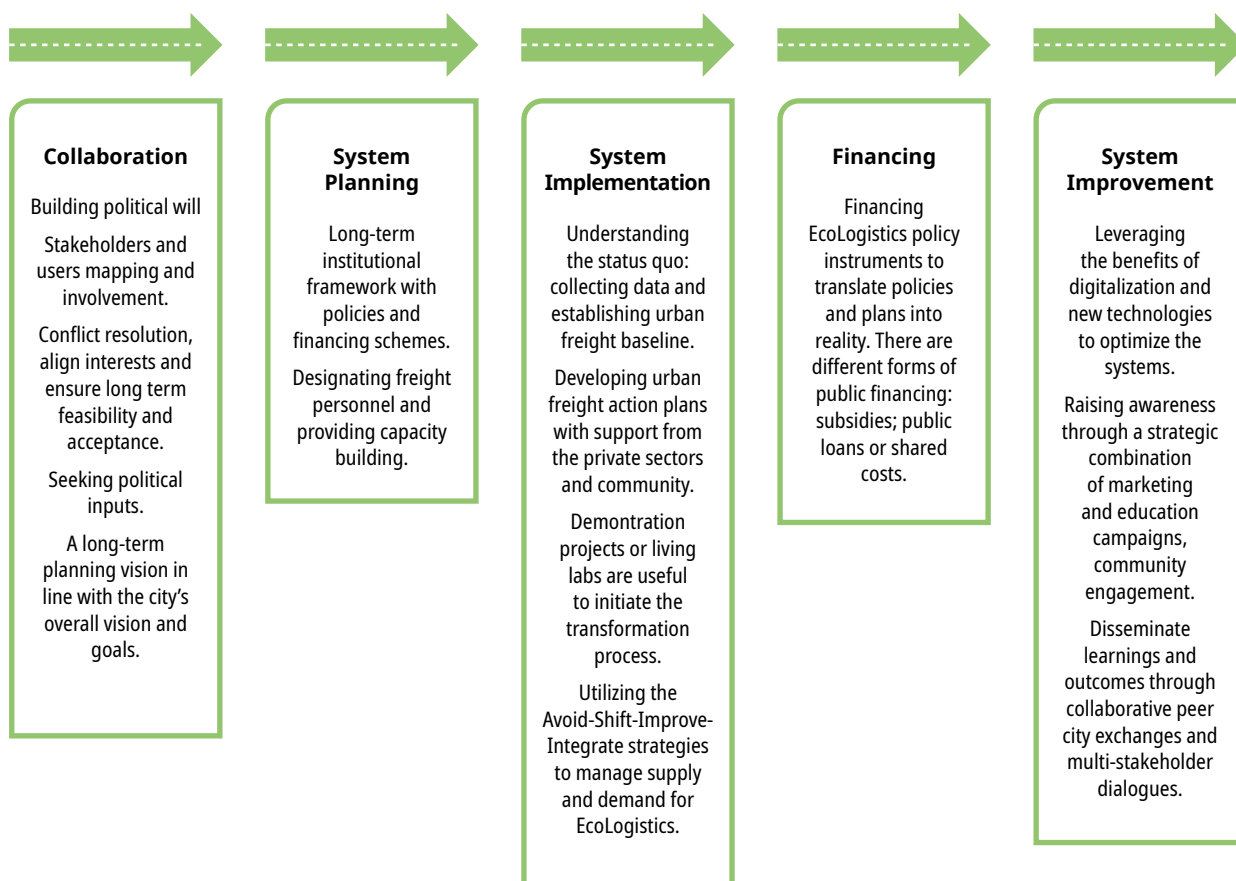
Sustainable urban freight planning is only likely to increase in importance and complexity. While cities are rapidly improving their understanding and planning for urban logistics, ambitious actions and solutions by

local government are essential to meet the rising challenge and demand.

The steps cities could take to plan and implement sustainable urban freight systems are shown in Figure 11.

Figure 11. Process of implementing sustainable urban freight systems.

SUSTAINABLE URBAN FREIGHT SYSTEMS



“Manizales participate in EcoLogistics, setting fundamental objectives to increase the efficiency of urban logistics by reducing GHG emissions. The project initially developed a baseline for the characterization of the cargo transport sector in the city. Subsequently, using the Emissions Self-Management Tool, we set a series of actions to optimize the efficiency of the city's urban logistics system.”

Carlos Mario Marín
Mayor of Manizales, Colombia

The EcoLogistics Community

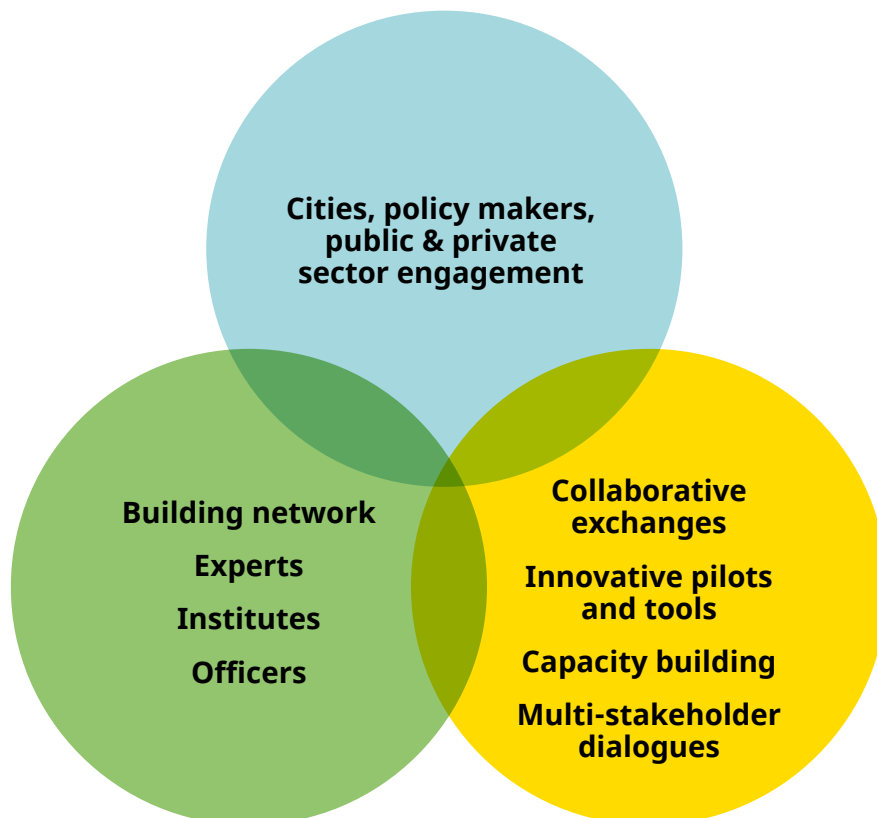
Recognizing the gap between what exists and what is needed, ICLEI launched the EcoLogistics Community in 2019, the first global city network committed to a sustainable urban logistics future.

The Community aims to be the global platform for highly committed cities and expert organizations advocating and driving sustainable urban logistics in towns and cities on an international stage.

Through collaborative exchanges, innovative pilots and tools, capacity building, and

multi-stakeholder dialogues, the Community supports local governments to enhance innovative capacity and practical actions in sustainable urban logistics. Cities benefit from being part of the Community through the shared knowledge and the resources made available to the network, and the opportunities to disseminate their successes.

Express your interest by contacting the team at ecologistics@iclei.org to learn more about the membership screening and selection process.





Mariquita coffee cableway 1922, Manizales, Colombia.

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Low carbon freight for sustainable cities

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