ICLEI
Local Governments
for Sustainability

桃園市政府
Taoyuan City Government

EcoLogistics
Community
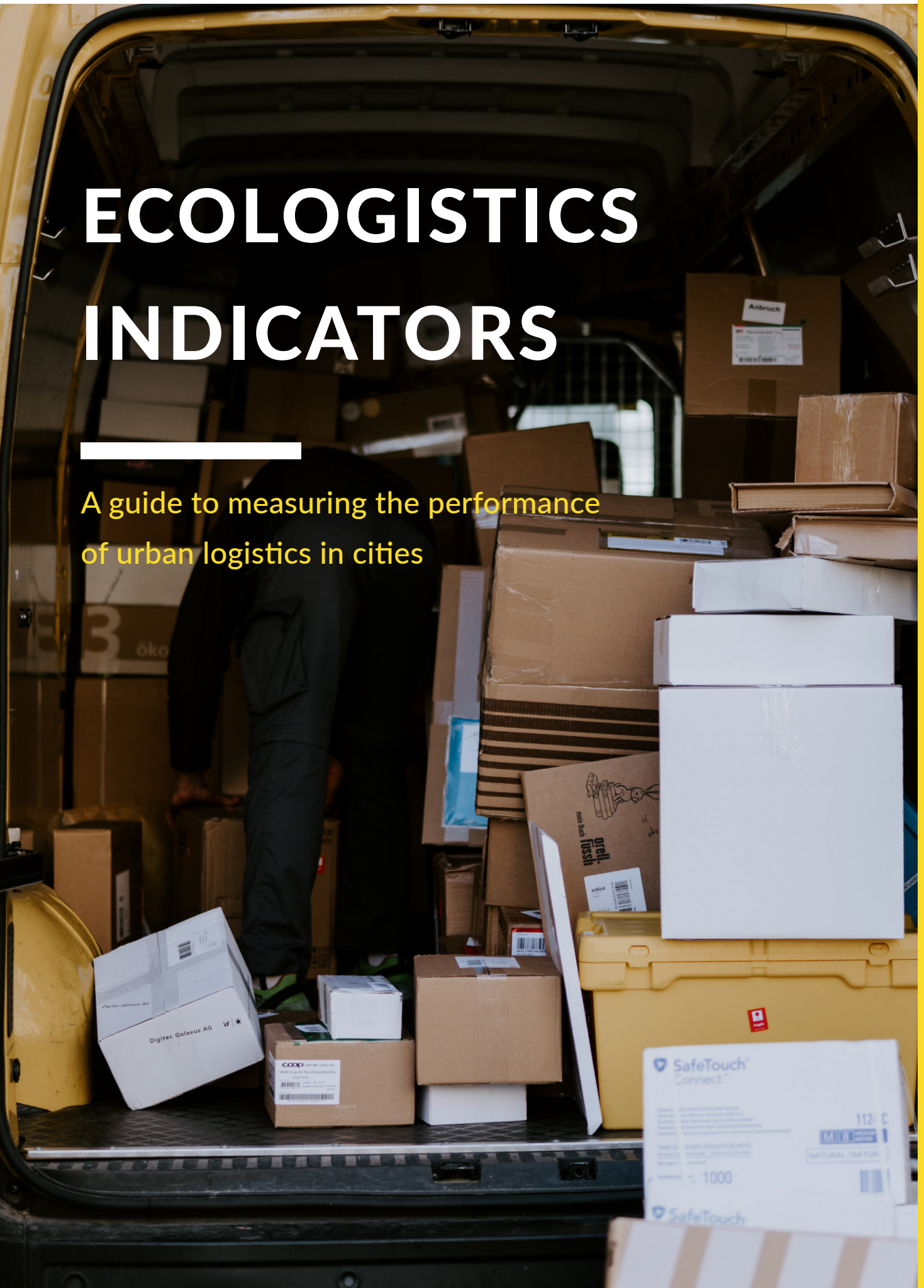An ICLEI-Local Governments for Sustainability Initiative

ECOLOGISTICS INDICATORS

A guide to measuring the performance of urban logistics in cities

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1. INTRODUCTION

The sustainable development of urban logistics activities is a growing concern in many cities. Driven by e-commerce and the COVID-19 pandemic, urban freight movement is an issue more relevant than ever for cities to address. While urban logistics acts as a backbone of the urban economy, supporting industries and society, many negative externalities on environmental, societal, and economic impacts are also widely acknowledged. Urban freight vehicles emit a more significant proportion of certain pollutants per kilometer than passenger cars or motorcycles.

Traditionally, urban logistics are thought of in terms of efficiency to maximize the profit of shippers and logistics vehicles. A sustainable and efficient freight logistics sector is essential to maintain the city's competitive edge, economic growth, and quality of life. Hence, EcoLogistics refers to promoting goods transport by prioritizing health, safety, low-emission, and people-centered urban development. It encourages circular and regional economies while limiting the impact of freight transport.

1.1. Why use an EcoLogistics Indicators system?

A sustainable logistics performance measurement system is valuable for policy makers to intervene and make informed decisions to improve the logistics system's efficiency without compromising social and environmental components.

Policymakers must evaluate any solutions holistically and in consultation with relevant stakeholders, such as logistics system users or communities impacted by the operation. There is now global recognition of the importance of a comprehensive approach to evaluating the mobility system that captures sustainability's different facets. However, a coordinated strategy for assessing the ecologistics system is still very much lacking with sporadic attempts. As such, ICLEI hopes to utilize this opportunity to work on a methodological framework to evaluate sustainable urban logistics impacts. It does not seek to be a unique, "one-size-fits-all" framework but allows transferability and versatility to customize according to the various cities' needs.

Qualitative analysis is significant in identifying the prevailing trends from various stakeholders, especially on the availability of systems or processes to approach ecologistics within the city. The EcoLogistics Indicator system will serve as a self-assessment tool to evaluate the status quo of the city's approach to managing sustainable urban logistics, with the potential of re-evaluation every two to three years to identify the progress, trends, and needs for intervention. This is part of the process for developing a Sustainable Urban Logistics Plan (SULP) or a similar action plan or pathway policy document to intervene and plan for the short-, medium- and long-term strategies.

Therefore, cities need to understand its ecologistics performance's status quo to identify gaps and opportunities for strengthening policies and interventions. The indicator system is structured into dimensions that take into account the need for sustainability: (1) environmental sustainability, (2) social equity, (3) economic sustainability, and (4) operational efficiency. These four dimensions form the basis of ICLEI's EcoLogistics Framework adopted for the EcoLogistics Indicators (ELI).

2. BACKGROUND TO THE ECOLOGISTICS INDICATORS

Acknowledging the difficulties in terms of time and financial resources needed for cities to collect meaningful data, the EcoLogistics Indicators is by no means an exhaustive list of indicators. The indicators' goal is to provide policymakers and advisors a snapshot of the city's ecologistics situation. Therefore, selected indicators need to fulfill these criteria: relevance, measurable, and usability in communicating and comparing the objectives. In developing the indicator systems, various consultations are made with multiple policymakers, academia, and technical consultants, and the final set of indicators is streamlined and selected.

Therefore, the EcoLogistics Indicator's goal is to look at urban freight sustainability from a cross-sectoral perspective with participation from multiple stakeholders and city departments and align with the city's policy objectives in sustainable urban logistics.

2.1. ICLEI's EcoLogistics Framework: Linking stakeholder needs and challenges to the policy goals

Urban logistics is the goods and service-related transport movement that begins and ends in the city and requires a wide range of stakeholders. An urban logistics chain describes the transport, storage, packaging, and handling of products as they move from the shipper to the final sale or consumption point. The operation encompasses stakeholders with varying interests, including the following:

- **Shipper** (manufacturers, wholesalers, producers, retailers)
- **The logistics service provider** (warehousing, consolidation center operators, transporters, carriers)
- **Receivers** (individual consumers, shopkeepers, commercial establishments)
- **Society** (the community that are not using the delivery services directly but are indirectly impacted; influences the market demand)
- **Government** (the local authorities and policymakers are the primary influencer, regulator and planner of the urban infrastructure and logistics systems)

While the public sector plays a role in policymaking, law enactment, and infrastructure provision, the private sector plays an increasing role in lobbying or implementing strategies. Driven by commercial profit and competition, new technologies or businesses emerge to meet customer needs more efficiently.

Very often, the interests and needs of the myriad of interest groups are paradoxical. Cheap and fast delivery usually counteracts the city's goals in providing unobstructed and open city space for all, while the city community hopes for reasonable and 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. **Table 1** presents the general interests and needs of the stakeholders in the logistics system.

Table 1: Interests and needs of the stakeholders

Interest/ needs	Shipper	Logistics service provider	Receivers	Society	Government
High-quality operation and delivery service	High-quality service to the receiver for the agreed price	Efficient pickup service from shippers	• High-quality service (Just-in-time deliveries, door-to-door, reliable, accessible, punctual) at an agreed price • Efficient pickup/delivery	_	Efficient urban distribution system and network optimization
Cost-effectiveness	Low cost of delivery to maximize profit for agreed service level	Maximizing profit with high-quality service at the lowest operational cost	Low-cost delivery for high level of service	Cost-efficient investments	Low-cost measures with high returns
Business environment	Low cost of delivery to maximize profit for agreed service level	Maximizing profit with high-quality service at the lowest operational cost	Low-cost delivery for high level of service	Cost-efficient investments	Low-cost measures with high returns
Environmental concerns	Environmental concerns	• Environmental concerns (ISO certification) • Greening operations to reduce cost and enhance the standard	An attractive urban shopping environment	Minimize air and noise pollution, and incidents	Minimize externalities (noise, air pollution, incidents)
Urban accessibility	_	• Loading and unloading zones • Consolidation areas or pickup/drop-off points	_	• Attractive urban environment (vehicle obstruction, illegal parking) • Easy access as pedestrians and cyclists	Provision of safe space for deliveries and road users
Safety and security	_	• Goods security • Driver safety	Goods safety	• Minimize traffic congestion • Efficient urban distribution with minimal nuisance	Reduce traffic accidents
Livability	_	_	_	Quality of life	Ensure the well-being of all stakeholders and users

Traditionally, the performance of the system is measured against operational efficiency, reliability, and profitability. However, to address the urban freight system's challenges, cities and policymakers must look at ecologistics from a cross-sectoral perspective for balanced economic and sustainable growth. This means that sustainability goals must also be considered to consider larger communities' and public' interests. The ICLEI's EcoLogistics Framework outlines four dimensions that balance the interests of diverse stakeholders while achieving the city's overarching goal in sustainability, which forms the backbone of the EcoLogistics Indicators:

- **Environmental sustainability** refers to reduced air and noise pollution, greenhouse gas (GHG) emissions, energy consumption from freight operations
- **Social equity** ensures safety, public participation in city policies, and overall quality of life of the local communities to minimize disturbances to the communities resulting from logistics operations
- **Economic sustainability** maintains the economic competitiveness of the city and addresses energy efficiency and overall freight sector efficiency and affordability
- **Operational efficiency** is a coefficient of delivery productivity (e.g., average payload), utilization (e.g., fleet), and reliability (e.g., timeliness).

2.2. The EcoLogistics Indicators System: Linking the policy goals to the ELI

The following figure presents the EcoLogistics Indicator System structure, which consists of four main dimensions and key indicators describing the progress to achieve the policy goals. There are also interactions between these indicators. Sub-indicators are presented in Section 3.
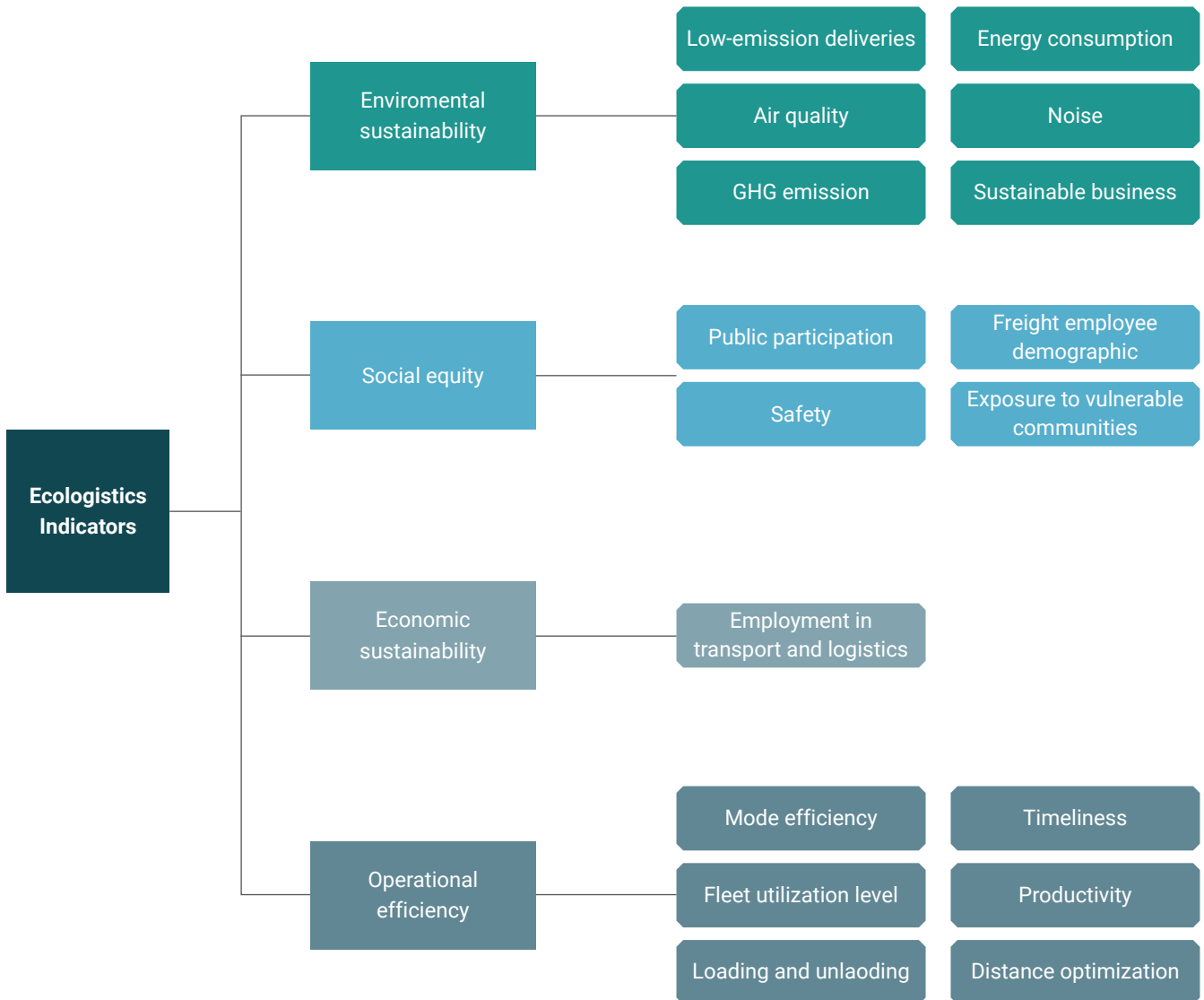
Figure 1: Overview of the EcoLogistics Indicators

2.2.1. How does it work?

The manual acts as a baseline tool for cities to compare and analyze various urban freight indicator data to measure sustainability. The baseline data can be measured against existing target values to measure the achievement. Cities may also collect reference values from international studies and sources as a benchmark. However, to best customize for your city's context, cities should adjust the target value based on the policy targets, i.e., the target value to be achieved in the future. The indicators will allow cities to make meaningful comparisons over time and with other cities in terms of urban freight sustainability.

2.3. How to use the EcoLogistics Indicators system

This section presents the steps for cities interested in conducting the assessment:

Step 1	Step 2	Step 3	Step 4	Step 5
Cities interested in conducting the assessments are encouraged to study the Manual and form a Task Force for EcoLogistics comprising city staff	Decide the goal of the study – collect baseline data to set policy target for the city	Data collection and compilation	Self-assessment process	Review policies, plans, and actions as part of the Sustainable Urban Logistics Plan or a similar policy document

The implementation process is not part of the existing EcoLogistics Indicators process. However, it is suggested that the city continuously revisit and review the progress every two- to three years to understand the progress and for continuous improvement.

Table 2: Description of the steps for the EcoLogistics Indicators system

Step	Description	Meeting
Step 1: Forming a Task Force for EcoLogistics	The city can form a Task Force comprising two-to-three city staff reporting to the Head of EcoLogistics Department or a similar function. The Task Force's primary role is to collect data and inform the assessment progress to the broader city departments and policymakers, particularly the Mayor, to make critical decisions based on the assessment results.	Kick-off meeting with the Task Force and ICLEI
Step 2: Decide the goal of the study	Set a policy target so the city can track progress in the future.The policy target would help the Sustainable Urban Logistics Plan development and monitoring process.	Kick-off meeting with the Task Force and ICLEI
Step 3: Data collection and compilation	The Task Force personnel can commence the data collection process by: - Scoping exercise (to determine the scope of the city) - Studying the indicators and if additional indicators must be included that are relevant to the city's policy goals - Timeline and realistic resources required - Data collection methods for various indicators The city can commence the data collection process, where different types of data sources can be considered, either primary or secondary sources (see Appendix 1).	Taskforce ongoing meetings
Step 4: Self-assessment process	Based on the data and information collected, review the data and analyze the relationships, the interconnections and conduct a gap analysis to provide a narrative to the quantitative data.	Taskforce assessment meeting with EcoLogistics Director
Step 5: Review policies, plans, and actions (short-, medium- and long-term)	Based on the information acquired, the city can review the existing policies, plans, projects, and strategies and determine if significant changes are needed to be made. It is suggested that a wider discussion can be made with the decision-makers on the actions and interventions required to achieve the policy goals and targets. It is suggested to hold one Strategy meeting moderated by the Task Force with other high-level decision-makers, policymakers, and stakeholders to present the data, discuss the findings, review the policies, and discuss short-, medium- and long-term strategies interventions.	Strategy meeting with pertinent multi-stakeholder groups moderated by the Taskforce

2.3.1. How to collect data or evidence?

The actual process of evidence collection varies from indicator to indicator. Some indicators might already be clearly defined in a given city, whereas others will need to be investigated and assessed for the first time.

When considering the evidence necessary for any given indicator, it is recommended to refer to the Indicator description section **(Section 3)**, which summarizes suggested evidence for each indicator.

Suggested evidence should, when available, always be collected. Cities are generally expected to provide all available evidence to support an indicator. Overall, we differentiate three types of evidence:

- Hard facts (F) through surveys, monitoring data;
- Policy/strategy documents or reports (D); and
- Expert judgment (J), where data is not available, an educated guess can be made.

For quantitative indicators, provide a brief note next to the figure on how calculations were done, what data sources were used, and if relevant, refer to the person or service who was in charge of measuring that particular indicator for more information.

For qualitative indicators, highlight the specific sections and pages in the planning and policy documents or reports where you find the evidence for the indicator you are looking for i.e., do not just refer to the entire document over 100 pages.

More information about data surveys is provided in **Appendix 1**.

2.3.2. How much evidence is needed?

You should use the latest available evidence, and this should be no more than five years old. In some cases, it may be appropriate to take a combined value over a few years (for example, funding electric last-mile mobility might vary in amount from year to year due to budget focus). If data is not available, similar data with the same aim can be referred. Ensure that your method is appropriately documented in the documentation template **(Appendix 2)** to the best possible.

Taoyuan City, the EcoLogistics Chair city, will be the first city to pilot the ELI, and experiences will be gauged to improvise and enhance the Indicators.

2.3.3. Identify possible short and long-term goals for improvement

While assessing each indicator within the working group, the EcoLogistics multi-stakeholder group (comprising logistic and freight operators and managers in the city) needs to facilitate the discussion about strengths and weaknesses.
Guiding questions are:

- Why does an indicator show good/ bad performance? Is it possible to strengthen it further through immediate actions?
- What effort is needed to reach an improve performance of an indicator? Can it be done in a short period? Or does it require long-term actions?
- What are the concrete suggestions among the working group members of ways to improve?

All information gathered through these discussions can help the Task Force prepare for the next step, "Review policies and plan action" (step 5). For indicators consisting of two or more sub-criteria, it is encouraged to discuss the assessment on the different sub-criteria levels as these provide insightful information for possible improvement actions for the future. Do not forget to make comprehensive notes about strengths and weaknesses on the sub-criteria level (if any) after each working group meeting and circulate the notes among the working group members for feedback.

2.3.4. Prepare for strategy meetings

The Task Force who involve all working groups needs to consider the following tasks for preparing the strategy meeting:

- Review the existing policies and strategies within the city and make a list of current improvement actions planned within the city that could be relevant to ecologistics
- Make a list of specific suggestions collected from the assessment meeting (for future action/ improvement)
- Look for inspiring good examples of measures that match short-term and long-term targets identified during assessment

This strategy meeting aims to:
- Discuss the feasible paths for the city based on the assessment results (e.g., long term infrastructure)
- Propose and draft an action plan based on short-, medium and long-term proposals and projects, highlighting planned actions that are important to ecologistics, or add strategic actions to an

existing program from the ecologistics point of view

- Propose initial timelines, budgets, and responsibilities to policy proposals. It is suggested to involve politicians, user groups, or other stakeholders in this strategy meeting depending on the interest and commitment in the assessment process's earlier steps. It is meaningful for cities that have undergone an assessment to exchange experiences with other cities in the EcoLogistics Community network.

The multi-stakeholder group should discuss how to prioritize actions in their city. The indicators can guide how the city should best employ its efforts to improve its ecologistics status. Do not forget to look into the detail of the sub-criteria in several indicators. This should be taken within the context of the goals and sustainable mobility policies of the city. A good starting point in prioritizing actions could be low-hanging fruits, i.e., easy-to-implement improvements. In the long term, the city is encouraged to have concrete plans and activities with significant impacts.

2.3.5. Documentation

Documentation is essential for future assessments. To facilitate this work, there is a documentation template (**Appendix 2**). This template provides headlines and further guidance. This includes the main areas to document, such as:

- Who has participated in the working group? How were the roles distributed?
- The stakeholder engagement process, decision-making process, and decisions
- The assessment of the indicators with a short justification and reference to primary evidence in the appendix
- Illustration of the results
- Identified strengths and weaknesses of each indicator, including their possible causes
- The recommendation of actions
- Benefits and lessons learned
- Conclusions

The first draft of the report should be circulated among the working group members for final feedback. Any remaining gaps in evidence should be filled up, and any ambiguities in the analysis should be clarified.

3. INDICATOR DESCRIPTION

A complete overview of the EcoLogistics Indicators is presented below. In each dimension, various indicators are delineated, and many do interact with each other.

3.1. Environmental sustainability

E1: Low-emission deliveries/Zero-emission deliveries

Purpose   To ascertain freight-related emissions from the freight vehicles and deliveries

Terminology
- Low emission vehicles (LEVs) refer to vehicles emitting less than 75 grams of CO_2 per kilometer from the tailpipe (or refer to country's definition), and zero-emission vehicles (ZEVs) are vehicles that do not produce any tailpipe emissions
- Low emission deliveries refer to freight delivery trips that are made with low emissions vehicles or zero-emission vehicle.

Data sources
- Vehicle registration data
- Company questionnaires
- On-ground surveys

Data collection method
- A survey amongst the logistics service providers (typically larger corporations) would use LEVs or ZEVs.
- Modal split survey for freight vehicles.

Sub-indicators	Definition	Unit	Policy target
Low emission delivery	The share of low emission delivery in total km traveled	%	
The share of LEVs and ZEVs in the urban freight vehicle fleet	The percentage of low-emission vehicles and zero-emission vehicles in urban freight delivery	%	
Total km traveled by LEVs and ZEVs	The total distance traveled by LEVs and ZEVs	km	

E2:

Air quality

Purpose To measure air pollution impact due to freight activities at different areas of the city

Terminology
- Air Quality Index (AQI) is an index reporting air quality daily
- Sensitive areas refer to hospitals, schools, elderly homes, parks

Data sources
- AQI data from the Environmental Department
- Landuse map that identifies sensitive areas
- Map critical freight route hotspots (through a survey)

Data collection method Map important freight routes within the city through surveys and identify hotspots that are critical to be considered. Layer it with the landuse map and the AQI data across the city. Analyze differences between the different neighborhoods and sensitive areas

Sub-indicators	Definition	Unit	Policy target
Air Quality Index – Nitrogen dioxide (NO2)	Percentage of inhabitants exposed to concentrations of nitrogen dioxide (NO2) exceedances per the World Health Organization (WHO) guideline limit	%	
Air Quality Index – Particulate matter (PM10 and PM2.5)	Percentage of inhabitants exposed to Particulate matter (PM10 and PM2.5) exceedances per the World Health Organization (WHO) guideline limit	%	
Emissions from logistics buildings	Share of the emissions from logistics buildings to the total logistics operations	%	

E3:

GHG emission

Purpose

To measure GHG emissions from the freight sector within the city boundary and contribution from different modes

Terminology

- Light delivery vehicles are two- and three-wheel vehicles, motorcycles, and quadricycles used for goods delivery (Category L in the EU context)
- Light-duty vehicles (LDVs) are vehicles less than 3.5 tons carrying goods (Category N in the EU context)
- Heavy-duty vehicles (HDVs) are vehicles (lorries) of more than 3.5 tons (Category N in the EU context)

Data sources

- Modal split for freight vehicles
- GHG emissions from the different freight vehicles (Environmental Department or through surveys)

Data collection method

Employ ICLEI's EcoLogistics self-monitoring tool, which describes the data collection method, boundaries, data parameter for emission acounting for various modes (road, rail, and inland water way freight transport). Other tools can be adopted as long as it fulfills the goals and purposes of the data required and sound methodology is used.

If it is resource-exhaustive to collect city-wide data, representative data can be used through surveys and on-site measurements

Sub-indicators	Definition	Unit	Policy target
GHG emissions from the freight sector (Road freight transport)	Average GHG emitted from the freight sector annually within the city	ton CO2e/year gCO2/ ton-km	
	Percentage of emissions from freight amongst total transport-related GHG emissions	%	
GHG emissions according to the type of vehicle	Average GHG emissions from light delivery vehicles (Category L) per km	gCO2 emissions/km	
	Average GHG emissions from light-duty vehicles (less than 3.5 tons) per km	gCO2 emissions/km	
	Average GHG emissions from heavy-duty (more than 3.5 tons) vehicles per km	gCO2 emissions/km	
	Average GHG emissions from other modes per year*	gCO2 emissions/km	

E4:

Energy consumption

Purpose
To measure the energy consumption for delivery and efficiency, also beneficial to monitor driver behavior or vehicle conditions and operations at warehouses or buildings supporting logistics operations

Terminology
- Fuel consumption is the amount of fuel a vehicle used to travel a particular distance at a specific speed (for example, liters per 100 km)
- Renewable fuel sources are produced from renewable resources, such as biofuels, hydrogen fuels, renewable electricity for electric cars, solar energy for warehouses)

Data sources
- Surveys
- Transport Department data

Data collection method
Surveys can be done with critical logistics service providers using different modes to determine the fuel consumption that is used per 100 kilometers. For each vehicle trip, collection of the fuel source can also be done.

For energy consumption at warehouses, key warehousing activities at key locations can be surveyed (for example, at logistics clusters, key industrial zones). Should the private companies not provide such information, qualitative information can be inserted, e.g., if the warehouses are powered by any renewable energy and the share of renewable energy in warehousing operations.

ICLEI's GHG self-monitoring tool provides this information too.

Sub-indicators	Definition	Unit	Policy target
Fuel consumption	Average fuel consumption per 100 vehicle-km	Liters/100km	
	Average fuel consumption per 100 vehicle-km (light delivery vehicles)	Liters/100km	
	Average fuel consumption per 100 vehicle-km (LDVs)	Liters/100km	
	Average fuel consumption per 100 vehicle-km (HDVs)	Liters/100km	
Renewable fuel sources	Share of renewable energy use at the energy source for Low and zero-emission vehicles	%	
Energy consumption at warehouses*	Energy use for each floor space (m2)	kWh/m2 floor space	
	Energy use for a cubic capacity of shelf space (m3)*	kWh/m3 floor space	

*or the share of renewable energy in warehousing operations

E5:

Noise Pollution

Purpose
To measure noise pollution and impact to the residents during day and night time

Terminology
- Day noise exposure, Lden is the day-evening-night weighted sound pressure level as defined by ISO 1996-1:2016
- Night noise exposure, Lnight, is the equivalent continuous sound pressure level when the reference time interval is the night

Data sources
- Noise exposure data from the Environmental Department at key logistics areas and also at residential/ commercial areas
- Road maps and landuse maps

Data collection method
Select vital logistics and industrial areas, residential, commercial areas required for the data and 24-hour monitoring at selected locations in one year (Data from the Environmental Department)

Sub-indicators	Definition	Unit	Policy target
Day noise exposure	Percentage of inhabitants exposed to Lden noise levels higher than 55 dB (ISO 1996-1:2016)	%	
Night noise exposure	Percentage of inhabitants exposed to Lnight noise levels higher than 50 dB (ISO 1996-1:2016)	%	

E6: Sustainable business

Purpose

To measure the proactiveness of logistics companies that have basic environmental-related policies and programs in place

Terminology

- ISO 14001 is a voluntary environmental management system standard (EMS) for companies and organizations of any type to manage their environmental responsibilities. It provides an indication and assurance to the management and external stakeholders that environmental impact is being measured and continuously improved.
- Logistics businesses are companies and organizations that register logistics services as their core business activity (warehousing, delivery, packaging)

Data sources

The number of organizations and companies registered under the ISO14001

Data collection method

Quantify the number of companies with logistics-related activities under the Business Registration list and collect the ISO 14001 or EMAS certification from the Environmental Department

Sub-indicators	Definition	Unit	Policy target
Sustainable business	Percentage of businesses with certification ISO 14001 vs. total companies with logistics activities as their core business	%	

3.2. Social equity

S1:   Public participation

Purpose   To enhance public awareness and collaboration

Terminology
- Public participation is a deliberative process hosted by government actors with interested or impacted residents, business units, vulnerable communities, civil society organization, enabling dialogues amongst multi-stakeholders to have a shared understanding of issues and solutions
- Public participation can come in different levels, from access to information, consultation, and allowing active involvement and partnership that enables collaboration and joint decision-making in each process and stage.
- Marginal or underrepresented community groups can refer to women, people of color, low-income group, elderly or less educated population
- Impacted communities are the community groups that are directly affected by logistics activities or projects

Data sources
- Sustainable Urban Logistics Plan or EcoLogistics Plan or a similar ecologistics strategy document that stipulates the requirement and approach in public participation
- Policy and technical documents guiding city staff on how and when to run participation activities
- Participation methods: How? Standard (e.g., surveys, focus groups), innovative (e.g., citizen panels, dialogue café, visiting user group sites like schools, community centers, shopping malls); is this systematically collected (e.g., an appropriate framework to analyses diverse aspects of a transport mode or a system)
- Collection of user complaints and suggestions: systematic? How is this done (e.g., via an online tool, call center, website); How is the feedback used to improve services?
- Existence of a Freight Partnership Group or a multi-stakeholder partnership group for freight-specific consultations
- Minutes, photos, agendas, and recorded outcomes of participation activities
- Actual consultation/ participation materials (e.g., questionnaires)

Data collection method
- Review of policy documents, meeting minutes, and attendance sheet
- Review of the invitees or participants, if impacted communities, and if marginal communities are invited

Sub-indicators	Definition	Unit	Policy target
Policy existence	The level of political and managerial vision and support for public participation related to Sustainable Urban Freight/ EcoLogistics strategy and how far the senior staff and politicians lead the policy both strategically and at an implementation level.	Qualitative	
Existence of Stakeholder working group and extent of participation	Percentage of actual participants in ecologistics-related stakeholder meetings and working groups.	%	
	Percentage of participation representing marginal or underrepresented community groups, e.g., people of color, poor income group, impacted communities	%	
	The degree to which the city investigates the current and future needs of all supply chain users and collects relevant baseline data on the ecologistics status (freight-related data, livability, safety) of the city and the public participation process to understand their views.	0-5 from very unlikely to very likely	

S2:

Safety

Purpose

To determine the safety impacts on other road users. Freight-related incidents typically cause more serious injuries, and the number of incidents tends to be disproportionate to the kilometers travelled by freight vehicles. As a result, this is a major concern to other road users, particularly pedestrians and cyclists. Hence, road safety hotspots need to be addressed.

It also looks at the occupational health and safety risk exposed to light delivery vehicles driven by high e-commerce demand or over-exhausted drivers and warehouse workers.

Terminology

- A road traffic crash is a crash that was reported to the police, which occurred on the road open to the public and involved at least one moving road vehicle and at least one fatality or injury
- Freight vehicles involvement rate refers to road traffic crash reported that involves a freight vehicle (light delivery, light duty, or heavy-duty vehicles)
- Fatality is defined as a person who dies within 30 days from injuries in a road traffic crash
- A serious injury is a person identified in a police crash report and is admitted to a hospital, and does not die within 30 days of the crash

Data sources

- The policy document that adopts the Vision Zero or Safe System approach to eliminate deaths and severe injuries on the road, mainly caused by freight vehicles
- Traffic fatality and accident data categorized according to vehicle type, road user type from the Traffic Department or the Police Record
- Traffic violations of drivers driving under influence (positive test on alcohol and drug use)
- Occupational health and safety data from delivery drivers, particularly light delivery vehicles who met an accident during delivery trips; and warehouse accidents)
- Coverage: road users across the road network within the city – pedestrians, cyclists, passenger vehicles drivers, light delivery vehicles, light-duty truck drivers, and heavy-duty truck drivers
- Warehousing incidences reported to the Occupational Health and Safety centers or insurance claims

Data collection method

- Collect city-wide data from the Police or Traffic Department and analyze according to the profile
- Layer with the road network and identify hotspots where the crash happens the most

Sub-indicators	Definition	Unit	Policy target
Existence of a politically endorsed policy on safety	Addresses road safety at the Sustainable Urban Mobility Plan/EcoLogistics strategy that is politically endorsed and implemented	Qualitative	
Freight vehicles involvement rate	Percentage of incidents involving freight vehicles in the total traffic incidents (including LGVs and HGVs)	%	
	Percentage of freight-related incidents according to road-user types (pedestrians, cyclists, car drivers, truck drivers)	%	
	Percentage of freight-related fatalities according to road-user types (pedestrians, cyclists, car drivers, truck drivers)	%	
Driver safety	Percentage of freight drivers testing positive on alcohol or drug use versus total drivers tested	%	
Speed violations	The number of speed violators	number	
Delivery drivers' injuries/fatalities	The number of drivers injured or killed on the job per year (e.g., via crashes, vehicle/tire malfunction)	Number of drivers/year	
Freight employees' injuries/fatalities	The number of employees injured or killed on the job per year (e.g., warehouse accidents.	Number of warehouse workers/ year	

S3: Freight employee demographics

Purpose To understand the demographics of freight workers and income disparity between genders or race within the freight industry

Terminology
- A person employed in the logistics industry (as a driver, warehouse worker, packaging, managerial positions, software engineer, etc.) sorted based on male and female or ethnicity
- Average income between gender and race/ethnic group

Data sources
- Employment data from the Office for National Statistics or City Statistics
- National Census data

Data collection method Collect information based on the National Statistics or Census data to analyze the differences between gender and ethnic groups

Sub-indicators	Definition	Unit	Policy target
Gender of workers in freight-related industries & occupations	The percentage difference between male and female workers in the freight industry	%	
Gender income disparity in freight-related industries & occupations	The average difference of income between male vs. female employees in the freight industry in comparison to similar sectors (managerial positions)	%	
Race/Ethnicity* of workers in freight-related industries & occupations	The percentage of representation from other race or ethnic groups in managerial positions in the freight industry	%	
Race/Ethnicity* of workers in freight-related industries & occupations	The average difference between different race profile in the freight industry	%	

*for multicultural cities, i.e., for ethnic groups with distinct cultural practices, color, and religion (or when identified by the law)

S4:

Exposure to vulnerable communities

Purpose   To measure freight-related air pollution effects in vulnerable communities

Terminology   Vulnerable communities refer to low-income groups, disadvantaged communities, race-ethnic differentiation if applicable

Data sources   Landuse map that identifies vulnerable communities

Data collection method   Based on the data collected for the AQI, layer the data with the landuse map and identify the hotspots and characteristics of the area

Sub-indicators	Definition	Unit	Policy target
Exposure to vulnerable communities – air pollution	Percentage of transport-related pollutants (NOx, PM) emissions that are emitted by urban freight in the transport-related emissions at neighborhoods with low-income population or vulnerable communities	%	

3.3. Economic sustainability

EC1: Employment in transport and logistics

Purpose To understand the contribution on employment by the logistics sector

Terminology
- Employment rates show the number of people in paid work as a proportion of the population
- Annual income

Data sources
- Income Tax Bureau
- Department of Labor
- Online statistics (e.g., Statistica)

Data collection method
- Collect data from census or income tax department (can be national data)
- Tax contribution to the city broken down by percentage
- Survey and questionnaire to the companies to get an average estimate on income (e.g., truck drivers, warehouse workers, manager positions)

Sub-indicators	Definition	Unit	Policy target
Number of jobs in freight and logistics	The employment rate for freight in the city (percentage of workers employed in the freight sector). Study of Urban Freigh Transport define five major market sectors: - Retail (including, e-commerce) - Express, courier and post - Hotel, restaurant and catering - Construction - Waste	%	
Income contribution	Percentage of freight-related income in the city	%	
	The average annual income of workers in freight-related industries in comparison to similar roles	$	

3.4. Operational efficiency

O1:   Mode efficiency

Purpose

To know the types of vehicles in circulation on the road to understanding the impacts from different delivery modes. Multimodality is essential in planning efforts, where the shift from road to rail or inland waterways or lighter duty logistics vehicles encourages multimodality and reduces emissions, primary energy use, and road congestions

Terminology

- Modal split is defined as the percentage of each transport mode in total inland transport expressed in tonne-kilometers (t-km), including road, rail and inland waterways
- Road transport is based on all movements of vehicles (light delivery, light-duty, and heavy-duty vehicles), and some cases of walking for last-mile delivery if applicable
- Rail transport is generally based on movements within the national territory, but variations may vary according to the city context.
- Inland waterway is the use of water vessels for inner-city goods distribution, which may also be relevant in some cities

Data sources

Modal split broken down according to walking; light delivery vehicles; light-duty vehicles; heavy-duty vehicles; rail; and inland water transport

Data collection method

- Visual counts across a cordon or screen line or interview surveys with the logistics service providers and shippers (24-hour scenario, different seasons)
- Through surveys and interviews with the shippers, carriers, drivers, and receivers
- Secondary city-data if available

Sub-indicators	Definition	Unit	Policy target
Modal split	Percentage of total inland freight ton-km	%	
Share of freight vehicles	Percentage of freight vehicles in total vehicular traffic	%	
Vehicle-kilometers traveled	Total kilometers traveled per day according to LDV, LGV, and HGV (Distance traveled by a vehicle multiplied by the number of vehicles)	Vehicle-km traveled	

O2:

Fleet utilization level

Purpose

To measure the utilization rate for delivery vehicles and the efficiency in route planning

Terminology

- Fleet utilization is the percentage of the used capacity to the total capacity available (such as the amount of space in a container occupied by a load). It is a means to reflect the efficiency in route planning and trip planning, packaging
- Warehouse utilization is the percentage of the used capacity to the total warehouse capacity available (or distribution hub) as a means to determine the efficiency in warehousing location and potential for co-sharing

Data sources

Shippers and carriers' use data

Data collection method

On-ground visualized surveys or interview with shippers and carriers

Sub-indicators	Definition	Unit	Policy target
Capacity utilization	The load capacity of light delivery vehicles	%	
	The load capacity of commercial vehicles LGVs (<3.5 tons)	%	
	The load capacity of commercial vehicles HGVs (>3.5 tons)	%	
Warehouse utilization	Average utilization of the warehouse or distribution centers	%	

O3:

Loading and unloading

Purpose

To measure how does parking impact the road space and if parking space is sufficient for loading and unloading activities to reduce the time spent on parking during a delivery trip as well as illegal parking, to also measure the importance of the goods flow in a zone and the contribution to road obstruction and delivery

Terminology

- Loading/ unloading areas mean the loading and unloading operations of the load from warehousing facilities to a freight vehicle or from a freight vehicle to the receiver and vice versa
- Bulk cargo (usually at port cities): are used for transporting bulk cargo, such as grain, fertilizers), relevant for port cities
- A container contains goods that are not loose material (bulk) with different types of commodities inside in a container, relevant for port cities
- Packaged goods: Consumer merchandises, food, beverages, cosmetics, or courier, express and parcel (CEP) services, relevant for last-mile delivery to consumers as receivers

Data sources

- Loading and unloading time from shippers, receivers, and carriers
- Number of parking space for freight from the Transport Department
- Surveys of delivery routes and transloading time (planned versus actual)

Data collection method

- Select representative zones and areas for surveys, including commercial districts, industrial sites, port areas, residential areas, urban core where traffic congestion is a key concern
- Carry out surveys or interviews with shippers, receivers, and carriers

Sub-indicators	Definition	Unit	Policy target
Loading and unloading in a zone	The average number of minutes of on-street parking for delivery or pickup in a zone, per vehicle	Mins/vehicle	
	Distance covered for loading and unloading in a zone, per vehicle, per activity	Number of km covered for one delivery/ pickup	
Loading and unloading in a zone	Percentage of unauthorized parking in loading zones for HGV	%	
	Number of public parking places for freight vehicles	Number	
	Total number of commercial vehicles with parking-related fines per million freight vehicle km*	n/million km	
Loading/unloading timeliness	The average standard deviation of loading/unloading time for bulk goods	Mins	
	The average standard deviation of loading/unloading time for container goods	Mins	
	The average standard deviation of loading/unloading time for a package	Mins	

*voluntary

O4:

Timeliness

Purpose
To measure the share of timeliness as an indicator of efficient deliveries and performance in the urban logistics system – not just about speed but agreed delivery times; to also measure the contribution of congestion and impact on the various delivery vehicles

Terminology
Timeliness refers to on-time deliveries and is often related to infrastructure quality, route planning, reliability, and customer satisfaction in performance

Data sources
- On-ground surveys and interview
- Company reports

Data collection method
- Follow the deliveries to collect actual data on on-time delivery and speed
- Carry out surveys with the carrier companies and customers to gauge the percentage of timely delivery and customer satisfaction

Sub-indicators	Definition	Unit	Policy target
On-time deliveries	Percentage of on-time deliveries vs. total deliveries	%	
	Percentage of on-time deliveries on the road	%	
	Percentage of on-time deliveries on the rail	%	
	Percentage of on-time deliveries on inland waterways	%	
Customer satisfaction	Percentage of distributors and end customer that are satisfied with delivery times	%	
Speed (within urban core during peak hours)	Average speed per delivery excluding stops: Light delivery vehicles	Km/hr	
	Average speed per delivery excluding stops: LGV	Km/hr	
	Average speed per delivery excluding stops: HGV	Km/hr	

O5: Productivity

Purpose
To measure the delivery productivity in terms of output generated (such as tons per km or vehicle per km) based on the inputs (fuel, vehicles, and labor). Better productivity is not just making more trips but also ensuring that each trip are maximized meaningfully to avoid empty runs

Terminology
- Delivery productivity
- Empty runs are the percentage of total vehicle-kilometers that are run empty. It is clear evidence of the underutilization of vehicle capacity
- Load factor is the ratio of the shipment weight to the payload capacity of a vehicle
- Payload is different for each mode of transport. In general payload capacity is the actual loading capacity of a vehicle to contain and load goods, which means deducting the actual weight of the vehicle from the vehicle payload

Data sources
Surveys or interview with the shippers and carriers

Data collection method
- Carry out an on-ground survey along significant freight routes at selected districts together with the delivery vehicle drivers
- Interview questionnaire with freight operators

Sub-indicators	Definition	Unit	Policy target
Delivery productivity	Average tons of goods delivered per kilometer	Tons/km	
	Average number of deliveries a vehicle can accomplished in a day (based on the sum of time spent on operations): LDV*	Number of deliveries/ operational time/ vehicle	
	Average number of deliveries a vehicle can accomplished in a day (based on the sum of time spent on operations): LGV*	Number of deliveries/ operational time/ vehicle	
	Average number of deliveries a vehicle can accomplished in a day (based on the sum of time spent on operations): HGV*	Number of deliveries/ operational time/ vehicle	
Empty run	Percentage of total vehicle-kilometers that run empty	%	

*Can also be the average number of trips made for each type of delivery vehicle

O6:

Distance optimization

Purpose

To determine the efficiency in route planning as a prognosis of freight vehicle traffic

Terminology

- How delivery is organized is an essential indicator for congestion contribution to delivery efficiency, it is the process of collecting transporting goods from an origin to a predefined destination
- Congestion is a cause of delayed shipments, but freight traffic is also a contributor to traffic congestion. Therefore congestion is looked at in two dimensions: the delay caused by congestion and the percentage of freight traffic which could contribute to congestion
- The distance of warehouse or distribution hubs is generally the source of origin for each trip. It is crucial to map out the warehouse locations (particularly for deliveries into the urban core) to determine the distance that will impact the vehicle-km traveled and contribute to congestion. It is also a measure of the extent of logistics sprawl based on the distance

Data sources

- Surveys
- Landuse maps with warehouse and distribution hubs identified

Data collection method

- On-ground survey with the delivery vehicles to determine the number of deliveries, distance, and duration. The researcher can log the time for each driver activities (such as driving time, loading/unloading time, traffic time, rest time, refueling time) to determine the actual impact of congestion
- During the survey, the distance from the warehouses or hubs can be calculated and mapped out

Sub-indicators	Definition	Unit	Policy target
Delivery organization	Average deliveries per round per vehicle (parcel, express, and courier)	Number of deliveries	
	Average distance traveled per delivery/pickup (from urban delivery hub to core servicing areas)	km	
Congestion	Average duration of delay due to traffic congestion or a vehicle in a day	Mins/ vehicle/ day	
	Percentage of freight traffic at main traffic corridors	%	
The distance of warehouse from city center	Average distance between logistics centers/ warehouses/ distribution hubs and delivery points within the urban core	km	

APPENDIX 1: METHODOLOGY FOR DATA COLLECTION

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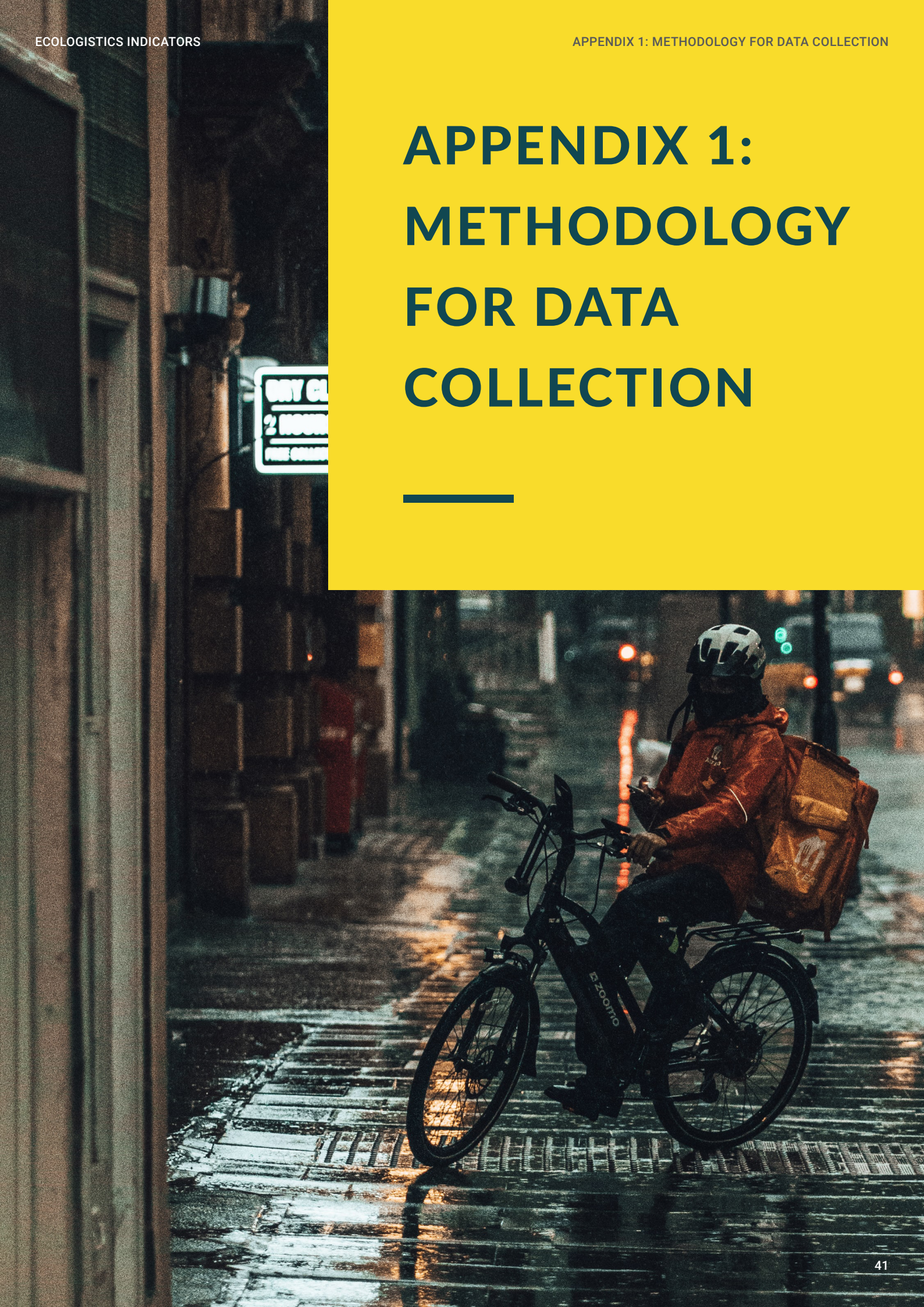
Although collecting urban freight data is not an easy process, it provides significant value for cities and policymakers to understand the freight situation and build future scenarios as urban freight is increasingly a vital issue. Since many cities are not familiar with data collection for urban freight, this section provides a guideline for cities to frame the scope and structure the research before undertaking the process. This is only a guideline for cities and modifications can be made based on local conditions, policy goals, and research purpose.

The items to be discussed within the Task Force and the city decision-makers are:

1. Research goal and purpose
2. Boundary: the study area and focus based on the research goal
3. Data availability and limitations
4. Methodology and action plan (financial resources, responsibilities, and timeline)
5. Documentation and data analysis

Step 1: Research goal and purpose

The ELI system aims to provide a snapshot of the city's ecologistics system by looking at cross-sectoral policy goals to sustainable urban logistics. The indicator types are generally outcome-oriented and are valid for cities to identify gaps and intervene based on the analysis results. The indicators can also be part of the city's ecologistics policy goals and can be revisited every two- to three years to monitor progress.

Suppose a city has never undertaken such a process. In that case, it is essential to establish a good baseline and actively communicate with the city leaders and stakeholders to identify opportunities for improvement. More resources may be needed during this phase compared to the subsequent monitoring. As the urban freight scene develops rapidly, it is critical for the city to relook the research aim and identify additional indicators or data points as part of the monitoring and continuous improvement process.

Activities

- Task Force meeting with the city leaders to get commitment and resources (human and financial resources) needed to undertake this process
- List out clear research goals and aims
- Identify existing human and financial resources, potential limitations, and support system
- Identify skills requirement and reach out to external support (prepare tendering process)

Output for documentation

- Research aims and how the data will be used later (e.g., developing a sustainable urban logistics plan)
- Existing resources and limitations
- External support

Step 2: Establish study boundary

Based on the research goal and limitations, define the geographical scope – it can be within the city's administrative unit or the functional urban area (where logistics activities occur, incoming and outgoing freight traffic, and/or through traffic). The research scope must be relevant. A city land use map with the boundary is essential, and through stakeholder involvement, preliminary identify:

Macro-level
- City-level or Functional urban area

Meso-level are districts or areas where the following criteria are considered
- Key logistics activities (e.g., port area, industrial areas where the movement to the inner-city core is frequent and impactful, logistics cluster)
- Areas where traffic congestion is an issue – urban core with commercial and residential activities
- Residential areas – low, medium, and high-income groups; different race and ethnicity
- Sensitive areas – hospitals, schools
- Hotspots – air pollution, traffic incidences
- Mixed landuse areas – a mix of commercial, residential, and industrial activities)

If possible, an active public participation process can take place to select the boundary and city area.

Micro-level
- Street-level or freight corridors/highway
- Loading/unloading area/ parking zones
- Logistics operation areas (shippers, carriers, and warehousing activities)

It may be worthwhile for micro-level data to engage at least three key shippers or carriers with active logistics operations for in-depth research (which is necessary for many Operational Efficiency indicators). Data collected can be anonymous to protect sensitive data. For example, DHL Express, e-commerce giants that operate delivery services, food delivery companies)

Activities
- Discuss the study boundary the appropriate body/bodies to take leadership in the planning process
- Draft data protection agreement with the identified corporations
- Identify stakeholders and companies that will be involved in this research process (including residents or shop owners who will be the target for survey questions)

Output for documentation
- Map the study boundary and critical areas
- Political approval on the geographical scope
- Agreement with the identified stakeholders and companies (e.g., Non-Disclosure Agreement)

Step 3: Identify data availability and accessibility

Conduct a desktop study on the current information available, including data, figures, maps, and reports, to get a good overview of the available data (quality and accessibility). Identify the gaps and additional information needed and make plans to fill the data gaps to the best possible.

Some policies and regulatory documents are good sources of information:

- National and regional mobility plan and freight plan
- City's sustainability policy documents, mobility plans
- Environmental report (air quality, GHG, and noise)
- Traffic reports (fatalities and accidences) according to area
- Public participation policy guidance and meeting minutes
- Social inclusion policies
- Transport plans and documents
- Financial records and public procurement records
- Business registration records
- Landuse plans, urban spatial plans, or regional development plans
- Parking policy and census

Activities

- Perform a data audit to get an overview of the data needs and sources
- Retrieve existing data, including all sustainable mobility
- Explain with the external stakeholders why certain data is required and how it fulfills the city's policy goals and helps them in their business operations. Create an intranet folder to compile all the existing data, best on an excel spreadsheet with references to the data source so that it is easily retrievable

Output for documentation

- Data folder – including the existing data and required data
- A list of required data
- Maps: landuse map, transport network map(s) (road freight, rail and inland waterways, airport), social equity map, traffic hotspot map, port

Step 4: Methodology

Data will be collected through primary and secondary sources, as shown in **Figure 1** below.
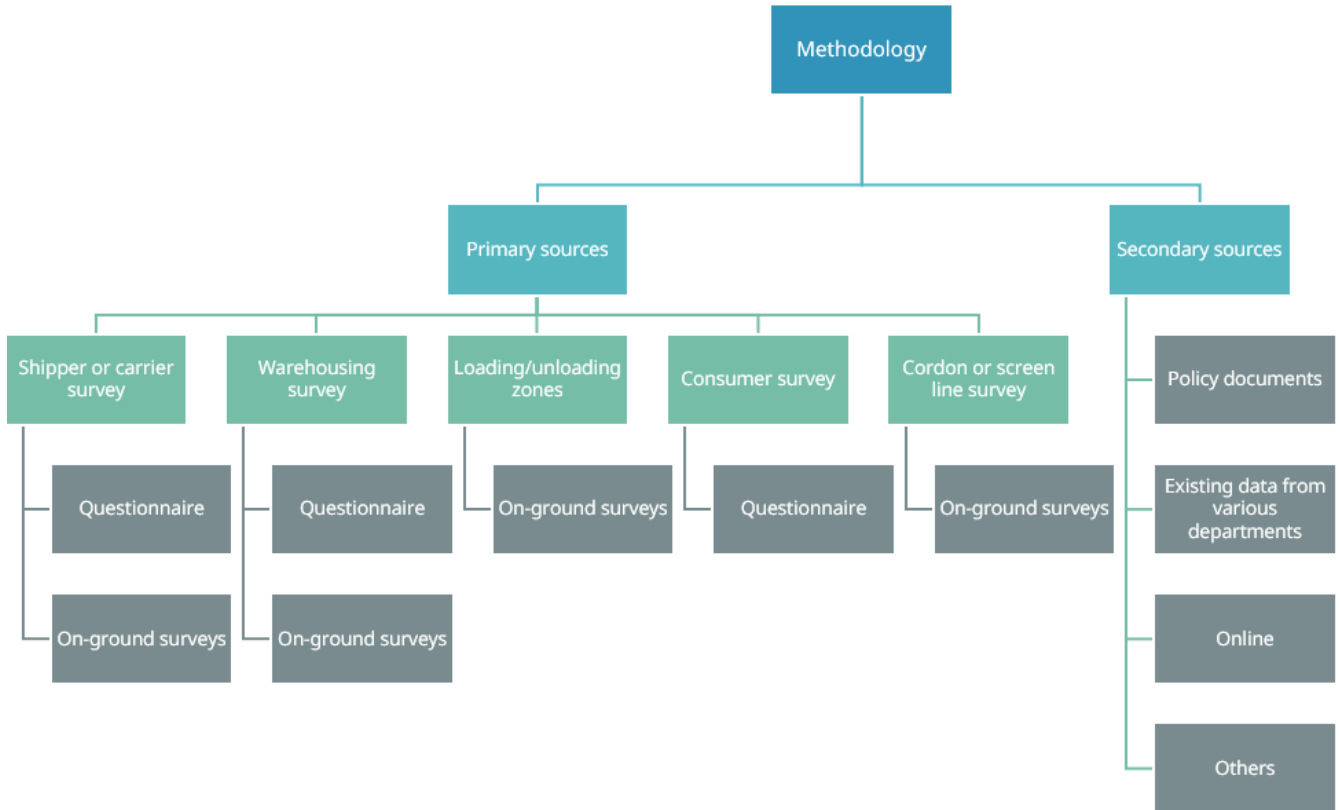

Figure 1: Methodology to collect data

Primary sources

The main tools to collect primary data is through questionnaire and on-ground surveys. According to the various indicators and survey areas, there are three different nature of data, which can be adjusted based on the city's effort. Still, the following table presents the minimum requirement. For example, the GHG emission data is usually at the city-level, while air quality data should be localized to a city district because air quality is generally localized. Distance optimization is impacted by the city district depending on the warehouse location and at the micro-level, where congestion may contribute to the delay. This serves as a guideline for cities as they plan and shape their approach.

Table 1-1 below shows the nature of the data that should be collected. For example, macro-level refers to city-level data, while meso-level data refers to district-level or industrial-area specific data. Micro-level information is specific to a local area (loading-space, junction). Detailed data may also require micro-level data. For example, the loading/unloading efficiency evaluates if a district provides sufficient loading/unloading area (meso-level) and the typical hotspots for double-parking and road blockage due to loading/unloading deliveries (micro-level). Naturally, all indicators can also look at city-wide data, but more efforts will be required.

Table 1-1: The nature of the data according to the indicators

Data	Macro	Meso	Micro
Environmental sustainability			
Low emission deliveries	X	X	
Air quality		X	
GHG emissions	X		
Energy consumption		X	X
Noise	X		
Sustainable business	X		
Social equity			
Public participation	X		
Safety	X	X	X
Freight employee demographics	X		
Exposure to vulnerable communities		X	
Economic sustainability			
Employment data	X		
Operational efficiency			
Mode efficiency	X	X	X
Fleet utilization		X	X
Loading and unloading		X	X
Timeliness		X	
Productivity		X	
Distance optimization		X	X

Now that the study area is divided into three levels: macro; city district or clustered zones; and specific road corridors or carrier activities, the following information from the following sources needs to be extracted.

Shipper or carrier survey

Select key shipper or carrier surveys within the city and study area to collect information. A city may have more than 1000 carrier companies, consisting of many small to medium-size enterprises with one or two lorries. Therefore, collecting data to such a level of detail may be extremely challenging. A data sample of 5% is suggested.

How to select shippers or carriers for surveys?

Shippers from the following categories can be identified, from large, medium, and small enterprises.

Core business/ commodity type	Receivers	Own warehouse or joint consolidation center?	Type of goods
Manufacturing industry	B2B or B2C		
Hospitality industry	B2B or B2C		Hotel, food, and beverages
Retailers	B2B or B2C		Consumer packaged goods (quick replenishable goods such as toiletries, food, stationery, over-the-counter medicines, cleaning and laundry products, personal care products)
RetailersE-commerce companies/ couriers, express and parcel (CEP)			
Pharmaceutical products	B2B or B2C		Medicine
Construction and road services	B2B		
Waste and reverse logistics			Plastic waste, pallets
Textile industry	B2B or B2C		Clothes, textile products, accessories
Hazardous materials			
Others			

The type of carriers can be:

- In-house logistics service providers/ deliveries or a major corporation with logistics contributing in their core business activity in addition to local providers e.g., IKEA
- Third-party logistics service providers, e.g., Evergreen
- E-commerce companies' logistics services, e.g., Amazon
- Courier, express, and parcel (CEP) logistics services, e.g., DHL

For cities with critical port operations, key operators can also be considered.

In addition to questionnaire surveys, it is also suggested that researchers can carry out on-ground surveys by following delivery vehicles to collect raw data to be processed.

- Percentage of low emission delivery and low emission vehicles (LEVs)
- The total distance traveled by LEVs
- Fuel consumption for LDVs, LGVs, HGVs
- Use of renewable energy – in vehicles or warehousing operations
- Energy consumption at warehouses
- ISO 14001 certification
- Percentage of fatalities or injuries – when driving or at warehouses – and the causes
- Driving under influences
- Gender of freight employees and income
- Types of vehicles used for deliveries
- Vehicle-kilometers traveled each day according to LDVs, LGVs, and HGVs
- Capacity utilization – vehicle and warehouses
- Percentage of on-time deliveries
- Customer satisfaction survey
- Average speed excluding stops – LDVs, LGVs, and HGVs
- Delivery productivity
- Empty run percentages
- Delivery organization per vehicle
- Congestion – delay due to congestion

Warehouse operator survey

- Warehouse establishment maps and average distance to the urban core
- Energy consumption at warehouses and energy sources
- Air quality and noise monitoring data
- ISO 14001 certification
- Warehouse utilization rate
- Warehouse accident rates
- Delivery productivity
- Empty runs

Loading and unloading zones survey

The first step is to identify loading and unloading zones at the various study districts. It requires the analysis of vehicle traveling around the city to identify their deliveries' locations (macro-level to meso-level). This can be done through GPS analysis, commonly used to track vehicles at the urban level. Evaluating the vehicle stops and classifying them according to their purpose (work or non-work related) to optimize the urban freight transportation system to assess the delivery performance indicators is helpful to gain insights into the activities.

To make the actual on-ground survey more feasible, a spatial clustering process can be done by grouping the stops or where the stops' density is the highest, reflecting the most critical areas. Aside from looking at the density, other selection criteria can be:

- Sites where congestion issues are frequently encountered
- Street characteristics (with access restrictions)
- Location of retail outlets

Carry out observations on the following:

- Number of parking spaces for different types of vehicles
- Types of vehicles that stopped for loading/unloading (hand cart for walking can also be observed)
- Number of hours of on-street parking for delivery or pickup in a zone for vehicles (to determine parking demand)
- The average number of minutes of on-street parking for delivery or pickup in a zone per vehicle
- Illegal loading and unloading occurrences
- Double-parking occurrences
- Parking time
- Loading and unloading time for the different types of goods
- Driver behavior
- Day and night differences
- Pedestrians or cyclist's behavior
- The time lost in congestion in each street traveled
- Identification of stops made

It is good to carry out the observations in one week.

This can also be done with the carrier drivers (follow the driver throughout the working hours and take notes). Photos should be taken too for documentation.

Cordon or screen line survey

Identify key transport corridors and junctions in and around the city and within each study district to collect the following data:

- Share of freight vehicles in total vehicular traffic
- Number of freight vehicles entering the city; through freight; exiting the city

- Type of vehicles (LDV, LGV, HGV)
- Type of commodities carried
    ◦ Empty trips
    ◦ Vehicle utilization, %
    ◦ Types of commodities
        ❋ Fresh groceries and food
        ❋ Construction materials
        ❋ Consumer goods
        ❋ Others
- Congestion – time delayed due to congestion

Consumer survey
- On-time deliveries
- Customer satisfaction survey
- Exposure to air pollution and noise pollution
- Safety perception

Activities	• Create an Action Plan for data collection (sources, target groups, financial and human resources, timeline) • Carry out data collection based on the action plan
Output for documentation	• Action Plan for data collection • Raw data collation and organization

Step 5:
Documentation and data analysis

Collected data should be well documented and analyzed for relationships, cause-and-effect. Maps results from the questionnaire or interview and photographic evidence can provide the qualitative explanation of the data.

Appendix 2 provides an overview of documentation.

APPENDIX 2: DOCUMENTATION TEMPLATE

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Overview

International, national, regional policies

International	EcoLogistics Principles
National	Climate-related: Transport and freight-related: Others:
Regional	Climate-related: Transport and freight-related: Others:

City policies

Urban sustainability	
Transport and mobility	
Multimodal freight	
Energy	
Climate	
Smart city	
GHG	
Air and noise	
Parking	
Public participation	
Road safety	
Social equity	
Others	

A brief overview of the transport infrastructure

- Main road corridors
- Rail and inland waterways
- Port and airport
- Passenger mobility map
    - High-speed rail, subway network, bus lines, walking, and cycling network
- Passenger mobility modal split

Multi-stakeholder groups involved in the logistics and freight sector

National-level	Regional-level	Local-level	Private companies	Academia	NGOs
Department of Transport Airport Authority		Department of Transport ..			

On-ground surveys

Shipper or carrier survey	Name:
Date/ time	
Interviewee	
Data collected	(see Appendix 1)
Interview	
Observations	

Warehouse survey #1	Name:
Date/ time	
Interviewee	
Data collected	
Interview	
Observations	

Loading/unloading zones #1	Location:
Date/ time	
Interviewee	
Data collected	Type of vehicle used: Exact stop location: Duration of stop (time): Number of packages or parcels delivered/ collected: Means of delivery: pallet, trolley, by hand Origin: Destination:

Interview	
Observations	Cause of congestion/ double-parking/ time due to congestion/

Consumer survey #1	
Date/ time	
Interviewee	
Data collected	
Interview	Satisfaction survey: What type of goods do you normally order online? How often do you purchase online in a week? Which platform do you normally use? How do you prefer to collect your goods? Percentage of on-time delivery? How do you collect your goods? – self-pickup/ convenience store/ home/ office/ others Are you satisfied with the online delivery service? (1 to 5) In your opinion, what should the local government do to enhance urban logistics?
Observations	

Cordon or screen line survey #1	Location:
Date/ time	
Interviewee	
Data collected	
Interview	
Observations	Vehicle type: Type of commodities: Load capacity (%): Origin: Destination:

Glossary

Carbon dioxide (CO2)
It is the most common GHG emitted and comprises the majority of emissions for freight and logistics activities

Carbon dioxide equivalent (CO2e)
It is a unit used to represent the global warming impact of various GHGs

ELI
EcoLogistic Indicator

EcoLogistic multi-Stakeholder
Direct members of the private sector are involved in the operation, including citizens who are affected due to freight operation and urban freight planning. It is a working group member but does not directly involve direct in the task force

LCAP-UF
Low Carbon Action Plan for Urban Freight

LEVs
Low emission vehicles

SULP
Sustainable Urban Logistic Plan

Task force
Comprise two to three city staff members. Their primary role is to collect data and inform the progress of decision-makers

Tonne-kilometer (ton-km)
Refers to the transport of one tonnes of goods over a distance of one kilometer. To evaluate freight transport activities, it is essential to consider both the weight of the shipment and the distance the cargo is transported. As such, t-km is useful to express efficiency for freight transport in a consistent manner. t-km = Payload capacity (t) x Load factor (%) x Total distance (km)

Working group
Organization group, communicate direct with the task force. Their members are part of the community and act in different stages of freight operation in the city

ZEVs
Zero emission vehicles

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