



UNCTAD FRAMEWORK FOR SUSTAINABLE FREIGHT TRANSPORT

(UNCTAD SFT Framework)



UNCTAD
New York and Geneva, 2017

NOTE

The designations employed and the presentation of the material do not imply the expression of any opinion on the part of the United Nations Secretariat concerning the legal status of any country, territory, city or area, or of its authorities or concerning the delimitation of its frontiers or boundaries, or regarding its economic systems or degree of development.

Material in this publication may be freely quoted or reprinted, but acknowledgement is requested, together with a reference to the document number. A copy of the publication containing the quotation or reprint should be sent to the UNCTAD secretariat at the following address: Palais des Nations, CH-1211 Geneva 10, Switzerland.

This publication has not been formally edited.

ACKNOWLEDGEMENTS

This publication was prepared by Frida Youssef, Hassiba Benamara and Mathis Weller, Transport Section, Trade Logistics Branch, Division on Technology and Logistics, UNCTAD, jointly and in close collaboration, with Mr. Sudhir Gota (international expert) and Professor Alan McKinnon (Professor of Logistics, Kuehne Logistics University, Hamburg and Professor Emeritus, Heriot-Watt University, Edinburgh).

This publication draws heavily upon the substantive work carried out by Mr. Gota and Professor McKinnon under the framework of the UNCTAD UN Development Account Project (9th tranche) on *“Building capacities of developing countries to shift towards sustainable freight transport”*.

Table of Contents

UNCTAD FRAMEWORK FOR SUSTAINABLE FREIGHT TRANSPORT.....	1
NOTE	2
ACKNOWLEDGEMENTS	2
List of Abbreviations and Acronyms	5
I. Introduction	6
II. UNCTAD Framework for Sustainable Freight Transport (UNCTAD SFT Framework).....	7
A. Purpose and Target Audience.....	7
B. Defining Sustainable Freight Transport	7
C. UNCTAD SFT Framework: Steps and Process.....	8
1. Diagnosis	11
2. Visioning.....	16
3. Targets and Indicators	20
4. Implementation	26
5. Partnerships and Programmes.....	34
6. Monitoring and Evaluation	36
7. Enabling Factors.....	40
III. Final Remarks	46
List of Annexes	47
ANNEX 1: Freight Transport-related Data	47
ANNEX 2: The Sustainability Triangle	50
ANNEX 3: Sustainable Freight Transport and Linkages to Relevant Global Processes on Sustainable Development	51
ANNEX 4: Relevant Definitions Applied in the Context of Sustainable/Green Freight Transport.....	56
ANNEX 5: Dimensions and Objectives of Sustainable Freight Transport	58
ANNEX 6: Examples of Findings Resulting from the Diagnosis.....	76
ANNEX 7: Case: Metropolitan City "X"	79

List of Tables

Table 1: Arizona State Freight Transport Plan – Vision and Goals.....	17
Table 2: Examples of Vision Statements in the Freight Transport Sector	17
Table 3: Examples of Vision, Goals and Objectives.....	19
Table 4: Sustainability Targets and Vision	22
Table 5: Examples of Relevant Freight Transport Sector Targets.....	24
Table 6: Example of Indicators Used for Monitoring, Reporting and Verifying Sustainable Freight Transport Strategies	37
Table 7: Sustainable Freight Transport Instruments.....	43

List of Figures

Figure 1: Sustainable Freight Transport and the Triple Bottom Line.....	8
Figure 2: UNCTAD Framework for Sustainable Freight Transport (SFT Framework).....	9
Figure 3: UNCTAD SFT Framework - Steps and Cross-cutting Enabling Factors	9
Figure 4: UNCTAD SFT Framework Diagnosis Step	11
Figure 5: Types of Data Collection Surveys in the Freight Transport Sector	13
Figure 6: UNCTAD SFT Framework Visioning Step.....	16
Figure 7: UNCTAD SFT Framework Visioning Substeps.....	16
Figure 8: UNCTAD SFT Framework Targets and Indicators Step.....	20
Figure 9: Translating a Vision into Goals, Objectives, Targets and Key Performance Indicators	21
Figure 10: UNCTAD SFT Framework Implementation Step	26
Figure 11: Green Logistics Framework.....	29
Figure 12: External Factors Influencing Freight Transport Sustainability Levers.....	30
Figure 13: ASI, Green Logistics and IF-TOLD Frameworks for Sustainable Freight Transport	30
Figure 14: External Costs of Freight Transport in the EU-27	31
Figure 15: UNCTAD SFT Framework Partnerships and Programmes Step.....	34
Figure 16: UNCTAD SFT Framework Monitoring and Evaluation Step	36
Figure 17: UNCTAD SFT Framework Enabling Factors	40
Figure 18: Institutional and Legal Set-Up: The Case of Urban Freight Transport.....	45

List of Abbreviations and Acronyms

ASD	Agenda for Sustainable Development
ASI	Avoid-Shift-Improve
CH4	Methane
CO2	Carbon Dioxide
ESCO	Energy Service Companies
ETI	Enable Trade Index
EU	European Union
FMO	Freight Mobility Office
GDP	Gross Domestic Product
GHG	Greenhouse Gas Emissions
GLEC	Global Logistics Emissions Council
GT	Gigatonne
ICAO	International Civil Aviation Organization
ICCT	International Council on Clean Transportation
IEA	International Energy Agency
IMO	International Maritime Organization
ISO	International Organization for Standardization
ITS	Intelligent Transport Systems
KPI	Key Performance Indicator
KM	Kilometre
LDC	Least Developed Country
LCV	Light commercial vehicle
LPI	Logistics Performance Index
MDB	Million barrels per day
MIIT	Ministry of Industry and Information Technology
MOT	Ministry of Transport
MRV	Monitor, Report, Verify
N2O	Nitrous Oxide
NOx	Nitrogen Oxides
OECD	Organisation for Economic Co-Operation and Development
PM	Particulate Matter
PM10	Particulate Matter less than 10 microns in diameter
PM2.5	Particulate Matter less than 2.5 microns in diameter
PCN	Penalty Charge Notice
SDG	Sustainable Development Goal
SIDS	Small Island Developing States
SFT	Sustainable Freight Transport
SMEs	Small and Medium Enterprises
SO2	Sulphur Dioxide
TEU	Twenty-foot Equivalent Unit
TIMBER	Technology, Infrastructure, Market, Behaviour
TKM	Ton-kilometre
TMG	Tokyo Metropolitan Government
UNCTAD	United Nations Conference on Trade and Development
WEF	World Economic Forum
WB	World Bank
ZEV	Zero Emission Freight Vehicle

UNCTAD FRAMEWORK FOR SUSTAINABLE FREIGHT TRANSPORT (UNCTAD SFT Framework)

I. Introduction

Freight transport enables economic growth, provides access to markets, connects producers and consumers, determines trade competitiveness, supports effective integration into global supply chains, and contributes to social progress and inclusive development. At the same time, however, freight transport activity also generates external costs that undermine sustainability objectives such as economic efficiency, social inclusiveness and environmental protection. Widely known as “externalities”, common freight transport-related external costs include, among others, congestion, pollution, fossil fuel depletion, infrastructure degradation, accidents, Greenhouse Gas emissions (GHG), vibration, noise and visual intrusion. See Annex 1 for relevant trends currently unfolding in the freight transport sector, including in terms of its energy consumption and air emissions.

Further information:
[Key Freight Transport-related Data \(Annex 1\)](#)

Addressing these externalities requires that external costs from the freight transport sector be internalised and that the sector’s ability to meet relevant sustainability objectives be improved. This entails a careful management of priorities and trade-offs to strike the right balance between the varied economic, social, and environmental sustainability objectives (see Annex 2). Together, the 2030 Agenda for Sustainable Development (ASD), the Sustainable Development Goals (SDGs) that came into effect in January 2016, and the 2015 Paris Agreement on Climate Change, provide the global framework for advancing the sustainability agenda across all economic sectors including freight transport (see Annex 3).

Against this background, UNCTAD has, over recent years, intensified its work on sustainable freight transport to help developing countries, improve their understanding of the three dimensions of sustainability. UNCTAD’s interventions aim to build and strengthen the capacity of key freight transport stakeholders, including government authorities, policy makers, transport infrastructure managers, freight transport and logistic service providers, and shippers, to effectively plan, design, develop, and implement sustainable freight transport solutions. A key contribution in this respect, is the UNCTAD Framework for Sustainable Freight Transport (UNCTAD SFT Framework) that provides useful guidance and practical tools to support relevant stakeholders in mainstreaming sustainability considerations into their freight transport-related policies, plans, operations, and investment decisions.

Further information:
[Sustainability Triangle \(Annex 2\)](#)
[Sustainable Freight Transport and Linkages to Relevant Global Processes on Sustainable Development \(Annex 3\)](#)

II. UNCTAD Framework for Sustainable Freight Transport (UNCTAD SFT Framework)

A. Purpose and Target Audience

UNCTAD's Framework for Sustainable Freight Transport (UNCTAD SFT Framework) aims to build and strengthen the knowledge, skills, and capacity of relevant freight transport stakeholders interested in advancing the sustainable freight transport agenda.

It features a modular step-by-step methodology that details how to plan, design, develop and implement tailored sustainable freight transport strategies. In addition, the UNCTAD SFT Framework offers guidance and practical tools to help relevant stakeholders and decision makers, from both the public and the private sector, take adequate response measures that promote sustainable freight transport systems. The main tools include the **Self-Assessment Questionnaire**, filterable and extensive list of **Key Performance Indicators (KPIs)**, and, the **catalogue containing over 300 Sustainable Freight Transport Measures**.

With many players being involved in regulating, developing, implementing, managing, operating, and maintaining freight transport infrastructure and services, the target audience spans all relevant stakeholders from within and outside the freight transport sector. These include government authorities, policy makers, city planners, freight transport and logistics service providers (e.g. shipping carriers and logistics firms), users (e.g. shippers, traders, supply chain managers, etc.), infrastructure developers, managers and operators, as well as investors and financial institutions.

B. Defining Sustainable Freight Transport

Several elements underpin the economic, social, and environmental dimensions of freight transport (see Figure 1). The underlying linkages and intersections between these elements underscore the sustainability triple bottom line of the freight transport sector:

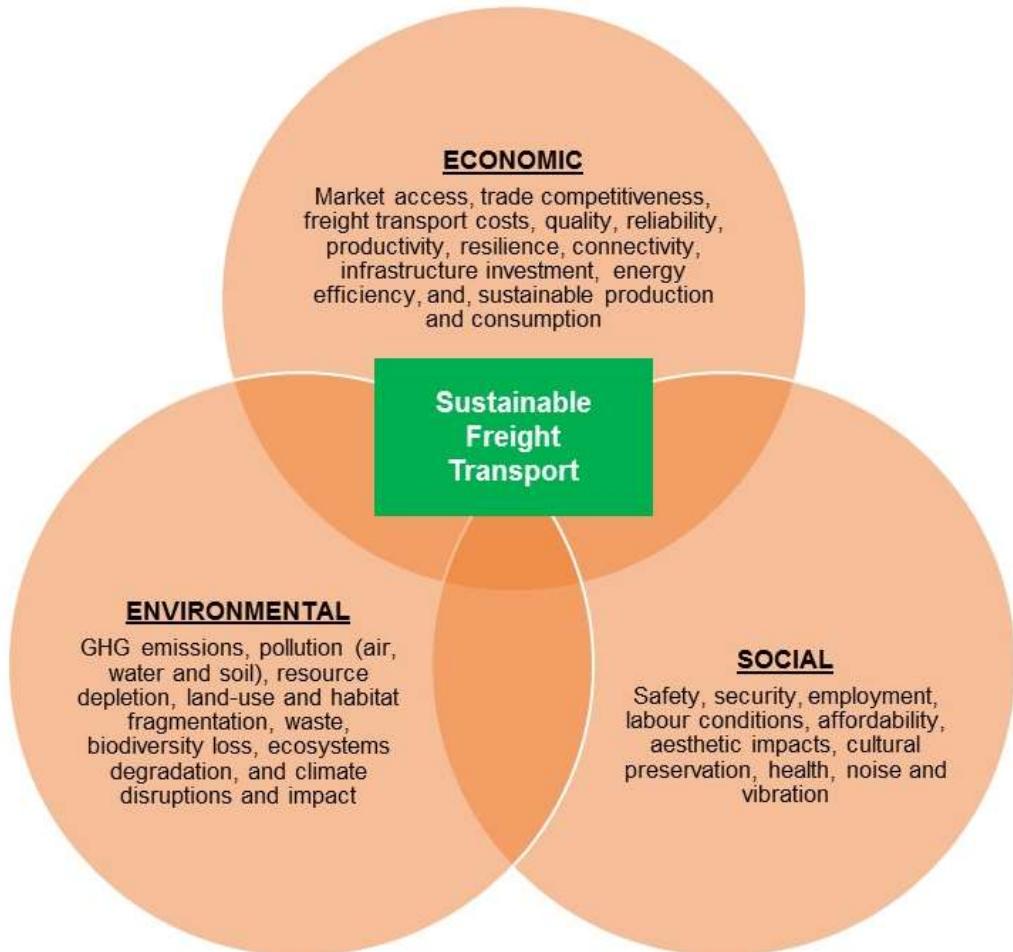
- **Economic sustainability**: relates to factors such as market access, trade competitiveness, costs, quality, reliability, productivity, resilience, connectivity, infrastructure investment, energy efficiency, and, sustainable production and consumption.
- **Social sustainability**: relates to factors such as safety, security, employment, labour conditions, affordability, aesthetic impacts, cultural preservation, health, noise and vibration.
- **Environmental sustainability**: relates to externalities such as GHG emissions, pollution (air, water and soil), resource depletion, land-use and habitat fragmentation, waste, biodiversity loss, ecosystems degradation, and climate disruptions and impact.

Existing definitions of sustainable freight transport may vary and may promote one particular dimension, such as the environment (green transport), society (inclusive transport) or the economy (efficient and competitive transport) (see Annex 4).

From UNCTAD's perspective, and while not intended as an exhaustive list, achieving a sustainable freight transportation entails, among other features, the ability to provide transportation that is safe, economically efficient, competitive, socially inclusive, accessible, reliable, affordable, fuel-efficient, environmentally friendly, low-carbon, and resilient to external shocks such as disruptions resulting from climate change factors and natural disasters.

Further information:
[Select Definitions of Sustainable Freight Transport \(Annex 4\)](#)

Figure 1: Sustainable Freight Transport and the Triple Bottom Line



C. UNCTAD SFT Framework: Steps and Process

The UNCTAD SFT Framework is articulated around **six Steps** (Diagnosis, Visioning, Targets, Implementation, Partnerships and Programmes, Monitoring and Evaluation) and **one set of crosscutting Enabling Factors**. It features a modular step-by-step methodology to planning, designing, developing, and implementing sustainable freight transport strategies (See Figures 2 and 3).

Applicable to different stakeholders, within and across modes of transport, and in various geographical areas, the methodology is flexible and can be modulated to allow for some steps under the Framework to be carried out in parallel (see Figure 3). Substeps and related activities can also be adapted to reflect stakeholders varying needs, resources and priorities.

In addition, the SFT Framework allows for a circular process in which a monitoring and evaluation exercise is undertaken at the end of the cycle after having implemented the sustainable freight transport strategy. This is to help determine how the sector is performing in terms of the economic, social, and environmental sustainability objectives. Once this performance measurement is established, adequate adjustment measures that help improve the strategy can be envisaged.

Figure 2: UNCTAD Framework for Sustainable Freight Transport (SFT Framework)

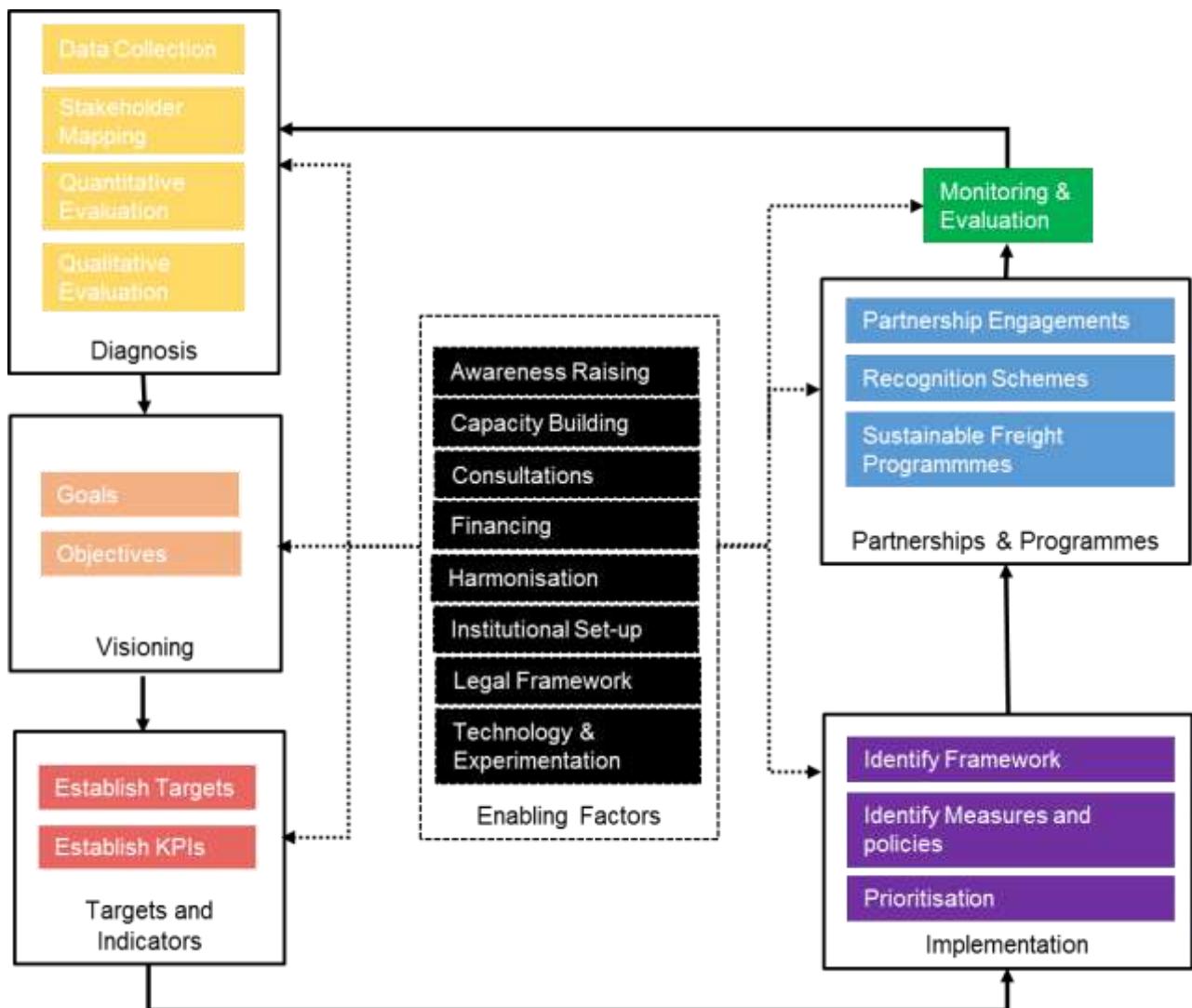


Figure 3: UNCTAD SFT Framework - Steps and Cross-cutting Enabling Factors



Incorporating sustainable freight transport considerations into existing public and private sector planning processes may require additional work and resources. Depending on the context, however, some steps are likely to be more critical than others, and may require more attention and resources. Overall, efforts involved during each step can vary depending on local priorities and resources.

An effective sustainable freight transport strategy does not stop at the question “*what do we want to do?*” i.e. outlining the overall **vision**. The strategy needs to support the vision with an **action plan** to deliver the desired **outcomes** through the appropriate **instruments**, including policy-related instruments. The main question is therefore, *how do we do it and how do we get the resources (institutional and financial) to deliver the strategy?* Other related considerations include the following:

1. *Which issues in the freight transport sector should be considered?*
2. *Who are the stakeholders?*
3. *What determines the performance of the freight transport sector?*
4. *What are the broad and bold aspirations associated with the freight transport sector?*
5. *What is the ultimate objective that the sustainable freight transport strategy aims to achieve?*
6. *What are the best options for developing and implementing a sustainable freight transport strategy?*
7. *How to balance the varied perspectives and move the planning process forward?*
8. *How can the strategy be made into a reality?*
9. *How can we learn and adapt when things are not happening as planned?*

1. Diagnosis

"How do we know if the freight transport sector is/becoming sustainable or unsustainable?"

Figure 4: UNCTAD SFT Framework Diagnosis Step



The starting point under the UNCTAD SFT Framework is the **Diagnosis step** (Figure 4), which aims to identify “problems” in the freight transport sector that need to be addressed through a sustainable freight transport strategy. Before developing such a strategy, it is important to ascertain the existing state of play in terms of the performance of the freight transport sector, including in terms of its ability to meet relevant sustainability objectives.

Work carried out at this stage will aim to identify the main challenges that undermine the sustainability of the freight transport sector and examine their underlying causes. This evaluation is carried out while bearing in mind the three pillars of sustainability and considering relevant existing policy and governance context. This process is heavily driven by data collection and analysis as well as stakeholders’ consultations and inputs.

The Diagnosis combines insights gained from qualitative and quantitative evaluations while taking into consideration available resources and local priorities (Figure 5). The Diagnosis, aims to, *inter alia*:

- Define the problem.
- Gather evidence relating to the nature and scale of the problem.
- Extrapolate current trends and scenarios to formulate possible images of the future by merging quantitative and qualitative inputs.
- Identify sectors and stakeholders that are primarily affected by the externalities generated by the freight transport sector.

The Diagnosis can be structured along the substeps of data collection, quantitative assessment, stakeholder mapping and qualitative assessment.

Data collection and quantitative assessment

To guide the data collection and analysis, the following [key questions](#) can be considered:

- How much cargo/freight is being moved? – This is linked to the economic activity as freight transport facilitates economic growth. This data is useful in infrastructure and traffic planning and management.
- Where is cargo/freight going? – Spatial segregation of freight transport helps in understanding the regional distribution of cargo/freight flows. This information is useful in land use planning (consolidation centers) as well as in infrastructure and traffic planning and management.
- What is the relative use of different transport modes? – Assessing the most efficient means of freight transport requires careful consideration. This is useful for deriving modal shift strategies and infrastructure planning.
- What is the quality of freight transport infrastructure? – This deals with the quality of the physical transport infrastructure (ports, roads, warehouses, etc.). Infrastructure quality varies by infrastructure type and it has a major impact on transport costs and operations.
- How efficiently is cargo/freight being transported? – Inefficient freight transport has economic, environmental, and social consequences. The paucity of information on freight transport efficiency leads to poor planning and constrained investment.
- What is the external impact of the freight transport activity? – Costs include delays resulting from traffic congestion, injuries, fatalities, and property damage from accidents, harmful effects of exhaust emissions and infrastructure wear and tear.
- Are the systems safe and compliant with relevant standards and regulations? – This helps to assess future investment needs.
- How does freight transport performance compare to relevant benchmarks? – To adequately assess the status quo, it can be helpful to compare performance with neighbouring countries, cities, corridors, transport and logistics service providers, supply chain managers, and shippers.

Quantitative approaches help assess the economic, social, and environmental impacts of freight transport by quantifying these impacts and converting them into monetary outcomes. In most cases, quantitative approaches require a significant amount of data and extensive analysis. Many survey instruments could be combined to collect comprehensive freight transport data (Figure 6). Surveys could involve in-person interviews, computer-aided telephone interviews, mail-out/mail-back surveys, and combinations of these deployment methods. In Tokyo for example, urban freight transport surveys are carried out periodically to help understand the importance of urban freight transport and to manage related externalities. The Tokyo Metropolitan Freight Survey has been conducted in 1972, 1982, 1994, 2003-2004 and 2013-2014. In 2013, 140,000 establishments were considered for the survey with a response rate of 32% with 43,600 respondents. Data such as parking, loading, unloading, and pedestrian flow per day were collected and 30 to 40 large companies were interviewed to understand current logistics practices, strategies adopted, and investments required.

Figure 5: Types of Data Collection Surveys in the Freight Transport Sector



Stakeholder Mapping

Stakeholders' interactions are rarely considered in the traditional “[quantitative](#)” models. Therefore, to carry out an effective diagnosis exercise in the context of limited data and resources, both qualitative and quantitative analyses may be required.

Before initiating a qualitative evaluation, stakeholder mapping is conducted to identify relevant players involved in freight transport activities. [Stakeholders are defined](#) as any actor having a stake in the decision-making process, either directly affecting or being affected by its resolution. These may include policy makers responsible for approving policies and overseeing their implementation, regulators responsible for maintaining environmental quality and regulating competition issues, infrastructure development authorities, as well as land-use and transport planners. Other stakeholders may include shippers, supply chain managers, transport and logistics service providers, associations within and outside the freight transport sector, financing institutions, technology providers (e.g. providers of vehicle and equipment technologies, fuels and intelligent transport systems), civil society, and the general public.

During the stakeholder mapping exercise, some of the critical aspects, which need to be considered, include the following:

1. Agencies involved in relevant transportation policy, planning, and programming activities.
2. Major shippers, carriers, and relevant associations and stakeholders whether freight transport users or service providers.
3. Existing freight transport operations and performance.
4. Cargo/freight flows, patterns, and direction.
5. Type of freight transport-related data to use and whether accessible.

Qualitative Assessment

The **UNCTAD Self-Assessment Questionnaire** and the associated **Rating Scale** developed under the SFT Framework are an important tool that can improve respondents' understanding of the existing state of play and establish whether the economic, social, and environmental dimensions of freight transport are taken into account. This instrument can also help ascertain ways in which sustainability considerations have been integrated into relevant processes (see Tool on Self-Assessment Questionnaire). The UNCTAD Self-Assessment Questionnaire covers the three dimensions of sustainability along twenty-seven objectives. See Annex 5 for a more detailed description of these objectives.

A five-point rating scale is used for the scoring,¹ with the applicable ratings being qualitative and reflecting the respondent's perception and own understanding:

1. "Strongly improved": high positive impact on the economy, population or the environment, which result in substantial and long-term improvements from the base case.
2. "Moderately improved": moderately positive impact, possibly lasting only over the short term and which may be confined to a limited area.
3. "No change": no predicted positive or negative impact.
4. "Moderately deteriorated": moderately negative impact, probably short-term moderate impact, able to be managed or mitigated and/or which may be confined to a limited area.
5. "Strongly deteriorated": strongly negative impact with serious, long-term, damages to the physical, economic, or social environment.

After having completed the UNCTAD online Self-Assessment Questionnaire, respondents can view their respective results in a radar chart generated by the system. The chart will feature the sustainability performance of the respondent and indicate whether and the extent to which, main objectives under the three sustainability dimensions are being met. In addition, the Self-Assessment Questionnaire allows users to repeat their self-assessments including after a certain period (e. g. one year) and to compare their situation and performances over time. This facilitates performance monitoring and reporting on progress achieved.

In addition to the qualitative evaluations carried out through self-assessments, interviews with various stakeholders could also help determine the existing state of play. Data collection and analysis as well as information generated during the self-assessment exercise are supplemented with insights gained through the interview process. It is important to carry out [interviews with stakeholders](#) who have a broad perspective (i.e., strategic planning staff) and an operational perspective (i.e., staff at railroad yards or distribution centers).

Together, desktop research, quantitative and qualitative assessments, stakeholder interviews, and the self-assessment provide relevant and critical data and information required to perform a comprehensive diagnosis of the freight transport sector (see Annex 6 for a sample self-assessment). By identifying the underlying gaps and needs, the diagnosis exercise can also help determine the type of response measures and actions required to enhance the sustainability of the freight transport sector.

Tool:

[UNCTAD Self-Assessment Questionnaire](#)

Further information:

[Dimensions and Objectives of Sustainable Freight Transport \(Annex 5\)](#)

Further information:

[Examples of Findings Resulting from the Self Assessment \(Annex 6\)](#)

¹ This scoring scheme draws upon the Asian Development Bank's [STAR rating scheme](#).

For example, if, following a diagnosis process, it has been established that the current level of ‘rail usage is low’, relevant stakeholders may decide to set targets, adopt policies and make investment decisions that help increase the share of rail transport (e.g. achieve a 50% freight mode share in 2030).

2. Visioning

"If we do not know what sustainable freight transport should look like, how do we plan, implement, and measure progress towards that goal?"

Figure 6: UNCTAD SFT Framework Visioning Step



Developing a sustainable freight transport strategy requires a clear **Vision** of how the future freight transport sector would look like (Figure 7). A vision sets the foundation for preparing and implementing a sustainable freight transport strategy and the visioning process helps articulate a big-picture orientation, aligned actions and outcomes, as well as a focused plan.

A vision statement is usually broad and intended to be compelling, inspiring and uncontroversial. It sets out the overarching desired outcomes and leads to well-defined goals and objectives (Figure 8). The vision statement often includes a desired goal across the three dimensions of sustainability, a timeline, and, an inspiration quote that can motivate all the stakeholders and build momentum towards new approaches and policies.

Figure 7: UNCTAD SFT Framework Visioning Substeps



Vision Statement

To develop a vision, which adequately reflects local needs; it is necessary to have consultations, whether formal or informal, with a broad range of stakeholders, particularly the freight transport community from the private sector that had been identified during the Diagnosis step. The visioning process requires a consensus given the potentially conflicting priorities of the various stakeholders involved and the wide range of elements that underpin the economic, social, and environmental dimensions of sustainable freight transport. Consultations during the visioning exercise can help

identify ways in which the diverse freight transport perspectives can best be integrated into the sustainable freight transport planning process. Such consultations should take into account the needs of all affected parties, including smaller players such as single owner-drivers, small and medium-sized enterprises (SMEs) and small shippers. The vision statement should also result from a collaborative effort among the various stakeholders.

Goal Setting

A set of **goals** should support the vision statement to provide strategic direction to the sustainable freight transport strategy. These goals should be framed as broad statements that describe the desired end-result. A vision statement can have many goal statements (see Tables 1 and 2 for relevant examples).

As noted above, a broad vision statement helps identify the strategic elements and priorities that serve as the basis for developing more detailed goals, objectives, and corresponding targets and policies. For example, if a goal is to improve the mode share of waterways or shipping, then the focus areas may include carrying out port improvements, enhancing interconnectivity with highways, and, ensuring the availability of relevant infrastructure. Under an environmental goal for example, more attention would probably be given to concerns such as air pollutant and GHG emissions, water and soil quality, noise, etc.

Table 1: Arizona State Freight Transport Plan – Vision and Goals

Vision	Goals	Goal Statements
Arizona's freight transportation system enhances economic competitiveness and quality growth through effective system performance and management	Economic competitiveness	Increased economic activity, investment, and high paying jobs Increase trade.
	Increase system performance	Increase mobility and multimodal accessibility Increase safety and security Increase system efficiency and reliability Minimize negative social and environmental impacts
	Improve system management	Ensure system preservation and maintenance Work in partnership Ensure good fiscal stewardship Increase effective performance monitoring Link freight transport with land use Increase smart network expansion

Table 2: Examples of Vision Statements in the Freight Transport Sector

Name	Market/Scope	Vision/Goal
Australia - National Land Freight Strategy A place for freight	Country	To drive efficient and sustainable freight logistics that balance the needs of a growing Australian community and economy, with the quality of life aspirations of the Australian people.
Global Green Freight Action Plan	Global	To promote, enhance, and scale-up green freight transport programmes as a highly effective means of reducing CO ₂ , black carbon, particulate matter (PM), and other air pollutant emissions from the transportation sector.
California Sustainable Freight Action Plan	State	Utilise a partnership of federal, State, regional, local, community, and industry stakeholders to move freight in California on a modern, safe, integrated, and resilient system that continues to support California's economy, jobs, and healthy, liveable communities. Transporting freight reliably and efficiently by zero-emission equipment everywhere feasible, and near-zero emission equipment

Name	Market/Scope	Vision/Goal
		powered by clean, low-carbon renewable fuels everywhere else.
London Freight Plan	Urban	'...the safe, reliable and efficient movement of freight and servicing trips to, from, within and, where appropriate, through London to support London's economy, in balance with the needs of other transport users, the environment and Londoners' quality of life.
GreCOR Freight Strategy - for Greening Logistics in the North Sea Region	Corridor	Aim to strengthen the logistics industry's competitiveness and to create sustainable solutions for the entire community. The goal is to create freight transport corridors of excellence, where large and concentrated freight transport traffic flows between major hubs and along long distances can be handled in the most efficient, environmentally friendly and commercial manner.
Smartway Initiative	Shipper, supply chain manager, carrier, retailer, wholesaler, freight transport/logistics service provider	Help companies advance supply chain sustainability by measuring, benchmarking, and freight transportation efficiency.
East West Transport Corridor	Corridor	<ol style="list-style-type: none"> 1) In 2030, the solutions tried and tested in the Green Corridors are becoming the standard for freight transport 2) The Green Corridors are top of the line as regards innovative technology, efficient and sustainable logistics solutions, high-quality performance and a sound economy 3) Eco-labelling of transport services is standard in the Green Corridors network 4) Standardised European regulations on the infrastructure, terminals, and services of a Green Corridor are established 5) A decoupling between freight transport and traffic has been achieved, with continued economic growth
DHL	Shipper, supply chain manager, carrier, retailer, wholesaler, freight transport/logistics service provider	Vision is to be The Logistics Company for the World
A.P. Moller – Maersk Group	Shipping company	Unlocking growth for society and Maersk through efforts to reduce barriers to trade, invest in education and improve the energy efficiency of supply chains, we aim to grow our industries while addressing significant sustainability challenges in society.

Objective Setting

Once the goals have been identified, the next step is to formulate a set of **objectives**. While goals relate to the "big picture" or desired end-results, the objectives could be both broad-based and/or specific and measurable i.e. outcome, output, and activity-based objectives.

The objective answers the question, "*What do we ultimately want to achieve through the sustainable freight transport strategy?*" It should include or lead to the development of targets and KPIs that are required to support effective decision-making. This is further detailed in the step dealing with Targets and Indicators.

Objectives must be precise, sufficiently concrete and not be open to varying interpretations by different stakeholders. Such objectives are often known as "SMART" objectives that are specific, measurable, accepted, realistic, and time-bound. "SMART" objectives should be:

- S:** Specific enough to guide the formulation of policies, investments, and actions for achieving the objective without dictating the approach.
- M:** Measurable to facilitate quantitative and qualitative evaluations by clarifying how much should be achieved.
- A:** Agreed by stakeholders through consensus on a common objective.
- R:** Realistic so that it can be reasonably accomplished while bearing in mind resource limitations and competing demands.
- T:** Time-bound by identifying a timeframe for completion.

For example, if the diagnosis exercise had established that the level of 'rail freight usage is low', relevant stakeholders could decide to adopt the following vision: "*safe, reliable and efficient movement of freight*". They could also agree on the following goal: "*increase rail freight mode share*". To achieve this goal, objectives that are underpinned by the SMART principle may involve increasing the share of rail freight transport by 50% by 2030. They may also involve increasing railway investments by 30% and the fuel tax for diesel by 5%. The example in table 3 shows how the Vision, Goal and Objectives can be interlinked.

Table 3: Examples of Vision, Goals and Objectives

Vision	Goals	Objective
A vision statement is a broad statement intended to be compelling, inspiring and non-controversial.	A GOAL is a broad statement that describes the desired end state.	An OBJECTIVE is a specific, measurable statement that supports achievement of a goal.
Example – City		
Healthy, prosperous, and livable city.	Enhance the quality of life for all populations; Reduce contribution to climate change and improve resilience; Reduce citywide traffic congestion.	Reduce freight transport empty trips; Reduce logistics cost by improving fuel efficiency; Reduce congestion by improving traffic flow on the designated freight network; Reduce freight transport emissions, accidents and; Reduce freight transport noise; Increase rail freight transport mode share; Reduce logistics cost by improving fuel efficiency; Improve travel time.

3. Targets and Indicators

"What is happening in the freight transport sector? Are we improving our performance? Are relevant sustainable freight transport policies helping achieve the intended objectives?"

Figure 8: UNCTAD SFT Framework Targets and Indicators Step

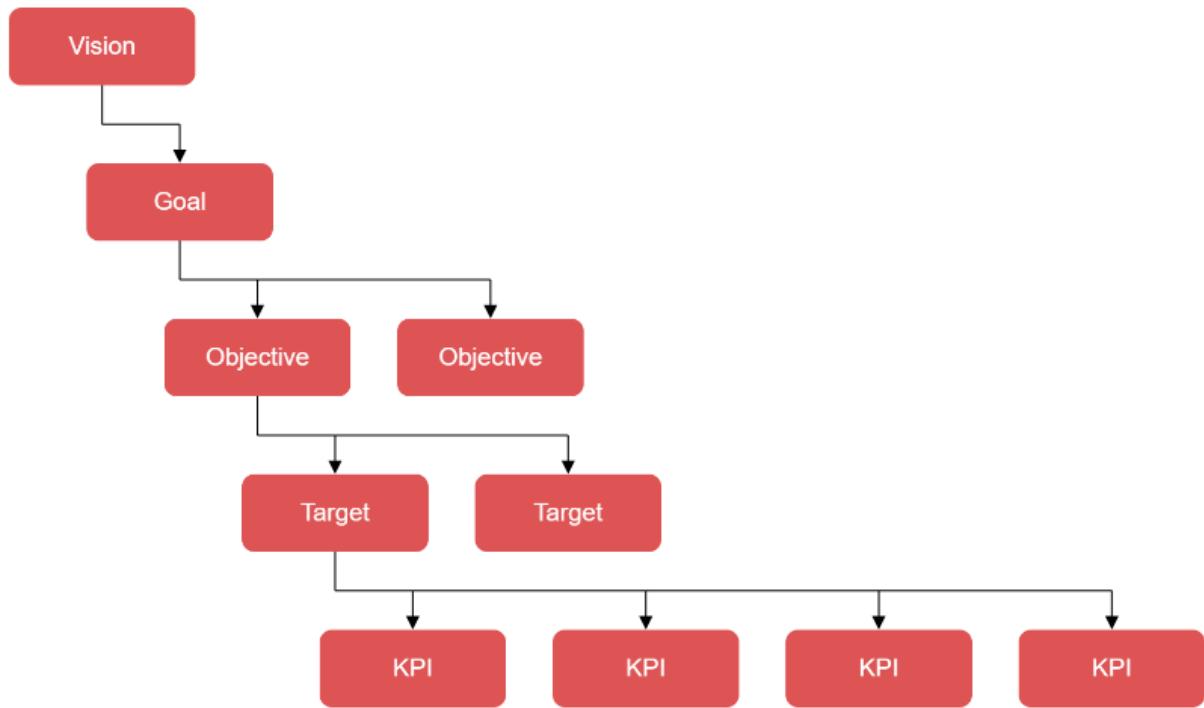


Once a set of goals and objectives has been established in accordance with the agreed vision, it will be important to set **Targets and Indicators (KPIs)** (Figure 9).

Setting sustainability targets is fundamental when developing a sustainable freight transport strategy. Targets help define, in specific and measurable terms, the desired outcomes of the strategy. They should be incorporated into a vision statement to contribute to a "SMART" objective. As shown in Figure 10, a vision or a vision statement can have multiple goals and each goal can have many objectives. At the same time, each objective can be linked to multiple targets and each target could be linked to various KPIs. Developing targets and indicators needs to be undertaken concurrently with the formulation of objectives. Where targets and indicators are developed in isolation from the objectives, there is a risk that the indicators start to drive rather than support the decision-making process. See Annex 7 for an illustration of the underlying linkages.

Further information:
[Vision-Goal-Objective-Target-KPI Linkages](#)
 (Annex 7)

Figure 9: Translating a Vision into Goals, Objectives, Targets and Key Performance Indicators



Benefits of setting sustainability targets include:

1. Establishing clear goals for various stakeholders and purposes (e.g. public authorities/organisations, projects, investments, etc.).
2. Motivating people working in the freight transport sector by clarifying their expected performance and how they can measure progress (or lack thereof).
3. Providing a benchmark against which improvements can be measured.
4. Demonstrating commitment to the sustainable freight transport agenda.
5. Generating potential marketing benefits.

Targets help to set up a clear course of action and guide future direction. By providing relevant benchmarks, targets provide a measure of how successful the strategy may have been and determine required adjustment to improve performance and results. As freight transport is a multi-faceted area of activity, targets should be clear and there should be no ambiguity about the objective that is being prioritized. This ensures that stakeholders understand how the different objectives are being balanced. This in turn, can help secure stakeholders' buy-in and support.

Relevant examples relating to Visions and Targets, including as applied in the freight transport sector are featured in Tables 4 and 5.

Table 4: Sustainability Targets and Vision

Name	Market	Vision	Goals/Objectives/Targets	Remarks
Australia - National Land Freight Strategy A place for freight	Country	To drive efficient and sustainable freight logistics that balance the needs of a growing Australian community and economy with the quality of life aspirations of the Australian people.	To improve the efficiency of freight movements across infrastructure networks, to minimise externalities associated with such freight movements and to influence policy making of relevance to freight.	Qualitative target. Applies across the freight transport sector (all modes).
California Sustainable Freight Action Plan	Sub-National/State	<p>Utilise a partnership of federal, State, regional, local, community, and industry stakeholders to move freight in California on a modern, safe, integrated, and resilient system that continues to support California's economy, jobs, and healthy, liveable communities.</p> <p>Transporting freight reliably and efficiently by zero-emission equipment everywhere feasible, and near-zero emission equipment powered by clean, low-carbon renewable fuels everywhere else.</p>	<ol style="list-style-type: none"> 1. Improve freight system efficiency 25% by increasing the value of goods and services produced from the freight sector, relative to the amount of carbon that it produces by 2030, 2. Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030, 3. Establish a target or targets for increased state competitiveness and future economic growth within the freight and goods movement industry. 	Quantitative target. Applies across the freight transport sector (all modes). Social aspects not prioritised.
DHL	Shipper, supply chain manager, carrier, retailer, wholesaler, freight transport/logistics service provider	To be The Logistics Company for the World.	Reduce the greenhouse gas emissions for every letter, every parcel, every ton of freight and every square meter of warehouse space by 30% by the year 2020.	Quantitative target. Applies across the transport service provider logistics sector. Only environmental aspects prioritised.
The Stockholm Freight Plan 2014–2017	City	<p>An initiative for safe, clean and efficient freight deliveries</p> <p>The Stockholm Freight Plan 2014–2017 is part of the</p>	Four goals for 2014-2017 period: The city aims to: <ol style="list-style-type: none"> 1. Enable more reliable delivery times. 2. Facilitate... for commercial freight vehicles. 	Qualitative target Applies across the freight transport sector (all modes).

Name	Market	Vision	Goals/Objectives/Targets	Remarks
		<p>City's commitment to a world-class Stockholm.</p> <p>The vision presents three coherent themes for the city's development, as well as a number of essential characteristics that show what it will be like to live in, work in and visit Stockholm in the year 2030.</p>	<ul style="list-style-type: none"> 3. Promote the use of clean vehicles, 4. Advance the freight delivery partnership between the City and other stakeholders. 	
EU Transport White Paper	Regional	Growing Transport and supporting mobility while reaching the 60% emission reduction target.	Achieve essentially CO ₂ -free city logistics in major urban centers by 2030, Low-carbon sustainable fuels in aviation to reach 40% by 2050; also by 2050 reduce EU CO ₂ emissions from maritime bunker fuels by 40%, 30% of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050, facilitated by efficient and green freight corridors, a fully functional and EU-wide multimodal TEN-T 'core network' by 2030, with a high quality and capacity network by 2050 and a corresponding set of information services, by 2050, move close to zero fatalities in road transport, full application of "user pays" and "polluter pays" principles.	<p>Quantitative target.</p> <p>Applies across the freight transport sector (all modes).</p>

Table 5: Examples of Relevant Freight Transport Sector Targets

Stakeholder	Targets relevant to the freight transport sector	Target type	Sustainability dimensions		
			Economic	Environmental	Social
EU Transport White Paper	Achieve essentially CO ₂ -free city logistics in major urban centers by 2030, low-carbon sustainable fuels in aviation to reach 40% by 2050; also by 2050 reduce EU CO ₂ emissions from maritime bunker fuels by 40%, 30% of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050.	Absolute target considering mode share, fuel type and emissions.	●	●	○
Bangladesh	Freight mode share target of 20% for inland waterways and 10% for railways for 2009–2014.	Absolute target in modeshare.	○	○	○
IATA	An average improvement in fuel efficiency of 1.5% per year from 2009 to 2020, A cap on net aviation CO ₂ emissions from 2020 (carbon-neutral growth), A reduction in net aviation CO ₂ emissions of 50% by 2050, relative to 2005 levels.	Absolute and intensity targets combined.	○	●	○
Fujitsu Group	To reduce CO ₂ emissions in domestic distribution by 11% compared to FY 2008 by the end of FY 2012.	Absolute target in reducing emissions.	○	●	○
Komatsu	8% reduction in CO ₂ Emissions per Cargo Weight (as compared to 2011 levels) as the goal for 2015.	Intensity target considering emissions per cargo weight	○	●	○
SDGs	By 2020, halve the number of global deaths and injuries from road traffic accidents. By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination. By 2030, improve water quality by reducing pollution, eliminating dumping and minimising the release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and increasing recycling and safe reuse by x% globally. Double the global rate of improvement in energy efficiency by 2030. Increase substantially the share of renewable energy in the global energy mix by 2030. Increase significantly the exports of developing countries, in particular with a view to doubling the LDC share of global exports by 2020.	Absolute and intensity targets combined.	●	●	●

Note: ● Fully considered, ○ Partially considered; ○ Not considered

When selecting targets, it is important to bear in mind the difference between the top-down and the bottom-up approaches.

Top-down versus bottom-up targets: Top-down freight transport targets are usually set based on a given ambition without any scientific quantification and justification. In most cases, they are not based on a detailed analysis of the mitigation potential. Instead, they are often aligned with targets quoted by competitors, trade bodies and/or government agencies. These targets often do not consider operational, technological, and financial constraints and do not take into account cross-functional variations in the potential for externalities abatement and its cost-effectiveness.

In contrast, bottom-up targets or activity-based targets take into account operational, technological, financial, and cost-effectiveness considerations. They are generally based on bottom-up quantifications that clarify the mitigation potential of relevant policies and measures.

Absolute versus intensity targets: Absolute targets reduce the total amount of externalities or impacts regardless of changes in the level of activity. Countries or private sector companies may fear that the pursuit of an absolute reduction target will constrain the growth of their economy and

business activities, and potentially carry a financial penalty. In this context, sustainability targets in the freight transport sector could often be intensity-related. Sustainability parameters are expressed in relative terms and are linked with an appropriate normalizer (e.g. emissions per ton-kilometre, emissions per vehicle-kilometre or freight fatalities per freight vehicle-kilometre). Targets can also be developed based on a tier approach where differentiation is made between the short and longer-term goals. Once finalized, targets ultimately set the course for future action. Table 5 features the type of targets used by some relevant stakeholders when devising and implementing their respective sustainable freight transport strategies.

These targets are monitored using KPIs, which are inherently linked to the [objectives and goals](#). KPIs are indicators used to assess whether stakeholders are on target as they work towards achieving the vision's goals and objectives. Indicators may need to be refined over time and improved to better reflect stakeholders' needs. For example, the policy priorities may change due to new and emerging critical challenges or there could be new developments in statistical methodologies and data availability, creating new opportunities for indicator refinement. Thus, some level of flexibility should be allowed when developing indicators. This aspect is elaborated further under the Monitoring and Evaluation step.

To support the selection of KPIs that address the economic, social, and environmental sustainability of freight transportation, **around 250 indicators** have been compiled under the UNCTAD SFT Framework. The list of KPIs compiled by UNCTAD, which can be displayed using various filters and criteria (e.g. by transport mode, scope and sustainability dimension), illustrates how different indicators can be formulated at different scales to measure different objectives (see Tool on UNCTAD SFT Key Performance Indicators). It should be noted however, that these indicators are not intended to serve as a complete or comprehensive list of KPIs in the field of sustainable freight transport.

Tool:
[UNCTAD SFT Key Performance Indicators](#)

When selecting the KPIs to be tracked, stakeholders' involvement is necessary. Targets and KPIs must also be accepted by all the parties that are expected to take responsibility for their achievement. Consulting stakeholders, including stakeholders identified during the Diagnosis and Visioning steps, is required to generate support for the KPIs and targets and to discuss the measures that are most important. Stakeholders need to decide who should be compiling information about the relevant measures and agree on how to link these measures to the strategies developed and implemented to achieve sustainable freight transportation. Consultations could also help address potential data gaps and double counting.

Efforts should aim to improve the freight transport-related data sources, availability, granularity, reliability and quality. Improved data systems can support the development of useful indicators, which in turn, are crucial enablers of sound and informed decision-making processes. This is particularly true in many developing countries, where limited access to freight transport-related data could undermine [evidence-based decision-making](#).

4. Implementation

"Sustainability can only be attained by optimising seemingly conflicting targets – not by maximising a single target"

The **Implementation step** moves the sustainable freight transport strategy development process from a conceptual level to a concrete and practical stage. During this step, efforts should aim to convert sustainable freight transport requirements identified during the diagnosis exercise (i.e. the agreed vision and the associated, goals, objectives and targets) into actual measures that promote sustainable freight transport (Figure 11).

Figure 10: UNCTAD SFT Framework Implementation Step



1. Frameworks for Identifying Improvement Measures and Policies

Several frameworks can help identify relevant sustainable freight transport measures, policies, and instruments. These frameworks vary by geographical scope, source, nature and duration of the problem and the solution as well as the actors involved in the implementation process.

a) Avoid-Shift-Improve (ASI) Framework:

- "**Avoid strategies**": Aim to reduce the demand for freight transport that generates externalities. Relevant strategies may include cutting the quantity of cargo carried, the distances travelled, or both, as well as avoiding or reducing unnecessary freight transport activities and empty mileage.
- "**Shift strategies**": Aim to transfer freight transport activities to more energy-efficient and/or environmental-friendly modes. The shift reduces emissions per unit of freight transport activity (e.g. ton-kilometre).
- "**Improve strategies**": Aim to enhance system performance and cover freight transport infrastructure, services, and operations. Relevant "Improve" strategies may include infrastructure design changes, infrastructure development and maintenance, energy intensity reduction across the various freight transport modes (e.g. increased load factors or fuel efficiency), and, generally, any sustainability-driven improvements affecting vehicles, ships,

equipment, transport operations, technologies, behaviour (e.g. changing drivers' behaviour), etc.

Unlike in passenger transport where it is relatively well established and popular, the [ASI Framework](#), in particular the "Avoid" element of the ASI Framework, appears to be less applied in freight transport. This is because countries may consider "Avoid" strategies that promote a reduction in freight transport demand, to be potentially detrimental to their economic growth and trade expansion. That said and while the correlation between economic growth, merchandise trade, and demand for freight transport is well established, experience in many developed countries shows that it is possible to decouple growth in the economy and freight transport activity, on the one hand, from growth in the associated externalities, on the other.

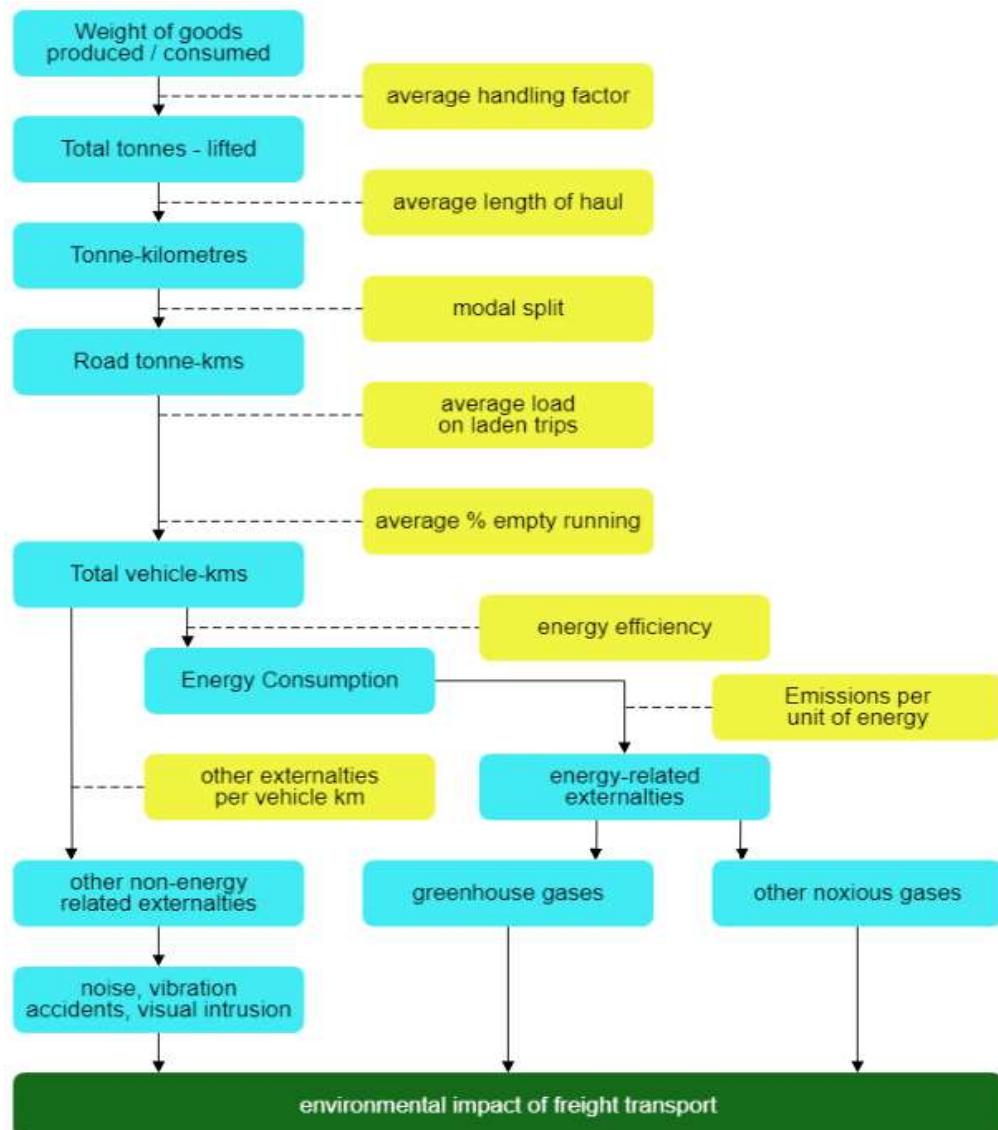
b) [Green Logistics Framework](#): This framework is particularly useful in linking economic growth with freight transport-related externalities, in particular the environmental externalities (Figure 12 and centre column of Figure 13). According to this framework, various levers interact to determine the level of externalities generated by a freight transport operation. These levers, which are set out below, are also associated with a set of parameters and outputs that are featured in Figure 12. The yellow-shaded boxes contain the parameters while the blue-shaded boxes contain the outputs. According to the Green Logistics Framework, the main levers determining the externalities generated by freight transport include the following:

1. ***The structure of the supply chain:*** Relates to the location of the nodes and links through which the cargo/freight moves, and which determine the geographical patterns of cargo/freight flows. Some of the nodes (such as warehouses or freight terminals) may be located in environmentally sensitive areas and may need to be repositioned. There may also be an environmental benefit in consolidating cargo/freight flows along particular corridors where investment in rail infrastructure can be concentrated. Under this lever, key parameters include the average handling factor and the average length of haul.
2. ***Freight modal split:*** Refers to the allocation of cargo/freight traffic among transport modes, which is critical to any sustainable freight transport strategy. Some modes are 'cleaner' than others in terms of the externalities they generate per ton-kilometre of cargo/freight carried. Modes also differ, however, in their functionality and face different infrastructural, operational and technical constraints. This prevents the shift of all cargo/freight to the modes of transport that are more sustainable. Modes are also interdependent. The low density of the rail and waterway networks, for example, makes them dependent on feeder transport by road making the freight transport 'intermodal'. Key parameters include the modal split.
3. ***Vehicle and ship routeing:*** Within a fixed supply chain, vehicles can follow different routes between nodes. Some of these routes will generate more externalities than others because of their length, traffic conditions and/or the environmental, cultural or historical sensitivity of the areas through which they pass. For example, environmentally optimised routeing can significantly cut emissions per vehicle-km, ship ton-mile, and per ton-kilometre.
4. ***Capacity and utilisation (infrastructure, vehicles, ships, and equipment):*** Many freight transport vehicles (road) are under- or over-loaded. When they are under-loaded, more trips are required to deliver the goods, generating more traffic, using more fuel, and causing more pollution. Overloading reduces the number of trips required, but, by causing the engine to work harder, it reduces fuel efficiency and increases emissions. Damage to the road surface caused by overloaded axles also reduces the fuel efficiency. Optimised vehicle loading is, therefore, a major goal of any sustainable freight transport policy. In the shipping sector, the growing deployment of larger vessels, especially in the containerised trade sector, allows for large volumes of cargo/freight to be carried over long distances. This leads to economies of scale and a reduction in unit costs. Through the establishment of shipping alliances, the shipping sector is able to share assets and capacity (e.g. ship carrying capacity, port terminal operations, and equipment). By supporting an effective use of capacity and assets, costs,

including external costs resulting from inefficient use of maritime transport capacity, can be reduced.

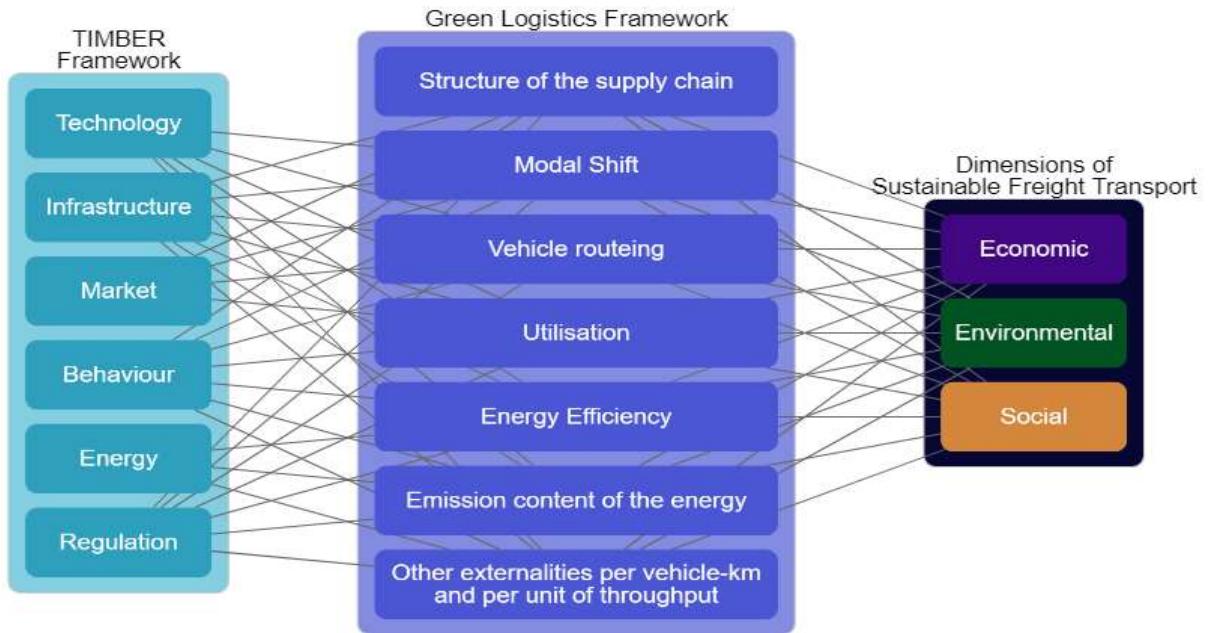
5. **Exposure to traffic congestion:** Operating freight transport vehicles on congested roads carries a fuel penalty. Rescheduling deliveries to off-peak periods and optimizing freight transport planning/volume/operations contribute to cutting fuel consumption and emissions and ease the level of congestion for all types of traffic. Relevant parameters include average load on laden trips and average % empty running.
6. **Energy efficiency:** A more efficient operation of freight transport vehicles and ships translates directly into lower energy consumption, lower emissions, and greater resource-conservation. A set of mutually reinforcing technological, operational, and behavioural measures can be deployed to improve energy efficiency. Many of these can be supported by public policy.
7. **Carbon and pollutant content of the energy source:** Freight transport can be propelled by fuels that vary in terms of carbon and pollutant content. Switching to cleaner fuels is key. Electrifying freight transport and using other clean technologies such as alternative fuels and hybrid propulsion systems, can generate environmental benefits both at local and global levels. However, alternative and cleaner energy sources or and/or the required refueling/recharging infrastructure might not be readily available and accessible, especially in developing regions. In addition, the cost differential with conventional energy sources can hinder an effective fuel switch. A key parameter relates to the emission intensity or emission per unit of energy.
8. **Other externalities per vehicle-km and per unit of throughput:** Not all logistics-related externalities are a function of energy consumption. There are other effects such as noise, vibration, and accidents. This can be expressed either with respect to vehicle-km in the case of road transport or with reference to the throughput of warehouses, terminals, etc. A key parameter would be externalities per vehicle kilometre.

Figure 11: Green Logistics Framework



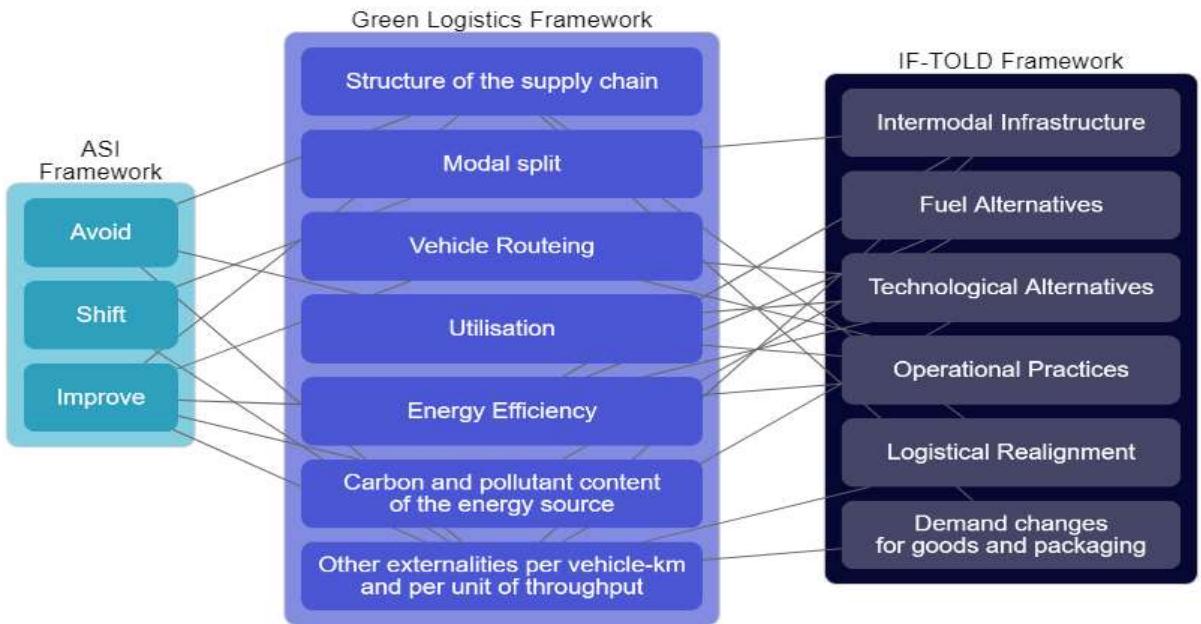
- c) **TIMBER Framework:** The sustainability levers could be influenced by external factors which could be grouped into six broad categories, using the acronym **TIMBER** which stands for Technology, Infrastructure, Market (i.e. market for logistics services), Behaviour (i.e. drivers), Energy and Regulation (figure 13, left hand column). The relatively large number of policy instruments and sustainability levers creates flexibility and allows governments, policy makers and industry players to tailor their sustainability strategies to reflect local needs. However, it also increases the complexity of policy formulation and implementation, which is further heightened by the variety of measures available within each policy instrument.

Figure 12: External Factors Influencing Freight Transport Sustainability Levers



- d) **IF-TOLD Framework:** This framework is similar to the Green Logistics Framework and involves reconfiguring freight transport technologies, operations, and infrastructure across six dimensions. These include the a) Intermodal Infrastructure; b) Fuel Alternatives; c) Technological Alternatives; d) Operational Practices; e) Logistical Realignment; and f) Demand changes for goods and packaging. Figure 14 illustrates the interlinkage between various the sustainable freight transport (ASI, Green Logistics and IF-TOLD Framework).

Figure 13: ASI, Green Logistics and IF-TOLD Frameworks for Sustainable Freight Transport

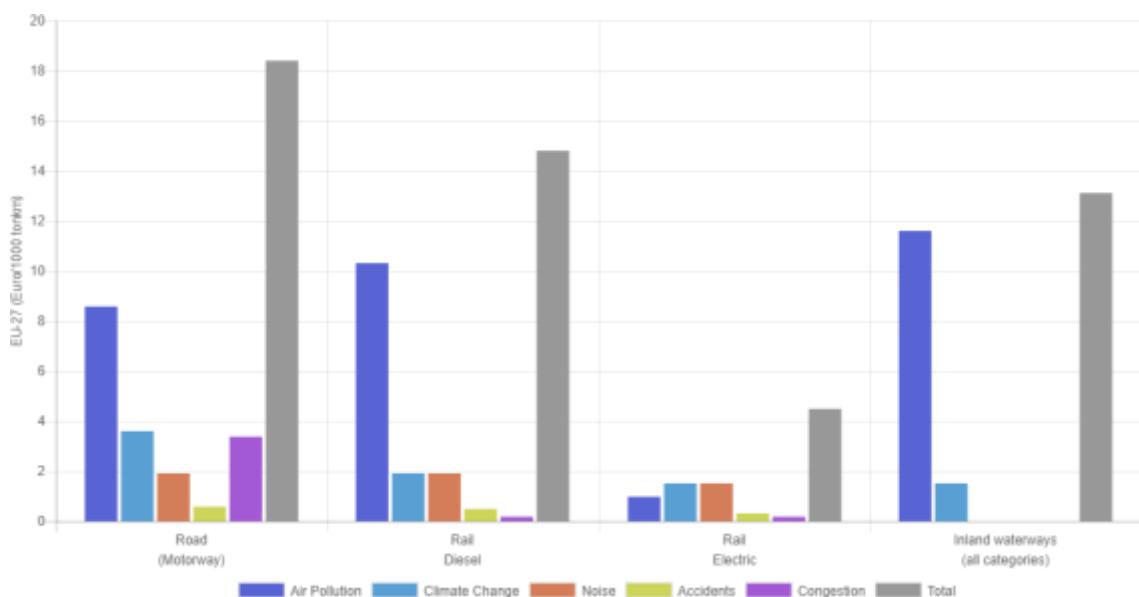


2. Identification of Projects/Strategies and Prioritization

Once the framework that will be applied has been defined and the relevant sustainability levers have been identified, the next step is to identify **potential projects, measures and policies** that will address existing sustainability gaps and bottlenecks that prevail in the freight transport sector.

To identify the sustainability improvement measures and policies required, all impacts, including environmental and social, need to be expressed in monetary terms to reflect the external costs. The monetary value becomes the common metric used to estimate the impact of the unsustainable freight transport patterns (Figure 15). By assigning a monetary value to all externalities, it becomes possible to manage the externalities by taking relevant action to internalise the external costs.

Figure 14: External Costs of Freight Transport in the EU-27



Source: UNCTAD calculations, based on [Marco Polo freight transport project proposals - EC Joint Research Centre, 2011](#).

Placing a monetary value on all the impacts of freight transportation, including the economic, social and environmental impacts, allows governments to, *inter alia*:

1. Model the trade-offs between the economic, social and environmental objectives using a common metric.
2. Conduct cost-benefit analyses of measures that reduce all types of impacts generated by the freight transport sector.
3. Calculate a financial rate of return on investments made to improve the sustainability performance of freight transport.
4. Estimate optimal subsidies for sustainable freight transport.
5. Assess the amount of taxes to be levied on the freight transport sector/activities to recover the costs associated with the sector's negative externalities.

Once the needs and gaps have been identified, sustainable freight transport improvement measures can be prioritised by using multi-criteria analytical tools such as PEST (Political, Economic, Social and Technological factors) or STEEP (Social, Technical, Economic, Ecological and Political) analysis. Multi-criteria analyses allow for multiple measures and actions to be proposed.

When identifying, prioritizing and implementing sustainable freight transport measures, the following considerations need to be taken into account:

- **Interconnections:** Freight transport is strongly linked to trade and thus the implementation of relevant policies needs to accommodate trade-related plans and investments. Freight transport planning also intersects with other areas including land planning, city development, rural development plans and tourism, etc. This implies the emergence of potentially competing objectives and priorities and fragmented jurisdictions (e.g. city, district, state, national and regional authorities). As a result, implementing sustainable freight transportation requires, as a pre-condition, effective inter-agency coordination (e.g. on trade, customs, tourism, environment, infrastructure planning, transport, etc.). On the operational side, freight transport often shares the right of way with passenger transport. Therefore, the overall vision for both passenger and freight transport needs to be coherent taking into account development and investment plans relating to both areas of transport activity.
- **Private sector coordination:** While selecting appropriate policies and strategies, it is important to acknowledge the timeframe mismatch that underpins the actions of the public and the private sector. Public authorities and the private sector usually operate according to different schedules. Owing to business concerns, the private sector requires clear long-term directions in terms of future regulatory and policy changes before it can make freight transport and logistics investment and operation decisions. It is therefore crucial to involve the private sector when defining, planning, and implementing sustainable freight transport strategies.
- **Freight transport is but one element of a logistics chain:** Initiating and implementing sustainable freight transport measures entails implications that extend beyond the immediate scope of freight transport operations. The spillover effects could reach other areas of freight transport and storage activity with the overall net effect being potentially positive or negative. Hence, it is also important to examine the direct and indirect impacts of sustainable freight transport strategies on the freight transport sector.

Over 300 sustainable freight transport measures (or solutions) are compiled in the UNCTAD SFT Measures Catalogue (see Tool on UNCTAD SFT Measures). Eleven criteria/dimensions can be used to filter and select relevant measures. It is possible to navigate the overall catalogue by using the full text search function, which allows users to locate the measures that meet their specific needs. The relevant filters or selection criteria include the scope of the measure (e.g. company or regional levels), transport modes, investment costs and time horizon, and the externality mitigation potential.

Tool:
[UNCTAD SFT Measures Catalogue](#)

Once the list of priority projects/measures/solutions is set and finalized, stakeholder consultations should be carried out to validate the selection. Interviews or focus group discussions can be relied upon to carry out these consultations. The main objective is to generate support for the projects and identify possible champions, i.e. stakeholders who could take the lead in the implementation of relevant measures and policies. Additionally, these consultations provide an opportunity to refine existing concepts and improve the list of projects and measures selected.

Each freight transport project, policy, measure or solution tends to be of particular relevance to a given audience, industry, grouping or stakeholder. For example, fuel economy standards play an important role from the perspective of heavy-duty vehicle manufacturers and trucking companies. Supply chain restructuring will have more relevance for shippers as they have a more influential role in this area. Carriers and freight transport service providers are usually the main stakeholders when dealing with technology retrofits. Consequently, and to cater to different stakeholders and audiences, outreach and consultation approaches need to vary depending on the target audience/stakeholder and the type of projects, measures and policies envisaged.

Priority projects and measures can be further validated by using quantifiable and flexible criteria (e.g. PEST/STEEP). This helps to guide the process aimed at identifying relevant sustainable freight transport measures, policies, investment decisions, and actions. The multi-criteria analysis approach under PEST or STEEP, for example, should be consistent with an existing data collection plan and resource availability.

The final priority list of sustainable freight transport projects, policies, measures or solutions, should be based on insights gained from both the qualitative and quantitative assessments carried out as well as from stakeholder consultations. It is important to integrate the identified and validated priority list into established transportation planning processes. This will ensure that they receive the same level of consideration as other aspects of transport planning, including passenger transport planning.

Following the prioritization process, an appropriate work plan needs to be developed. All stakeholders with a role in developing and implementing the sustainable freight transport strategy need to have a clear understanding of who does what and when. A work plan document should indicate all necessary milestones for implementing the strategy and should identify management procedures, tasks, and the corresponding responsible stakeholders.

5. Partnerships and Programmes

"There is no "one size fits all" approach to develop a sustainable freight transport program"

Figure 15: UNCTAD SFT Framework Partnerships and Programmes Step



Building new and leveraging existing **partnerships** and programs is important when developing a sustainable freight transport strategy (Figure 16). As freight transport transcends transport modes, geographical borders and jurisdictions, it is critical to ensure multijurisdictional and multi-stakeholder collaboration while developing sustainable freight transport strategies.

Partnerships

A starting point when developing partnerships in the freight transport sector is to liaise with relevant policy makers and ministries (transport, finance, trade, customs, infrastructure, etc.) and to leverage existing associations, industry groupings, chambers of commerce, and leading logistics and freight transport operators. Typically, leaders within these organisations are familiar with the members of the freight transport community and may be able to lead partnership-building efforts.

The benefits of partnerships in support of sustainable freight transport are manifold. For example, they can help:

1. **Address the problem of insufficient/limited data/information** relating to sustainable freight transport. There is a need to gather more and better quality and more reliable data and information on the state of the freight transport sector as well as its sustainability.
2. **Facilitate private sector involvement** and acceptance **and rally political support** for freight transport and sustainable freight transport-related projects.
3. **Ensure better coordination of competing and overlapping priorities** and planning (at local/national/regional levels). Agencies with stakes in freight transport tend to operate independently from one another and often with different priorities. As several interest areas overlap, the coordination of interagency work constitutes an important challenge. Partnerships could prove helpful in this respect.
4. **Learn from others**, gain knowledge about relevant issues as well as draw upon successful approaches and experiences from around the world.

5. **Help generate support and funding** for relevant and promising projects. In general, the freight transport sector receives funding from both the public and private sectors. However, given budget constraints and the competing priorities, including from within and outside the freight transport sector, funding earmarked for the freight transport sector may be limited.
6. **Develop policies**, regulation, legislation, financing mechanisms (both comprehensive and specific) to support the freight transport sector and its sustainability.
7. **Encourage and brand efforts** by the private sector.
8. **Promote the strategic role of the freight transport sector** as an economic competitiveness factor.

Thus, well-designed and effective partnerships in support of sustainable freight transport, allow stakeholders to gain a better understanding of their respective constraints and obligations as they provide a forum where experiences, views, information, data and good practice in the field of sustainable freight transport could be shared. Such forums help government, businesses, freight transport operators, environmental groups, private sector associations, local communities and other interested stakeholders to work together to address common issues faced when addressing the sustainability of the freight transport sector. Partnerships can help address the challenge associated with developing and implementing a sustainable freight transport strategy, while allowing for a tailored approach that takes into account the specific local conditions, constraints, and opportunities.

Programs

In addition to setting up partnerships, adopting a pragmatic approach is often required for successful implementation of sustainable freight transport strategies. This is because programmatic approaches build on existing efforts and platforms and dedicated programmes that integrate diverse strategies, policies, and investments to achieve a desirable vision. [Freight transport programmes and initiatives](#) are often proposed to help:

- Improve fuel efficiency across the supply chain, thus lower costs and reduce GHGs.
- Ensure adequate freight transport infrastructure and services.
- Harmonise standards.
- Lower emissions of air pollutants.
- Increase collaboration between and among governments, shippers, and carriers to support the use of clean and fuel-efficient technologies, information and communications technologies (ICT), and, Intelligent Transport Systems (ITS).
- Promote intermodality.
- Make the freight transport sector more socially inclusive.
- Improve access to sustainable freight transportation.
- Increase public recognition of efforts made to advance sustainable freight transport.
- Improve customer perception.

Existing freight transport programmes vary and need to be tailored based on the findings of relevant visioning and diagnosis work. Key objectives, targets, and timelines need to be developed and supported by ensuring a clear governance structure and mechanism.

By using a programmatic approach, a successful sustainable freight transport programme is able to grow horizontally and vertically over time (i.e. new components, more stakeholders, more activities are added over a period of time). Experience suggests that sustainable freight transport programmes should not be designed in full and at once. Instead, they should be developed gradually and in steps. Each new component throughout this process should be supported by studies and activities that take into account existing gaps to be addressed and reflect the needs of government and other stakeholders.

Sustainable freight transport programmes enable a structured relationship between government agencies and private sector entities seeking to address freight transport externalities and enhance

the sustainability of the sector. In principle, sustainable freight transport programmes should cover all possible modes of freight transport, maximise the potential for intermodal freight transport efficiencies and ensure greater use of more efficient modes. These programmes can be extremely successful at a relatively low cost and their establishment process creates coalitions of stakeholders that are valuable resources in themselves.

6. Monitoring and Evaluation

“Data and indicators help authorities make good policy choices and monitor those choices”

Figure 16: UNCTAD SFT Framework Monitoring and Evaluation Step



The final step in the development of a sustainable freight transport strategy is to **monitor and evaluate** performance and progress (Figure 17). This would entail collecting, monitoring and analysing data during strategy implementation to evaluate progress and impact. A monitoring and evaluation data system should be:

- **Comprehensive:** A broad range of data should be collected to allow various types of analyses and along multiple dimensions. There is a need to disclose and justify any specific exclusions.
- **Consistent:** It is important to be consistent with the definitions and processing of indicators to compare between different sources, jurisdictions and over time. It is also important to document any changes in definitions, boundaries, methodologies and frequency.
- **Cost effective:** The collection and processing of indicators should be cost-effective.
- **Transparent:** Assumptions, data collection, and processing need to be clearly explained so that users can replicate, and understand the process. Methods used to collect statistics must be accessible for review.
- **Accurate:** Uncertainties should be minimized to the extent possible. Methods used to collect data and process indicators should inspire confidence.
- **Accessible:** Data should be easily retrieved and processed.
- **Relevant:** Data should ultimately serve the purpose for which it was collected. It should be useful and add value to the decision-making process.

When considering the indicators required for monitoring and assessing progress towards the desired goals, a balance between *convenience* and *comprehensiveness* needs to be achieved. A smaller set of indicators, using easily available data, is more convenient to collect and analyse but may overlook important sustainability-related impacts. A larger set of indicators may provide a comprehensive assessment, but data collection and processing could be extremely expensive which may undermine the monitoring process.

As noted under step 3 on Targets and Indicators, it is extremely important to define, early in the planning process, the indicators required for monitoring and to involve multiple stakeholders for effective and efficient data collection and double counting avoidance. If indicators are not selected carefully, they can consume extensive resources and undermine the usefulness and value of the data generated. International and development organisations can play an important role in strengthening the capacity to collect, analyse, and manage data and indicators.

Specific methodologies and processes need to be established to quantify each of the KPIs and indicators identified for monitoring. Examples of indicators used for Monitoring, Reporting, Verification (MRV) various Sustainable Freight Transport Strategies are compiled in Table 6.

Following the quantification of indicators, a comparison is made between the estimated values and specific pre-established thresholds. If the value of the indicators quantified during the monitoring process is lower than the established threshold (or does not reach its anticipated level), then the action has failed to meet its set objective. Alternatively, the measures are believed to be consistent with the objective, if the value of the quantified indicators, meets the threshold. By routinely assessing the performance of the freight transport sector in terms of its ability to balance the various objectives under the three dimensions of sustainability i.e. economic, social, and environmental, gaps and needs can be assessed in a systematic and consistent manner and corrections/adjustments can be introduced in a timely manner.

Table 6: Example of Indicators Used for Monitoring, Reporting and Verifying Sustainable Freight Transport Strategies

Name	Market	Vision/Goal	Objectives/ Targets	Monitor, Report, Verify (MRV) Indicators
California Sustainable Freight Action Plan	State	<p>Utilise a partnership of federal, State, regional, local, community, and industry stakeholders to move freight in California on a modern, safe, integrated, and resilient system that continues to support California's economy, jobs, and healthy, liveable communities.</p> <p>Transporting freight reliably and efficiently by zero-emission equipment everywhere feasible, and near-zero emission equipment powered by clean, low-carbon renewable fuels everywhere else.</p>	<p>1) System Efficiency Target: Improve freight system efficiency 25% by increasing the value of goods and services produced from the freight sector, relative to the amount of carbon that it produces by 2030.</p> <p>2) Transition to Zero Emission Technology Target: Deploy over 100,000 freight transport vehicles and equipment capable of zero emission operation and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030.</p> <p>3) Increased Competitiveness and Economic Growth Targets: Establish a</p>	<p>1) CO₂/GDP</p> <p>2) Share of zero emission freight vehicles (ZEVs)</p>

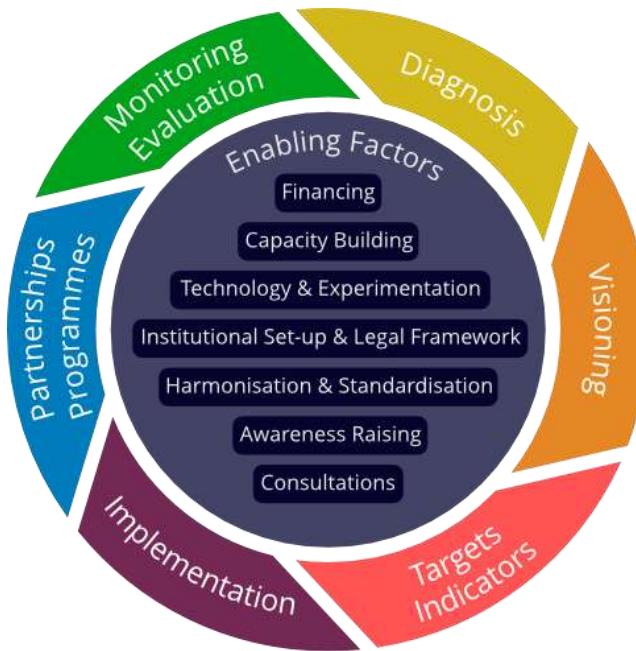
Name	Market	Vision/Goal	Objectives/ Targets	Monitor, Report, Verify (MRV) Indicators
			target or targets for increased state competitiveness and future economic growth within the freight and goods movement industry.	
London Freight Plan	Urban	“...the safe, reliable and efficient movement of freight and servicing trips to, from, within and, where appropriate, through London to support London’s economy, in balance with the needs of other transport users, the environment and Londoners’ quality of life”.	<ul style="list-style-type: none"> 1) Ensure London’s transport networks allow for the efficient and reliable handling and distribution of freight and the provision of servicing to support London’s economy. 2) Minimise the adverse environmental impact of freight transport and servicing in London. 3) Minimise the impact of congestion on the carriage of goods and provision of servicing. 4) Foster a progressive shift of freight from road to more sustainable modes such as rail and water, where this is economical and practicable. 	<ul style="list-style-type: none"> 1) Total number of commercial vehicle parking-related Penalty Charge Notices (PCNs) per million freight vehicle kilometres. 2) Freight fly-tipping incidents. 3) Overall number of people killed or seriously injured in collisions involving freight vehicles. 4) Number of thefts linked to freight activities on London roads. 5) Freight Operator Recognition Scheme membership at each level.
Smartway Initiative	Shippers, carriers, freight transport/logistics service providers	Help companies advance supply chain sustainability by measuring, benchmarking, and fostering freight transportation efficiency.	<ul style="list-style-type: none"> 1) Catalyse change across the entire freight supply chain. 2) Serve as global role model for other nations – including regions where extensive freight transport-related GHG emissions growth is projected. 3) Use SmartWay brand to identify green freight leadership. 4) Act as a clearinghouse for information sharing and exchange on greener goods movement. 	<ul style="list-style-type: none"> 1) Total miles driven. 2) Revenue miles versus empty miles. 3) Road speed and operational characteristics. 4) Total fuel consumed. 5) Alternative fuel (e.g. biodiesel, natural gas) consumed. 6) Number of trucks by class. 7) Fuel and payload by truck class. 8) Truck model engine year. 9) Payloads 10) Trailer capacity volume and utilisation 11) Average idle-hours per truck. 12) Ton-miles driven. 13) Type of cargo by commodity group.
East West Transport Corridor	Corridor	1) In 2030, the solutions tried and tested in the Green Corridors are becoming the	1) Sustainable logistics solutions with documented reductions of environmental and climate impact, high	<ul style="list-style-type: none"> 1) Total cargo volumes. 2) Corridor capacity. 3) Online delivery. 4) Total energy use.

Name	Market	Vision/Goal	Objectives/ Targets	Monitor, Report, Verify (MRV) Indicators
		<p>standard for freight transport.</p> <p>2) Green Corridors are top of the line as regards innovative technology, efficient and sustainable logistics solutions, high-quality performance and a sound economy. Eco-labelling of transport services is standard in the Green Corridors network.</p> <p>4) Standardised European regulations on the infrastructure, terminals and services of a Green Corridor are established.</p> <p>5) A decoupling between freight transport and traffic has been achieved, with continued economic growth.</p>	<p>2) safety, high quality, and strong efficiency.</p> <p>2) Integrated logistics concepts with optimal utilisation of all transport modes, so-called commodity.</p> <p>3) Harmonised regulations with openness for all actors,</p> <p>4) Concentration of national and international freight traffic on relatively long transport routes.</p> <p>5) Efficient and strategically located trans-shipment points, as well as an adapted, supportive infrastructure.</p> <p>6) A platform for development and demonstration of innovative logistics solutions, including information systems, collaborative models, and technology.</p>	<p>5) GHG emissions.</p> <p>6) Engine standards.</p> <p>7) Number of alternative fuels filling stations.</p> <p>8) ISO 9001 dangerous goods.</p> <p>9) ISO 31 000.</p> <p>10) ISO 39 000.</p> <p>11) Safe truck parking.</p> <p>12) Common safety rating.</p> <p>13) Fenced terminals.</p>
A.P. Møller - Mærsk A/S	Transport, logistics and energy provider	We aspire to unlock growth – for society and Maersk. We will achieve this through the core strengths of our businesses and by being a responsible business partner.	<p>1) CO2 reduction</p> <p>2) Increase personal safety</p> <p>3) Mainstream human and labour rights</p> <p>4) Increase diversity and inclusion</p> <p>5) Reduce oil spills</p> <p>6) Fight corruption [Selection]</p>	<p>1) GHG emissions</p> <p>2) Fatalities</p> <p>3) Degree of integration of human rights in governance</p> <p>4) Number of women and nationalities on boards of directors</p> <p>5) Number of Non-contained spills above 10 m3</p> <p>6) Number of bribery, fraud and facilitation payments [Selection]</p>

7. Enabling Factors

“Eliminating regulations that cause inefficiencies is a first major step”

Figure 17: UNCTAD SFT Framework Enabling Factors



Common barriers that influence the ability of stakeholders to develop and implement a sustainable freight strategy include:

- **Data limitation:** Good data is critical to any work aimed at improving understanding of the freight transport sector and its performance, including its ability to meet the growing sustainability imperative. Without data-supported analysis, it is difficult to identify and prioritise effective and adequate sustainable freight transport measures. However, in developing countries, freight transport-related data is often not collected. When available, data is often limited in scope or outdated. The only data which is frequently collected relates to the sale of fuels. For example, in the case of road transport, only few countries have data and information about how far trucks travel, what commodities they carry, their weight and volume and how much fuel they consume (and hence how much carbon they emit) per kilometre of travel. No comprehensive data on freight transport is available to indicate the origin and destination of goods and performance of different modes. When used in isolation, i.e. without qualitative evaluation, data available to the public sector, often does not provide sufficient detail for a meaningful analysis of the freight transport sector. Privately maintained freight transport databases are often costly to acquire and analyse.
- **Fragmented industry:** The freight transport industry is horizontally and vertically fragmented, across the private and the public sectors. In the case of road transport for example, more than 70% of freight transport operators in many countries own less than five trucks. In addition, freight transport integrates multiple levels of government and multiple agencies responsible for different modes.

- **Limited partnerships:** There are limited public-private partnerships relating to the freight transport decision-making processes. Many public authorities often consider freight transport issues as a private rather than a public matter and that the optimisation of transportation is a business-driven interest, which does not need government intervention except in the case of a serious problem. However, many freight transport measures cannot be implemented in isolation by a single stakeholder. No single decision maker can transform the freight transport sector without adequate support from other stakeholders. There is a need for sustainable freight transport partnerships between the public and private sector.
- **Lack of penetration of technologies:** Despite significant savings and short payback periods, the penetration of technologies, in particular technologies that promote fuel-efficiency and emission reduction remains insufficient due to the high investment costs and lack of awareness. Confidence in technologies among freight transport operators and government institutions is not always sufficient. Moreover, the reluctance of banks and financiers to lend money to freight transport service providers, especially the smaller players is also a problem. Financiers often do not know how to appraise the financing of technologies for freight transport and policymakers have minimal experience in applying economic instruments to the transport sector.
- **Limited awareness and capacity:** One of the most comprehensive [global reviews](#) of policies that seek to promote emission reductions across developing countries, has established that while around half of all transport policies addressed specifically passenger transport, in contrast only 5% focused on freight transport. There are not many cities and countries in developing regions which have established sustainable freight transport policies due to insufficient awareness and lack of adequate capacity. While most decision makers and officials have advanced training in passenger transport, few have formal training in freight transport and do not fully understand the complexity of supply chains and their associated effects.
- **Weak legal and regulatory framework:** Poor legal and regulatory framework is one of the major barriers to implementing sustainability measures in the freight transport sector of developing countries. For example, in the [East Africa Community](#), insufficient regulatory oversight results in low-skilled transport operators easily entering the industry. In [China](#), the Ministry of Industry and Information Technology (MIIT) is responsible for the legal obligations that underpin the manufacturing and sale of new trucks, while the Ministry of transport (MOT) is responsible for the operation of commercial trucks. However, both entities issued separate fuel consumption standards (JT 719—2008 and QCT924- 2011) creating a legal challenge as the MIIT test method was different from the MOT test method. Now, both the standards are implemented in parallel.

Thus, no sustainable freight transport strategy, however brilliant, can be implemented successfully without the relevant enabling factors (Figure 18). In addition to stakeholder consultations, other critical enabling factors include:

1. **Awareness Raising, Training and Capacity Building:** It is important to incorporate training and capacity building mechanisms into relevant institutionalised structures. For example, eco-driving training principles could be incorporated into the examination procedure for new drivers under the driving license certification procedure. In addition, peer to peer exchange programmes where participants can learn and share experiences is a simple yet invaluable mechanism to improve awareness and capacity building. Access to the exchange of information, expertise, success stories, good case studies and practices is critical to develop and mainstream adequate sustainable freight transport practices and policies. Private sector companies, including shippers and carriers need

to be able to easily access information about technologies and logistics solutions. In addition, their suppliers, banks and financing institutions need information on the innovative financing mechanisms that already exist or that could potentially become available to them. Meanwhile, freight transport sector associations need to learn more about good practices in the field of using collaborative instruments.

2. **Experimentation Projects and Technology:** It is important to carry out experimentation/pilot/demonstration projects and studies to better understand the investment potential, economic and social impacts as well as the strengths and barriers to the implementation of technology-based solutions, in particular new technologies. Although these experiments concern only a minor fraction of freight transport flows through a corridor, city or country for example, they are not only very effective in convincing political leaders and policy makers of relevant possibilities but also in understanding changes in the behaviour of consumers and the private sector. For example, all the experiments promoted by the city of Paris have been widely advertised in the specialised as well as the local press. Until and unless stakeholders utilize trial and error approaches and test innovative solutions, radical improvement is impossible. The freight transport industry is currently experiencing a technological transformation. New ICT and fuel efficiency improvement technologies are applied, including as retrofits to optimise global supply chains. Technology can allow for better data collection and analytical capabilities that enable faster, cheaper and more accurate analysis of freight transport routes, travel times, and infrastructure capacity. Technological transformation can be achieved through a concerted effort involving relevant stakeholders, including companies, governments, and financial institutions.
3. **Financing:** Incentives with improved access to affordable finance, especially for SMEs increase the pace of diffusion of technical innovations that require significant upfront or capital investment. The problem seems to be more acute in developing countries where the interest rates could be as high as 15-25%. Other challenges driving the lack of affordable finance are small business size, collateral requirements, documentation and financial literacy, and weak credit skills and poor business practice. By improving the fuel efficiency of freight transport, exposure to increasing energy costs can be reduced. This, in turn, can make business practices more sustainable and reduce future loan defaults.

Financing the construction, operation and maintenance of freight transport infrastructure involves different types of funding sources. These include, among others, [national and international](#) sources, grants, cooperative agreements, [loans, and revenue sources](#) from [both the public and the private sector](#).

Table 7 highlights the financing instruments which directly influence freight transport stakeholders (direct benefit instruments). Indirect benefit instruments (e.g. advertising) charge stakeholders for indirect benefits stemming from the transport investment while direct benefit instruments such as fuel taxes directly charge freight transport stakeholders. Fuel taxes for example are effective across the three sustainability dimensions (economic, social and environmental). Taking Stockholm as an example, it has been established that if the city had continued with business as usual and had not established "[congestion charging](#)", the city's air would have been 5 to 10% more polluted between 2006 and 2010. In addition, young children would have suffered 45% more asthma attacks.

Table 7: Sustainable Freight Transport Instruments

	Sustainable Freight Transport Financing Instruments	Stability	Political Acceptability	Administration Ease	Impact			Level of Application
					Economic Efficiency	Social Equity	Environmental Impact	
General Benefit Instruments	Transport Subsidies (low emission modes)	☆	★	★	★	★	★	Local/Urban/National
	Property Tax	★	★	★	★	★	★	Local/Urban/National
	Business Tax	★	★	★	★	★	★	Urban/National
	Loans and Grants	★	★	★	★	★	★	Local/Urban/National
	Parking Charges	★	★	★	★	★	★	Local/Urban
	Road Pricing	★	★	★	★	★	★	Local
	Congestion Charges	★	★	★	★	★	★	Local/Urban
	Fuel Tax	★	★	★	★	★	★	Local/Urban/National
	Vehicle Ownership Tax	★	★	★	★	★	★	Local/Urban/National
	Mileage Based Taxation	★	★	★	★	★	★	Local/Urban/National
Direct Benefit Instruments	Vehicle Inspection Fee	★	★	★	★	★	★	National
	Heavy Vehicle Fee	★	★	★	★	★	★	National
	Advertising	★	★	★	★	★	★	Local
	Employer Contribution	★	★	★	★	★	★	Local
	Betterment Tax	★	★	★	★	★	★	Local
	Tax Increment Financing (TIF)	★	★	★	★	★	★	Local
	Special Assessment	★	★	★	★	★	★	Local
	Transportation Utility Fee	★	★	★	★	★	★	Local
	Development Impact Fees	★	★	★	★	★	★	Local
	Negotiated Exactions (NE)	★	★	★	★	★	★	Local
Indirect Benefit	Joint Development Mechanism	★	★	★	★	★	★	Local
	Air rights sale	★	★	★	★	★	★	Local
	Public-Private Partnerships	★	★	★	★	★	★	Local/Urban/National
	Global Environment Facility	★	★	★	★	★	★	Urban/National
	Clean Technology Fund	★	★	★	★	★	★	Urban/National
	Clean Development Mechanism	★	★	★	★	★	★	Urban/National
	Nationally Appropriate Mitigation Action	★	★	★	★	★	★	Urban/National
	Climate Bonds	★	★	★	★	★	★	Urban/National
	Partnership for Market Readiness	★	★	★	★	★	★	Urban/National
	Green Climate Fund	★	★	★	★	★	★	Urban/National

Source: Based on Sustainable Urban Transport Financing from the Sidewalk to the Subway, the World Bank

Rating	Description
☆	Low level of achievement by an instrument for each attribute
★	Medium level of achievement by an instrument for each attribute
★★	High level of achievement by an instrument for each attribute

Traditionally, freight transport infrastructure projects were financed primarily through a combination of state funding streams such as taxes, fees and local funds based on "pay-as-you-go" principle i.e. projects are built in phases based on political priority and funding availability. However, the traditional approach of funding and financing is not suitable for scaling-up sustainable freight transport projects. Fundamental changes that take into consideration different funding and financing mechanisms and promote the use of innovative approaches are needed. Innovative finance encompasses a combination of techniques and specially designed mechanisms to supplement traditional financing sources and methods. Examples include leveraging additional funding from new sources of funding (e.g. climate finance, public-private partnerships), reforming transport

prices and financial management, adopting new institutional arrangements, and using the ["Polluter pays"](#) principle.

Freight transport project investments must compete with investment requirements from other sectors including passenger transport and moving away a project from the “drawing board” is challenging. They do not compete well with non-freight projects because of the way public investments are evaluated. Raising the profile of freight transport projects in the urban, regional and national policy agenda, requires that the benefits of sustainable freight transport projects along all three dimensions of sustainable development be highlighted and that the support of external stakeholders be secured. The development of quantifiable co-benefits criteria (where benefits are evaluated across the economic, social and the environmental dimensions) can help projects aimed at enhancing the sustainability of the freight transport sector obtain a “fighting chance” to compete for funding with other proposed projects.

4. **Harmonisation and Standardisation of Methods and Processes:** Examples include harmonisation of carbon and air emissions accounting methods. There are sufficient tools and models available for estimating the carbon emissions and air pollutants from the freight transport sector. A recent [global review](#) of 150 transport emissions methodologies and models reveals that nearly 70% of methodologies are applicable to the freight transport sector. These can help quantify GHG emissions and air pollutants across different jurisdictions, boundaries and areas of activity (e.g. national, city, project, supply chain, etc.). However, there is a need to harmonise methodologies and emissions reporting for private sector companies such as the shippers as well as transport and logistic service providers. Many global shippers and service providers have established targets to improve efficiency and reduce carbon emissions. However, there is no standard process in place for the capture and calculation of emissions. Harmonisation of emission calculation methodology will help scale-up efforts to reduce emissions from the freight transport sector by ensuring that a uniform standard system for collecting, analysing and monitoring emissions from private sector freight transport operations is applied. [The Global Logistics Emissions Council \(GLEC\), for example,](#) provides a common, global platform for the industry to develop, apply and advocate a harmonised logistics emissions accounting system.
5. **Institutional and Legal Set-Up:** While implementing sustainable freight transport strategies, institutional, legal and regulatory barriers need to be addressed along with the support and participation of all key stakeholders. There is a need for a one-stop approach that provides a single window or point of reference for information that the freight transport industry requires to operate in different settings (e.g. corridor, urban area, region, etc.). This is also important for consultations supporting relevant policy- and regulatory-making processes. For example, national governments consider urban freight transport to be a local problem, which is to be addressed by local authorities. At the same time, local authorities consider urban freight transport to be a private sector problem given its link to the sector’s commercial operations. The private sector often considers urban freight transport to be an infrastructure and regulatory problem that needs to be addressed by the government and yet, has no clear idea of institutional mandates (see Figure 19).

A “Freight Mobility Office” (FMO) or a freight “point-of-contact” could be established to develop and disseminate public outreach materials. Such an office can act as the liaison between various freight transport-related initiatives and between different agencies and stakeholders. It can also help ensure that freight transport issues are addressed within the multiple relevant planning activities. In the case of road transport, a FMO or point-of-contact can support the enforcement of truck routes as well as the development and

facilitation of transparent partnerships with stakeholders (e.g. for access and exchange of information, expertise, periodic sustainable freight transport training, documenting and sharing good and bad practice examples, etc.). Designating a point-of-contact or FMO helps to demonstrate a commitment to sustainable freight transport planning.

Figure 18: Institutional and Legal Set-Up: The Case of Urban Freight Transport



III. Final Remarks

“Freight transport is a means to an end rather than just an end in and of itself”

The UNCTAD SFT Framework provides a coherent and straightforward methodology to be used when planning, developing and implementing a sustainable freight transport strategy. The built-in modularity and flexibility ensure that the varying local requirements, stakeholders' perspectives and objectives as well as available resources and capacity are duly reflected.

When developing a sustainable freight transport strategy, existing barriers and resources will, to a large extent, shape decisions and dictate the exact course of action required to achieve the intended objectives. Therefore, and depending on the context, some steps under the SFT Framework may be more critical than others and may require more attention and resources. The SFT Framework also allows for some steps to be carried out in parallel, to accommodate varying sustainable freight transport readiness levels, local requirements, timelines, resources, etc. At each step, users have the possibility to evaluate their progress, make the necessary adjustments and refine their sustainable freight transport strategies.

The document supporting the strategy and documenting the strategy's development process should be succinct, readily accessible and understood by all stakeholders. Given the circular process set out in the SFT Framework, the sustainable freight transport strategy document should be seen as a living document.

List of Annexes

ANNEX 1: Freight Transport-related Data

A. Economic Growth and Trade

- Global logistics and the delivery sector account for about 15% of global gross domestic product (GDP). On average, delivery costs represent about 7-8% of a product's total costs. Transportation accounts for about 40% of the delivery costs. This share varies by type of product.
- Logistics usually accounts for 3 to 8% of the corporate carbon footprint.
- Between 2010 and 2050, intra-Asian trade is expected to grow sevenfold while intra-African trade is set to expand by a factor of more than 10. In comparison, intra-European trade is expected to treble between 2010 and 2050.
- The value of world trade is projected to increase by 200% to 270% from 2015 to 2050.
- Multilateral trade liberalisation could increase freight volumes by 10% compared with the baseline.

B. Freight Transport Activity

- In 2011, international trade resulted in 81,000 billion ton-kilometres (tkm) of global freight transport.
- For every 1% increase in GDP per capita, road freight transport activity i.e. tkm per capita increases by 1.07% on average.
- About 65% of freight transport activity is accomplished by heavy-freight trucks (HFTs) – a mix of rigid body and articulated trucks with a gross vehicle weight of greater than 15 tons.
- The global fleet of trucks operating in 2015 was dominated by light commercial vehicles (LCVs), which, at more than 130 million vehicles, made up 70% of the truck stock.
- Urban freight transport accounts for only 1% of global freight measured in tkm but consumes 21% of energy demand from freight transport.
- Between 2015 and 2050, freight transport activity is expected to grow much faster than GDP: Global freight transport demand is projected to grow by 3% annually while demand for air freight transport is expected to increase by 5%.
- According to the International Council on Clean Transportation (ICCT), the number of freight vehicles is expected to increase by 144% from 2010 to 2050 (Base scenario).
- Under the International Energy Agency's (IEA) reference scenario, from 2015 to 2050
 - ✓ the HFT stock increases by a factor of 2.6 with the number of vehicles reaching 64 million in 2050.
 - ✓ the number of medium-freight trucks (MHTs) on the road is expected to grow by 60% over its 2015 level with the number of vehicles extending over 50 million. LCVs are expected to increase by 65%, reaching around 220 million vehicles.
- By 2050, the combined length of the road and rail networks is expected to have increased by over 60% compared to 2010. In terms of freight transport surface infrastructure, the projected capacity increase is 67% in Asia, 46% in Africa and 9% in South America.² If no

² Capacity to grow – transport infrastructure needs for future trade growth.

additional capacity is created in ports, trade distances increase by 43% by 2030 and 65% by 2050 as goods need to travel through alternative routes. Also, the increase in freight delays would be 48% higher by 2030.

C. Energy Consumption

- Road freight vehicles are a central source of global oil demand today: at around 17 million barrels per day (mbd), road freight vehicles account for around one-fifth of global oil demand – equivalent to the current oil production of the United States of America and Canada combined.
- Freight transport consumes about 75 to 80% of diesel used in the transport sector. It has been established that exposure to diesel exhaust fumes causes cancer, in particular, lung cancer.
- Road freight transport alone was responsible for 2.6 gigatonne (Gt) of energy related carbon dioxide (CO_2) emissions in 2015, or about 7% of total global energy-related CO_2 emissions.
- Biofuels contribute 2.2% of final energy to road freight transport.
- Without further policy efforts, oil demand from road freight vehicles is set to rise by 5 mbd to 2050.
- Freight energy consumption is projected to increase by 60% from 2012 to 2050 by IEA in the business-as-usual scenario.

D. Air and Carbon Emissions

- In 2015, freight activity accounted for roughly about 7% of total global greenhouse gas (GHG) emissions. Global emissions from trade-related freight transport could rise from more than 2 billion tons in 2010 to 8 billion tons in 2050 under the International Transport Forum (ITF) baseline scenario. The share of freight emissions is expected to grow to 60% of transport emissions in 2050.
- As a global average, the on-road emissions of the HFTs are around 1,080 grammes of CO_2 per kilometre (g CO_2/km) and for MFTs some 690 g CO_2/km , while LCVs emit only around 260 g CO_2/km .
- In the case of Nitrogen Oxides (NOx), road freight vehicles contribute more than one-third of total transport-related emissions. For Particulate Matter (PM2.5) emissions, they account for nearly half of total transport-related emissions. For Sulphur Oxides (SOx), the share is much lower, at 4% of transport-related emissions.
- Commercial vehicles are estimated to make up roughly 20 to 40% of motorized road-space occupation and cause 20 to 40% of CO_2 emissions. For PM2.5, the commercial vehicle share is much higher.
- By 2050, the freight transport sector is expected to contribute 60% of PM2.5 and 52 % of NOx emissions related to the transport sector.
- By 2050, the CO_2 emissions in intra-Asian freight are projected to grow by 210%.
- Road freight transportation needs to contribute about 50% of transport emission reductions necessary to switch from a 6-degrees climate change scenario to a 2-degrees scenario.
- The most ambitious scenario of IEA projects the GHG emissions from the road freight transport sector to half until 2050 compared to 2015. About 18% of cumulative GHG emission reductions result from the reductions in truck vehicle activity. An additional 12% of the cumulative emission savings come through increased loads. Advanced biofuels

contribute about 24% reductions, and a switch to electricity generated by low-carbon sources contributes an additional 16%. At 30% of cumulative GHG savings, energy efficiency is the largest contributor to emission reductions.

- Compared to 3.8 billion tons in 2015, until 2050 freight transport emissions would need to be reduced between 19% under a 2-degrees scenario and 64% under a 1.5-degrees scenario.

E. Accidents and External Costs

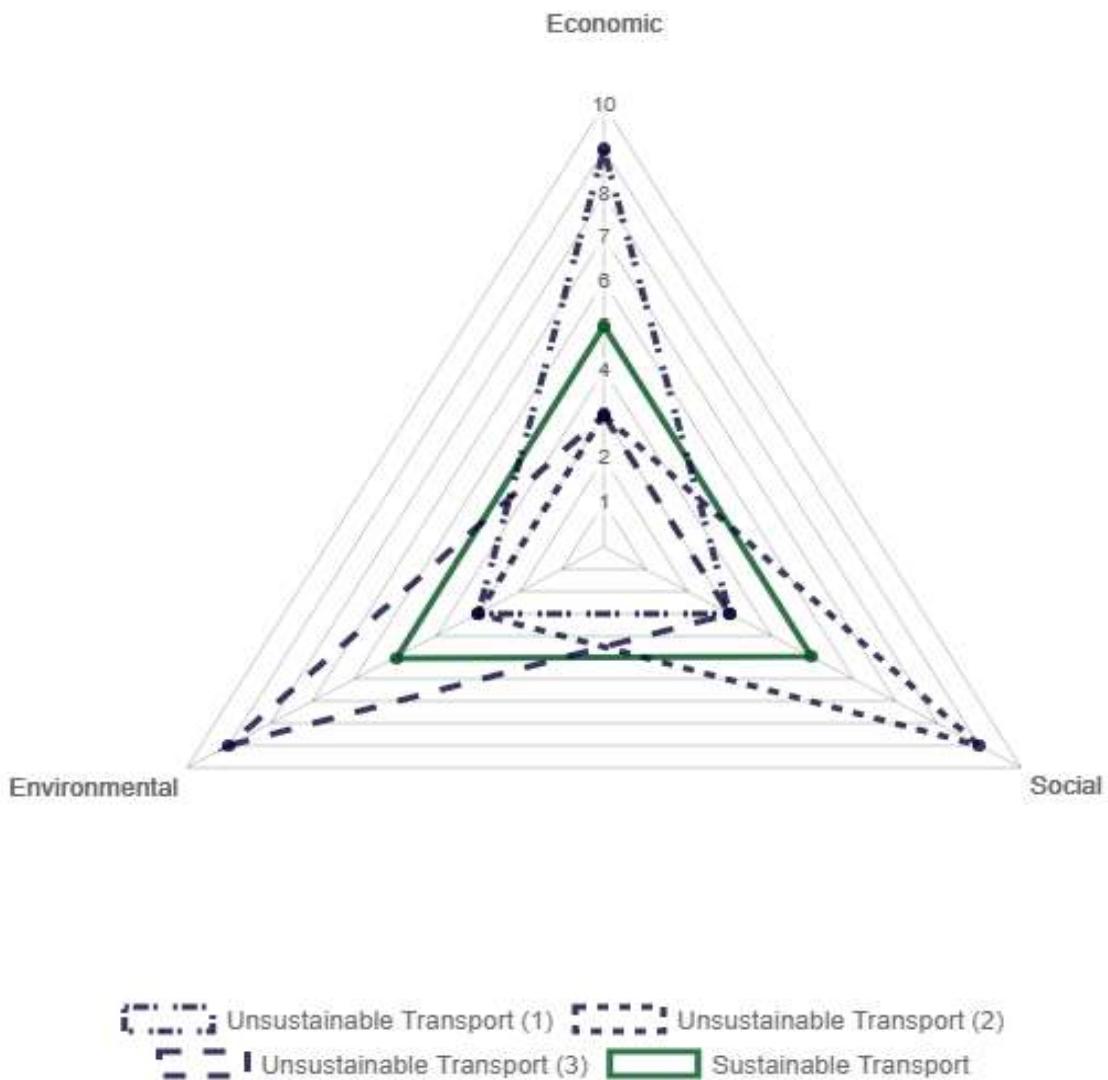
- A total of 1.2 million people die each year on the world's roads, making road traffic injuries a leading cause of death globally. Most of these deaths are in low- and middle-income countries where rapid economic growth has been accompanied by increased motorization and road traffic injuries. Freight transport is a significant contributor to road accidents (20 to 30%).
- Freight transport external costs have been quantified to range in the European Union (EU) from 5€ to 18€ per 1,000 tkm freight transport and in the United States of America from 2\$ to 3\$ per 1,000 tkm freight transport.

ANNEX 2: The Sustainability Triangle

The sustainability policy concept originates from the Brundtland Report of 1987 entitled “[Our Common Future](#)”. [The Brundtland Report](#) documented the increasing environmental degradation, poverty, and hardships in an ever more polluted world among ever decreasing resources. It recommended action to ensure that the needs of the present be met without compromising the ability of future generations to meet their own needs. This concept has been re-interpreted as encompassing three dimensions, namely economic, social and environmental. This sustainability argument can be visualized in mathematics as to maximise the “product” of all three dimensions - economy, society and environment.

In Figure A below, the “sum” of scores in all four scenarios is the same, i.e. 15. However, in the unsustainable transport scenarios, one dimension is prioritised over other dimensions and thus the “multiplication” value is only 81. In the sustainable transport scenario where all dimensions are equally prioritised, the “multiplication” value is 125. Clearly, [no single dimension can be optimized to such an extent that one of the other dimensions is negatively affected too much](#).

Figure A: The Sustainability Triangle



ANNEX 3: Sustainable Freight Transport and Linkages to Relevant Global Processes on Sustainable Development

The transport sector including freight transport is at the intersection of several global processes in particular the 2030 Agenda for Sustainable Development and the related Sustainable Development Goals (SDGs) as well as the 2015 Paris Agreement on Climate Change. The Freight transport sector is increasingly expected to address negative externalities arising from the sector's activities. These include, to name but a few, air pollution, carbon emissions, congestion and road traffic accidents. Global processes of direct relevance to the freight transport sector and which underscore the need for the sector to balance its economic, social and environmental objectives are as follows:

1. The [2030 Agenda for Sustainable Development and the Sustainable Development Goals](#). The 15-year global framework came into effect in January 2016. Transport, including the freight transport was not specifically or explicitly mentioned in the SDGs. However, it was recognised as critical for the realisation of other SDGs. Eight out of the seventeen SDGs have included freight transport-related targets (Goals 2, 3, 6, 7, 9, 11, 12, 13). Table A below illustrates the cross-cutting role of the freight transport sector as a key enabler of an effective and workable sustainable development agenda.

Table A: The Freight Transport Sector and the Sustainable Development Goals

Goals	Target
SDG targets directly related to freight transport	
3. Ensure healthy lives and promote well-being for all at all ages (Road Safety)	3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents.
7. Ensure access to affordable, reliable, sustainable and modern energy for all (Energy efficiency)	7.3 By 2030, double the global rate of improvement in energy efficiency.
9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (Sustainable infrastructure)	9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.
11. Make cities and human settlements inclusive, safe, resilient and sustainable (Sustainable (urban) transport for all)	11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

Goals	Target
12. Ensure sustainable consumption and production patterns (Fuel subsidies)	12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities.
SDG targets indirectly related to freight transport	
2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture (Agricultural productivity)	2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers (in particular women, indigenous peoples, family farmers, pastoralists and fishers) including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.
3. Ensure healthy lives and promote well-being for all at all ages (Air pollution)	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.
6. Ensure access to water and sanitation for all	6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all. 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.
11. Make cities and human settlements inclusive, safe, resilient and sustainable (Sustainable cities)	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.
12. Ensure sustainable consumption and production patterns (Food loss and waste)	12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses. 12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.
13. Take urgent action to combat climate change and its impacts	13.1 Strengthen resilience and adaptive capacity to climate related hazards and natural disasters in all countries 13.2 Integrate climate change measures into national policies, strategies, and planning.

2. The [Global Decade of Action on Road Safety 2011-2020](#): Its overall goal is to stabilize and then reduce the level of road traffic fatalities around the world by 2020. The global Plan serves as a tool to support the development of national and local plans of action, while simultaneously providing a framework to allow coordinated activities at regional and global levels.
3. The [New urban agenda \(Habitat III\)](#): It promotes age-and gender-responsive planning and investment for sustainable, safe and accessible urban mobility for all and resource-efficient transport systems for passengers and freight, effectively linking people, places, goods, services and economic opportunities. It prioritises Urban Freight Transport Planning and logistics concepts that enable efficient access to products and services, minimising their impact on the environment and on the liveability of the city and maximising their contribution to sustained, inclusive and sustainable economic growth.
4. The [Addis Ababa Action Agenda of the Third International Conference on Financing for Development](#): It considers the needs to address the special challenges and needs of landlocked developing countries in structurally transforming their economies, harnessing benefits from international trade, and developing efficient transport and transit systems.
5. The [Paris Agreement on climate change](#): Adopted in December 2015 under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC), it aims to strengthen the global response to the threat of climate change by mitigating the carbon emissions and keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the Agreement seeks to reinforce the ability of countries to deal with climate change impacts through resilience-building and adaptation action.
6. The [Sendai Framework for Disaster Risk Reduction 2015-2030](#): It prioritises the resilience of new and existing critical infrastructure, including water, transportation and telecommunications infrastructure, educational facilities, hospitals and other health facilities, to ensure that they remain safe, effective and operational during and after disasters in order to provide life-saving and essential services.
7. The [Vienna Programme of Action for Landlocked Developing Countries for the Decade 2014-2024](#): It confirms that the high transport and trade transaction costs remain a major stumbling block in the pursuit of landlocked developing countries to achieve their trade potential. The Programme of Action prioritises the development of adequate transit transport infrastructure networks and the completion of missing links connecting landlocked developing countries.
8. The small islands developing States ([SIDS Accelerated Modalities of Action \(SAMOA\) Pathway](#)): It prioritises the development of a strategy and of targeted measures to promote energy efficiency and foster sustainable energy systems in SIDS.
9. The [Istanbul Programme of Action for the Least Developed Countries for the Decade 2011-2020](#): It aims to develop and implement comprehensive national policies and plans for infrastructure development and maintenance encompassing all modes of transportation, communications and energy.

Table B below highlights the way in which sustainable freight transport objectives interlink with the relevant international development processes.

Table B: Sustainable Freight Transport Objectives and Linkages to Relevant Global Processes on Sustainable Development

Dimension	Objective	2030 Agenda for Sustainable Development (SDGs)	Paris Agreement	Decade of Action for Road Safety 2011-2020	Habitat III New Urban Agenda (NUA) (draft)	Financing for Development: Addis Ababa Action Agenda	Sendai Framework on Disaster Risk Reduction
Economic	Improve Trade Competitiveness	✓			✓	✓	
Economic	Transport Costs				✓		
Economic	Energy efficiency/Fuel use	✓			✓	✓	
Economic	Quality and Reliability				✓	✓	
Economic	Infrastructure Investment/Fiscal Burden	✓	✓				
Economic	Freight Transport Productivity				✓		
Economic	Sustainable Production and Consumption	✓	✓		✓		
Economic	Resilience and Operational Continuity	✓	✓		✓	✓	✓
Economic	Connectivity and Market Access	✓			✓	✓	✓
Social	Safety	✓		✓	✓		✓
Social	Security				✓	✓	
Social	Employment	✓			✓	✓	
Social	Labour Conditions	✓			✓	✓	
Social	Affordability	✓			✓	✓	✓
Social	Aesthetic Impacts						
Social	Cultural Preservation					✓	✓
Social	Health	✓		✓	✓	✓	✓

Dimension	Objective	2030 Agenda for Sustainable Development (SDGs)	Paris Agreement	Decade of Action for Road Safety 2011-2020	Habitat III New Urban Agenda (NUA) (draft)	Financing for Development: Addis Ababa Action Agenda	Sendai Framework on Disaster Risk Reduction
Social	Noise and Vibration				✓		
Environmental	Air Pollution	✓			✓	✓	
Environmental	GHG Emissions	✓	✓		✓	✓	
Environmental	Water Pollution	✓			✓	✓	
Environmental	Resource Depletion	✓	✓		✓	✓	✓
Environmental	Land Use and Habitat Fragmentation			✓	✓		✓
Environmental	Waste	✓			✓	✓	
Environmental	Biodiversity and Ecosystems	✓	✓		✓	✓	✓
Environmental	Soil Quality	✓				✓	
Environmental	Climate Resilience	✓	✓		✓	✓	✓

ANNEX 4: Relevant Definitions Applied in the Context of Sustainable/Green Freight Transport

Organisation/Source	Scope	Definitions	Dimensions considered (Direct Reference)		
			Economic	Environmental	Social
<u>UNCRD</u>	Regional	<p>A set of strategies, policies, practices and standards, developed and implemented by government, the private sector and other stakeholder groups jointly or individually, targeted at the movement of goods via road, rail, marine, inland waterways and air and aiming to:</p> <ul style="list-style-type: none"> (1) reduce the environmental, climate and public health impacts through reduced air pollution and greenhouse gas emission intensity; (2) improve social conditions, including road safety, and health and working conditions of people involved in freight movement; and, (3) enhance economic development through improved energy efficiency, fuel security, and efficiency and competitiveness of the freight and logistics sector overall. 	✓	✓	✓
<u>CCAC</u>	Regional	Activities that could reduce the energy use and emissions footprint of the in-use freight fleet with a combination of market-driven voluntary actions undertaken by private sector stakeholders (carriers, shippers, and logistics providers), in partnership with governmental or administrative authorities.		✓	
<u>Smart Freight Center</u>	Companies	Transformation of the freight sector aimed at reducing emissions intensity and improving fuel efficiency in the global supply chain, whilst maintaining competitiveness and economic growth.	✓	✓	
<u>London Freight Plan</u>	City	The safe, reliable and efficient movement of freight and servicing trips to, from, within and, where appropriate, through London to support London's economy, in balance with the needs of other transport users, the environment and Londoners' quality of life.	✓	✓	✓
<u>Green Freight Asia</u>	Regional	Strategies targeted at the movement of goods via road, rail, marine, inland waterways and air, with the aim to improve fuel efficiency, reduce fossil fuel dependency, improve air quality and minimize carbon dioxide emissions that contribute to climate change, whilst maintaining competitiveness and economic growth.	✓	✓	

Organisation/Source	Scope	Definitions	Dimensions considered (Direct Reference)		
			Economic	Environmental	Social
<u>South Australian Freight Council</u>	Sub-National	Green Freight involves the movement of goods in an efficient and effective way from paddock to plate, from wharf to warehouse and from retail store to customer in a manner that is sustainable and which minimises impact on the environment whilst maintaining economic growth.	✓	✓	
<u>EU Green Corridors</u>	Corridor	The definition of green transport can be interpreted as one that allows for the identification of transport measures which: (1) support the future needs of freight transport in the European Union; (2) enable the reduction of environmental impacts from transport directly at the source of emittance; (3) promote utilisation degree and increase efficiency of transport modes and infrastructure; and, (4) contribute to a modal shift towards rail and waterways.	✓	✓	
<u>Sustainable Freight: Pathways to Zero and Near-Zero Emissions</u>	Sub-National	A sustainable freight system is one that meets California's environmental, energy, mobility, safety, and economic needs by: enhancing system efficiency; deploying zero and near-zero emission freight equipment powered by renewable energy sources; providing reliable velocity while increasing safety, mobility and capacity; and improving the competitiveness of our logistics system.	✓	✓	✓

ANNEX 5: Dimensions and Objectives of Sustainable Freight Transport

Dimension	Objective	Description	Evaluation/Self-Assessment Questions
Economic (E)	E.1. Trade Competitiveness	<p>Lack of adequate, quality and sufficient freight transport infrastructure and services that connect producers to consumers, suppliers to users, importers to exporters, local to regional and international markets undermines trade competitiveness. Due to globalisation, freight transport goes through several layers of production in several countries, with components and assembled goods crossing continents before they reach their destination.</p> <p>Loss in trade competitiveness is reflected by uncompetitive landing/final prices of goods delivered. Uncompetitive trade and prices result among other from the following factors: inadequate regulatory framework, low productivity, limited penetration of ICT, limited security, rising energy cost, significant time delays and uncertainty in the transportation of traded goods. Elements influencing the ability of freight transport to promote trade competitiveness include: state of transport infrastructure, services (warehouse facilities, specialized storage facilities, etc.), efficient customs and administrative procedures, regional transportation policy harmonisation and implementation; ports efficiency and productivity, etc.</p> <p>Good measurement indicators are the Logistics performance index of the World Bank (LPI), time for border clearance and release (Doing Business WB), Enable Trade Index (ETI), World Economic Forum (WEF) quality and quantity of infrastructure indices, % of GDP used for transport infrastructure investment by mode, transport costs (United Nations Conference on Trade and Development (UNCTAD) and Organisation</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • trade volumes? • trade extensive and intensive margins? • logistics costs? • transport costs? • quality of transport infrastructure (road/rail/waterways/airports)? • transport efficiency (e.g. ports, trucking and rail transport operations)? • delivery/transit time and transport delay? • any other applicable criteria/indicator?

		for Economic Co-operation and Development (OECD), Liner shipping connectivity index (UNCTAD).	
Economic (E)	E.2. Transport Costs	<p>Transport costs are important in their relation to trade-offs, especially in relation to production and distribution costs. High transport costs result from a combination of factors and are often associated with inefficiency in the freight transport sector. For freight transport operators, transport costs include capital expenditure (e.g. ships, equipment, port facilities) as well as variable operating cost such as fuel cost, driver expenses, taxes etc.</p> <p>For governments, transport costs are not only important for trade competitiveness but also as public policy tools that could be relied upon to induce modal shifts. For shippers, transport costs are an important decision-making parameter and they use it for logistics decision making trade-offs.</p> <p>Measurement indicators for freight transport costs are US\$/tkm for different modes, US\$ per container/twenty-foot equivalent unit (TEU), US\$/ton/unit., level of competition in the transport carrying industry, number of service providers (i.e. a market structure that avoids monopolistic or oligopolistic structures), number of transhipment versus direct transport (e.g. for maritime transport), and economies of scale (unit costs e.g. US\$/ton, US\$/TEU).</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • transport cost levels? • transport costs in relative terms? • components of transport costs (e.g. fuel, repair/maintenance, labour, fees paid, etc.)? • level of competition (e.g. transport service providers, shipping lines, trucking companies)? • age of fleet and rolling stock? • efficiency of transportation fleets/vehicles and equipment? • repair and maintenance costs of fleet and equipment? • adequacy, sufficiency and efficiency of transport infrastructure? • repair and maintenance costs of infrastructure? • level of transport charges (e.g. port dues and tariffs, cargo charges, tolls, licencing fees, etc.)? • availability and cost of skilled labour force for transport operations? • insurance costs? • any other driver of transport costs (e.g. delays)? • any other applicable criteria/indicator?

Economic (E)	E.3. Energy Efficiency/Energy/Fuel Use	<p>By reducing energy required directly for the movement of freight, can result in significant economic benefits as fuel costs are often more than 40% of freight transport costs across different modes. For instance, the six main aspects of energy efficiency in road freight transport are fuel efficiency of new vehicles, truck technology retrofits, vehicle purchasing decision, vehicle maintenance, vehicle operation & fleet management, loading patterns, aerodynamic characteristics, and driving patterns.</p> <p>According to the IEA, for the global transport emissions to peak by 2030, a 30% reduction in average vehicle fuel consumption per truck will be required (relative to current emissions).</p> <p>Good potential indicators of fuel efficiency are fuel consumed/tkm or fuel consumed per mode-km (vehicle kilometre travel).</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • energy/fuel efficiency? • fuel consumption in absolute/relative terms (e.g. per tkm or fuel consumption per mode-km)? • incentive schemes to employ more energy efficient technologies? • strategies/policies/measures/instruments aimed at improving energy efficiency or reduce fuel consumption? • any other applicable criteria/indicator?
Economic (E)	E.4. Quality and Reliability	<p>Measuring service quality and freight travel time can prove useful in enhancing the competitiveness of freight transport operators. These two factors are often used to differentiate a company's product offerings from those of competitors. Shippers, for example, make transport decisions based on multiple freight transport service attributes such as the freight rate, transit time, reliability, and availability of service.</p> <p>Causes of unreliability may include temporary loss of road, air, or water access due to disruptions, poor road/rail/waterways/port infrastructure, and vehicles/ships condition causing mechanical failures. Additionally, unreliability can be caused by road or rail congestion causing variability in travel times, particularly during incident situations. These parameters are not only relevant from the operator's perspective, but also from a modal perspective as poor service, long transit time, and low punctuality level can reduce demand and influence modal shift.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • delivery of goods on time and in agreed condition? • theft, damage, loss, and spoiled cargo incidents? • measures to improve the tracking of cargo while on a voyage? • technology used to track vehicles/shipments and enhance visibility of their location while on route? • strategies/measures/policies/tools aimed at improving quality and reliability of freight transportation? • any other applicable criteria/indicator?

		<p>Indicators for measuring quality and reliability include travel time/delays, delivery on time (%) and delivery in agreed condition (%), number or % of losses, damaged cargo, ability to track and trace cargo while on a journey, transparency, and ease of communication between shipper and carrier (trust and long-term collaboration/relationships).</p>	
Economic (E)	E.5. Infrastructure Investment and Fiscal Burden	<p>Underdeveloped transport infrastructure and networks can lead to high transport costs for moving commodities to market as well as bringing in farm inputs, reducing producers'/farmer's competitiveness. Therefore, improving transport infrastructure is of critical importance for a sustainable freight transportation system.</p> <p>Investment refers to freight transport infrastructure construction, operation, and maintenance. This increase in global freight transport demand will require scaling-up current levels of investments in transport to respond to the growing needs in infrastructure and services. Investment is required to enhance transport systems and logistics, extend transport networks, build missing links and connectivity, remove bottlenecks, upgrade existing infrastructures, and develop new structures.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • government budgets dedicated to investment in freight transport infrastructure development/expansion/upgrade? • government budgets dedicated to investment in freight transport systems infrastructure, maintenance, and operation? • private investment participation in freight transport infrastructure development/expansion/upgrade/maintenance/repair? • other sources of finance for freight transport infrastructure? • government subsidies/guarantees/incentives and other support measures whether monetary or otherwise provided to support freight transport infrastructure?

		<p>Public finance has traditionally played a key role in developing transport infrastructure given quasi-public good nature, providing high economic and social benefits. Nevertheless, government freight financing is not enough to meet the required scale of investment and may come at a cost to the economy. This aspect considers the different sources of finance used to finance the transport sector along with long-term implications of investment, cost effectiveness of investment, private sector involvement, and government incentives to promote new and innovative sources and mechanisms of finance including through public-private partnerships, subsidies, guarantees, etc.</p> <p>Possible indicators are % of GDP used for transport infrastructure investment by mode, toll revenue, % of national/public budget dedicated to investment in freight transport infrastructure and services, amount/share of subsidies to the sector/projects, applications of guarantee in support of the sector, and suspension of application of levies/taxes.</p>	<ul style="list-style-type: none"> • development/upgrade/expansion/maintenance/repair, including in cases where projects are economically less viable/not self-sustained (e.g. supporting the provision of shipping services in small island States or for supporting infrastructure and logistics service in rural areas)? • government strategies/measures/policies/tools aimed at improving access to finance in the transport sector, including through public-private partnerships, capital markets, bonds, blended finance? • any other applicable criteria/indicator?
Economic (E)	E.6. Freight Transport Productivity	<p>Productivity is the ratio of outputs (such as tkm or vehicle-km) to inputs (such as fuel, vehicles or labour). It measures 'transformational efficiency' as it measures the efficiency with which a resource is converted into an activity. Improvement in freight transport productivity results in reduced transport costs and thereby directly contributes to increased economic growth.</p> <p>Freight transport productivity also benefits passenger transport movement as it reduces the number of vehicles on road and rail networks, thereby reducing accident exposure risk for other road users, and reducing externalities.</p> <p>Possible indicators include tkm/miles per truck/vehicle/ship per annum, tkm/fuel or vehicle</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • tkm/miles per truck/vehicle/ship per annum, tkm/fuel or vehicle kilometre travel driver man-hour? • average loads (across all vehicles and modes of transport)? • empty return (across all modes)? • crane productivity in ports (moves per working hour per ship), berthing time, dwell time, turnaround time, customs clearance time, other processing times? • reduction in the time needed by vessels to enter and leave the port? • reduction of labour/labour time to carry out the same level of freight transport operations?

		<p>kilometre travel/driver man-hour etc. crane productivity in ports, ship productivity, berthing times, dwell times, and turnaround time.</p>	<ul style="list-style-type: none"> • technology used for operational purposes (e.g. terminal cargo handling in ports, automation, etc.)? • application of Intelligent Transport System technologies? • strategies/policies/measures/instruments aimed at enhancing freight transport productivity? • any other applicable criteria/indicator?
Economic (E)	E.7. Sustainable Production and Consumption	<p>Freight transport is heavily influenced by the nature of countries' economic structures (i.e., what and how different commodities are produced, where they are produced and consumed, etc.).</p> <p>Freight policies that influence production, distribution, and consumption patterns to shift towards less distance intensive transportation and less emission intensive production processes could result in socially beneficial, economically viable, and environmentally friendly transport over the whole product life cycle.</p> <p>Relevant Possible indicators include freight transport intensity, which is defined as the measure of the amount of transport activity (measured in tkm) in an economy to the output (measured in GDP) of that economy, freight tkm/capita, waste, modal share, modal shift, etc.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • freight transport intensity associated with production and consumption processes? • monitoring of the impact of changes in freight transport intensity? • use of less carbon emitting transport modes? • measures to reduce the length of the supply chain (e.g. location close to sources of production and markets)? • recycling, reuse and sharing of equipment and material, etc? • strategies/policies/instruments/measures aimed at promoting freight transport systems that support the production and consumption of goods and services in a manner that is socially inclusive, economically efficient and environmentally friendly? • any other applicable criteria/indicator?

Economic (E)	E.8. Resilience and Operational Continuity	<p>There are various types of disruption- disruption in supply, disruption in transportation, disruption at facilities, freight breaches, disruption in communications, and disruption in demand. In this evaluation, the focus is on disruption of freight transport. In the freight transport and logistics sector, sourcing from distant low-cost locations and eliminating excess capacity to make the logistics and manufacturing “lean” can make logistics more cost efficient in the short term.</p> <p>However, such actions also make logistics more vulnerable to disruptions – i.e. high lead times – and thus could influence quality and reliability of travel. These disruptions could be due to natural disasters, terrorist attacks, congestion at ports, airports, and intermodal facilities, accidents, lack of capacity in the transportation network to accommodate surges in demand, etc.</p> <p>Relevant indicators include delays, delivery on time (%), days of closures (e.g. of port operations), diversion of cargo via alternative routes due to disruptions, changes in market shares due to diversion of business, transport costs, number of manufacturers switching suppliers, due to suppliers located in regions accessible through vulnerable routes, insurance costs (vehicles, hulls, cargo), etc.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • percentage of goods delivered on time? • days of closures (e.g. of port operations)? • diversion of cargo via alternative routes due to disruptions (natural, accidents, strikes, etc.)? • insurance costs associated with disruption impacts? • strategies/policies/measures/instruments aimed at reducing disruptions to freight transport operations and to the supply chains that they serve? • any other applicable criteria/indicator?
Economic (E)	E.9. Connectivity and Market Access	<p>Good transport services and transport connectivity can improve economic opportunities including in rural and remote areas, and can also encourage diversification to more profitable livelihoods, broadening the range of economic activities in a country/region. A reduction of marginalisation and remoteness could be beneficial for landlocked developing countries and Small Island Developing States.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • infrastructure and services linking rural areas to urban centres and markets? • strategies that facilitate urban freight transport and the movement of goods? • operational interoperability or technical compatibility of infrastructure, vehicles, rolling stock, signalling and other subsystems of transport systems (road/rail)?

		<p>Improved connectivity or reduced marginalisation can result in improved market access by moving from the periphery to the centre through better and more frequent transport/shipping connections.</p> <p>Relevant indicators include the number of services per country/per route/per port/per station, frequency of service (per week/month), size of service providers (e.g. large ships versus smaller ships), number of transhipments/transfers/stops, number and quality of hinterland connections, interoperability of transport systems, the availability of multimodal options, UNCTAD liner shipping connectivity, World Bank rural access Index, etc.</p>	<ul style="list-style-type: none"> • procedures for cross-border and transport facilitation? • number of freight transport service providers/companies? • frequency of services (e.g. number of ship port calls per week)? • number of transhipments/transfers/stops? • number and quality of hinterland connections? • multimodal options? • number of services per country/per route/per port/per station along the whole transport supply chain? • size of cargo flows handled by port hinterland connections (e.g. rail, road, barges)? • strategies/policies/measures/instruments aimed at improving transport connectivity and market access? • ICT and IT systems allowing smooth operations among various stakeholders involved in handling or use of freight transport services (e.g. ports, freight forwarders, Customs, shipping lines, trucking companies, etc.)? • any other applicable criteria/indicator?
Social (S)	S.1. Safety	<p>Transport safety in all transport modes is key. 1.2 million people die each year on the world's roads, making road traffic injuries a leading cause of death globally. Most of these deaths are in low- and middle-income countries where rapid economic growth has been accompanied by increased motorization and road traffic injuries.</p> <p>Freight transport is a significant contributor to road accidents. Furthermore, freight transport stakeholders share responsibility for the health and safety of those involved in the sector, especially those working in freight handling and movement of hazardous/dangerous goods. Efforts need to be taken to ensure that manual handling risks are eliminated, or if this is not possible,</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • number of accidents and incidents? • number of injuries/number of fatalities? • number of disruptions caused by accidents? • damages to equipment/vehicles caused by accidents (from and within the sector)? • number of commercial safety violations? • strategies/policies/instruments/measures aimed at enhancing freight transport safety and reduce accidents? • level of application and enforcement of relevant measures legalisations and conventions on safety and security (e.g. International Maritime Organisation

		<p>minimised. A possible indicator is accident fatalities per million mode kilometre travel.</p>	<p>(IMO), International Civil Aviation Organisation (ICAO); United Nations Economic Commission for Europe (UNECE), etc.) including transporting/shipping dangerous goods increased/decreased?</p> <ul style="list-style-type: none"> • any other applicable criteria/indicator?
Social (S)	S.2. Security	<p>Freight transport network nodes are considered vulnerable points in the transportation network where heightened security is essential. This creates delays and inefficiency for freight transport, which creates congestion, which can lead to increased cost. Additionally, there is a growing threat of cargo theft due to organized gang activities as commodity value density is increasing.</p> <p>Lack of security is also a threat for the life of people e.g., labour /crew on board ships when dealing with maritime piracy.</p> <p>Possible indicators include theft quotas, cargo insurance rates, Commercial vehicle safety violations, piracy activity at sea, security breach incidents, expenditure on security/prevention, ransom values, life losses/injuries, etc.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • theft incidents? • cargo claims? • cargo insurance rates? • commercial vehicle safety violations? • piracy incidents at sea? • security breach incidents? • expenditure on security/prevention? • maritime piracy incidents? • life loss/injuries? • strategies/policies/instruments/measures aimed at promoting higher security in freight transport? • any other applicable criteria/indictor?
Social (S)	S.3. Employment	<p>Employment created through transport can help reduce poverty, enhance the standards of living, allow population and communities to enjoy a variety of services including education, health, travel, etc. Transport enables access to various services and facilities, and can improve livelihood prospects. Transport also directly benefits many people through employment in the sector.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • labour's access to transport infrastructure and services in rural and remote areas? • employment in the transport sector? • overall employment level? • Income/revenue? • any other applicable criteria/indicator?

		Relevant indicators include reduction in poverty rate, access to education, health, opportunities for growth and personal development, higher disposable income, expenditures on basic and luxury goods in the transport sector and overall employment level, employment, and reduced migration.	
Social (S)	S.4. Labour Conditions	<p>Truck drivers face long working hours, weekend working, and several health and safety hazards associated with driving long distances. This includes risks relating to posture, musculoskeletal disorders, high stress levels, and HIV/AIDS transmission. The road freight transport sector is highly fragmented with most owner-driver trucks. Fragmented industry acts as a catalyst in increasing inefficiency in the freight sector, including poor working conditions due to low profit margins.</p> <p>Many studies have established that the transport sector is among the sectors where work is the hardest and labour conditions are among the poorest, while attractiveness of employment is very low. The situation is similar in other sub-sectors of freight transport, including for labour employed as crew on ships – whether such ships are trading internationally or domestically.</p> <p>Elements for consideration include driving time, labour hours, used leave time, ability to connect with family and friends, pay and social benefits/packages, health conditions and access to medical services, discrimination (including based on gender or colour/origin), access to education, and career development opportunities.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • strategies to limit driving times/working hours of crew (on ships/trucks/railways)? • working environments and safety? • health conditions of employees? • employers actively preventing discrimination at the workplace and in employment policy? • employees' income and compensation packages? • employers` facilitation of access to education, medical services and career development opportunities? • road-side clinics and wellness centres for truckers, health passports and/or targeted communication materials? • training/ educational programmes for employees/drivers/etc.? • leaves and rest time (e.g. shore leave for seafarers, vacation)? • strategies/policies/instruments/measures aimed at improving labour conditions in the freight transport sector and the overall economy by addressing related barriers and obstacles? • any other applicable criteria/indicator?

Social (S)	S.5. Affordability	<p>Freight affordability refers to the financial ability of shippers, SMEs transport and the public to access adequate freight transport services without compromising their ability to purchase other basic goods and services. Freight rates/transport costs (US\$/tkm) are good indicators for freight transport affordability. Freight transport affordability can be enhanced not only by improving the efficiency of travel, but also by reducing the amount of freight travel required to access destinations by improved infrastructure.</p> <p>Addressing factors that drive up inefficiencies and increase costs can help reduce the overall freight transport costs, which in turn improves affordability. Assessing transport needs and allowing for effective interventions for different social groups small and medium enterprises (SME's) including poor and most vulnerable groups (e.g. gender) can improve affordability.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • freight transport costs? • strategies that make freight transport services more affordable for smaller players (e.g. SMEs and smaller shippers and traders, as well as women)? • impact of transport interventions/investment/benefits on SMEs and the poor? • any other applicable criteria/indicator?
Social (S)	S.6. Aesthetic Impacts	<p>Freight transport infrastructure creates a high proliferation of signage and hoardings which can be not aesthetic in the local landscape, affecting user perception and evaluation of public space. Visual pollution could be regulated by means of juridical and spatial planning.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • value of residential areas and touristic assets (e.g. beaches, marinas, resorts, residential developments next to corridors, ports, airports, etc.)? • freight transport operations that developed at the expense of the environment, fauna, vegetation (e.g. a railroad that disrupts the areas dedicated to safaris and wildlife)? • strategies aimed at protecting the natural environment used for public attraction/leisure? • other relevant measures of aesthetic impacts?

Social (S)	S.7. Cultural Preservation	<p>The high intensity of freight traffic through land that accommodates historic buildings, sacred land areas, neighbourhood parks, older neighbourhoods, and towns could result in conflicts and issues.</p> <p>Among these are noise and air pollution, vibration, as well as increased danger to pedestrian safety. By promoting sustainable methods of freight transport operations that are sensitive to cultural and community resources, these predicaments can be avoided.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • threats/damages/losses to cultural resources (e.g. historic buildings, sacred land areas, neighbourhood parks, older neighbourhoods and towns, and traditional building styles) caused by freight transport development and activities? • policies/measures/strategies aimed at preserving natural/historical heritage? • any other applicable criteria/indicators?
Social (S)	S.8. Health	<p>Communities living next to freight nodes and corridors like freeways, ports, railway lines, designated truck routes and inter-modal centres bear the brunt of air pollution, noise, road accidents and other negative impacts of freight transport. These externalities induce and exacerbate health problems such as stress, sleep disturbances, cardio-vascular disease, and hearing loss.</p> <p>Diesel fumes have been identified as carcinogenic, and air pollution increases the risk of cardiopulmonary disease, stroke and lung cancer – some of the most common causes of premature death. Traffic-related air pollution is also associated with asthma onset in children and impaired lung function, as well as increased infant mortality.</p> <p>The improvements in ambient air quality brought about by freight transport emission reduction strategies can lower rates of fatal heart disease, lung cancer, and other respiratory diseases, reduce hospitalizations for heart attacks and emergency room visits for asthma attacks, increase productivity by avoiding days of school or work lost due to illness, and improve children's overall health.</p> <p>Relevant indicators include the number of fatalities, Particulate Matter emissions, nitrogen oxides (NOx) emissions, Black Carbon emissions, sulphur oxides</p>	<p>1. Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • number of health-related premature deaths caused by the negative impact of freight transport? • air quality? • level of air pollution (NOx, SOx, smog, particulate matter, black carbon, etc.)? • medical costs due to air pollution induced illnesses? • Insurance costs to cover medical bills associated with air pollution induced illnesses? • injuries/handicaps to individuals caused by freight transport accidents? • contamination level of waters and soil caused by freight transport activity and causing allergies and other illnesses? • number of measures taken to address or reduce the health-related impacts of freight transport? • stress caused by heavy traffic and congestion on the road? • any other applicable criteria/indicator? <p>2. Does the existing freight transport policy framework address the health problems resulting from freight transport activity?</p>

		(SOx) emissions, increase in air pollution costs, the number or proportion of vehicles powered by alternative fuels, deployment of clean air technology such as scrubbers, exposure to traffic noise, exceedances of air quality objectives due to traffic, and cost of medical treatment, and medical insurance costs attributable to freight transport.	3. If so, have relevant policies/strategies/measures/instruments been effective in reducing the impact of freight transport on health?
Social (S)	S.9. Noise and Vibration	<p>Freight movement and operations are a major cause of noise pollution. People living near ports, consolidation centers, and other freight generating land uses can be impacted by noise pollution and vibration due to high density of freight movement. Noise is not only unpleasant, but also contributes to health problems such as stress, sleep disturbances, cardio-vascular disease, reduced productivity and hearing loss.</p> <p>Relevant indicators include incidents/cases of health problems caused by freight transport related noises, loss of economic value/depreciation of residential/touristic assets located close to noisy areas such as ports, moves away from noise polluted area, total vehicle kilometres performed by the heavy trucks, overloaded trucks (%) etc. Additional possible indicators include noise levels, truck driving, and share of corridor length above 50-55dB(A).</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • number of incidents/cases of health problems caused by freight transport related noises and vibration? • cases where residential and corporate real estate lost economic value because of disturbances from freight transport related activities causing vibration and noise? • measures/efforts to mitigate the effect of a loss in the economic value/depreciation of residential/touristic assets located close to noisy areas such as highways/ports? • strategies/measures/instruments/policies aimed at reducing/preventing/compensating for the negative impact caused by noise and vibration? • any other applicable criteria/indicator?
Environmental (G)	G.1. Air Pollution	<p>Freight transport infrastructure sites are hotspots for air pollution. Freight transport activity contributes a significant share of the emissions of air pollutants such as Particulate Matter (PM10), SOx, Particulate Matter (PM2.5) and NOx.</p> <p>Long-term exposure to air pollutants can cause Acid rain precipitation, which damages trees and causes soil and water bodies to acidify, making the water unsuitable</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • average age of the fleet? • fuel quality and standards? • emission levels of local pollutants such as Particulate Matter, NOx, black carbon and SOx? • monitoring and measurement of air quality? • use technology to reduce the effects of pollution (e.g. scrubbers on ships)?

		<p>for some fish and other wildlife. It also speeds up the decay of buildings, statues, and sculptures (social impact). Eutrophication can cause fish kills and loss of plant and animal diversity.</p> <p>Other impacts are haze, ozone depletion as well as damages to wildlife, crop and forests. Possible indicators include Particulate Matter emissions, NOx emissions, Black Carbon emissions, SOx emissions, air pollution costs, etc.</p>	<ul style="list-style-type: none"> • measures/policies aimed at preventing/reducing/compensating for the negative impacts of freight transport induced air pollution? • any other applicable criteria/indicator?
Environmental (G)	G.2. GHG Emissions	<p>Freight transport contributes to about 7% of total global greenhouse gas (GHG) emissions. Global emissions from trade-related freight transport are estimated to be around 2 billion tons and could rise to 8 billion tons by 2050 under the baseline scenario. The share of freight transport emissions is expected to grow from current 40% to 60% of transport GHG emissions in 2050.</p> <p>Relevant indicators include GHG/CO₂ (carbon dioxide) emissions, gCO₂/tkm, carbon intensity of fuel used, emissions that add to climate change, e.g. black carbon.</p>	<p>1. Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • GHG/CO₂ emissions from freight transport? • use of less carbon intensive freight transport modes of transport? • use of low-carbon technology such as Alternative Fuel Vehicles (AFVs)? • fuel efficiency? • use of alternative fuels? • use of renewables? • strategies/measures/instruments/policies aimed at reducing GHG/CO₂ emissions from freight transport? • any other applicable criteria/indicator? <p>2. Is relevant data on the GHG/CO₂ emissions in freight transport available and accessible?</p>
Environmental (G)	G.3. Water Pollution	<p>Freight transport has both direct and indirect impacts on water quality. For example, routine discharge of ballast water from marine vessels can cause oil pollution at sea. Oil and chemical spills, dredging of ports could result in high pollution. Further, road accidents and vehicle breakdowns can result in oil and other hazardous chemicals mixing with ground water.</p>	Was there an improvement/deterioration/no change in the: <ul style="list-style-type: none"> • number of water pollution incidents from freight transport? • cost and damages of water pollution • measures taken to prevent water pollution resulting from freight transport activity (e.g. prevention of oil or chemicals related pollution)?

		Relevant indicators include the number of incidents of pollution from oil or other materials, including chemicals and hazardous substances, from all modes.	<ul style="list-style-type: none"> measures taken to restore an existing marine environment following a water pollution damage or to compensate for damages and losses? cases where water pollution has had negative impacts on other sectors e.g. fisheries? any other applicable criteria/indicator?
Environmental (G)	G.4. Resource Depletion	<p>This objective considers resource efficiency in accommodating freight transport. Resources consumed for facilitating freight transport include energy resources (comprising fossil fuels), use of land for building infrastructure, use of water resources, material procurement etc.</p> <p>Resource depletion could be reduced by encouraging the use of the most resource-efficient products and services, minimizing the use of water resources, maximizing reuse and recycling of wastewater, the use of renewable energy sources and the improvement of energy efficiency, and land use etc.</p> <p>Possible indicators include the shares of alternative fuel vehicles (by type) as percentage of the vehicle fleet, megajoules/tkm, megajoules per vehicle kilometre, etc.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> energy efficiency in freight transport (Megajoules/tkm, Megajoules/vehicle-km)? use of fuels from renewable energy sources? use of efficient technologies reducing freight transport-related water consumption? integration of transportation and land-use planning? transport-related damages to environment, fisheries, agriculture, etc.? any other applicable criteria/indicator?
Environmental (G)	G.5. Land Use and Habitat Fragmentation	<p>Freight transport infrastructure and movement are major causes of habitat fragmentation, the disruption of wildlife habitats, and their division into smaller areas. Freight transport infrastructure creates accessibility barriers separating functional areas within a habitat. Habitat fragmentation can be considered using length and width of freight transport infrastructure and of the habitats through which they pass.</p> <p>In land use planning, zoning can be used to guide the development of industrial land uses. This includes new freight warehouses or intermodal facilities near major highway access points to reduce truck travel, locating land use generating large volumes of freight away from</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> amount of buffer zones? share of major generators with appropriate roadway access to highways? number of disrupted habitats? integration of transportation and land-use planning? any other applicable criteria/indicator?

		<p>sensitive land uses, and adopting context sensitive designs of freight transport infrastructure. Indicators such as buffer zone, percent of major generators with appropriate roadway access to major highways etc.</p>	
Environmental (G)	G.6. Waste	<p>Waste is not only a by-product of the production and consumption process but is also a contributor to economic activity through the recovery of energy and resources from waste.</p> <p>For example, disposal of plastics at sea is a significant source of environmental harm. Regulating the discharge of garbage from ships, minimizing construction and operational waste, and considering life-cycle analyses to inform sensitive and/or complex investment decisions could lead to better waste management. Further, by implementing environmentally friendly disposal and by recycling, better efficiency could be achieved. Freight transport needs to consider avoiding, reducing, reusing, and recycling.</p> <p>Relevant indicators include freight transport fly-tipping incidents, share of construction and operational waste diverted from landfill, waste management practices, waste dumping reported incidents, costs for removal of dumped waste, and estimated economic losses (e. g. from tourism) due to dumped waste.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • volume of wastes generates by freight transport activity? • application and enforcement of relevant instruments such as the IMO rules on waste management (Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter)? • number of fly-tipping and waste-dumping incidents? • number of waste disposal /recycling facilities? • number of waste treatment facilities? • any other applicable criteria/indicator?

Environmental (G)	G.7. Biodiversity and Ecosystems	<p>Sustainable Development Goal 15 of the 2030 Agenda for Sustainable Development aims to "protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss".</p> <p>Freight transport has a major impact on biodiversity. The need for construction materials and fuels for the development of freight transport infrastructure and facilitating freight movement has led to deforestation and land use changes. Many freight transport corridors reduce wetland areas and water plant species. Ships and pipeline oil spills also have obvious impacts on ecosystems and wildlife, including under water noise caused by ships engines.</p> <p>Relevant indicators include incidents/cases/proportion of/extent of biodiversity losses, wetland areas, water plant species, wildlife and ecosystems losses and damages, and disturbance of wildlife at sea due to noise caused by ships.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • number of cases where biodiversity elements were lost or damaged because of freight transport activity? • costs and negative impacts of biodiversity loss? • application of measures/policies/instruments aimed at preventing/reducing biodiversity destruction (e.g. wetland areas, water plant species, wildlife and ecosystems, forests)? • area of nature conservations/protected zones area (in km²)? • instruments/policies/measures/strategies that promote biodiversity and ecosystems? • any other applicable criteria/indicators?
Environmental (G)	G.8. Soil Quality	<p>Freight transport infrastructure development and movement has significant impact on soil erosion, soil contamination, loss of fertile land etc. Soil contamination can occur with the use of toxic materials as well as by spills from the freight transport industry.</p> <p>Constructing new freight transport facilities may require a conversion of land use from open space reserve or greenspace to concrete facilities resulting in soil erosion and poor absorption of rainwater, resulting in flooding etc.</p> <p>Relevant indicators include incidents/cases/proportion of/extent of soil erosion, soil contamination, loss of fertile land, poor absorption of rainwater resulting in flooding etc.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • number of incidents/cases/proportion of/extent of soil erosion, soil contamination, loss of fertile land, poor absorption of rainwater resulting in flooding etc.? • measures/policies/instruments to prevent soil pollution? • any other applicable criteria/indicator?

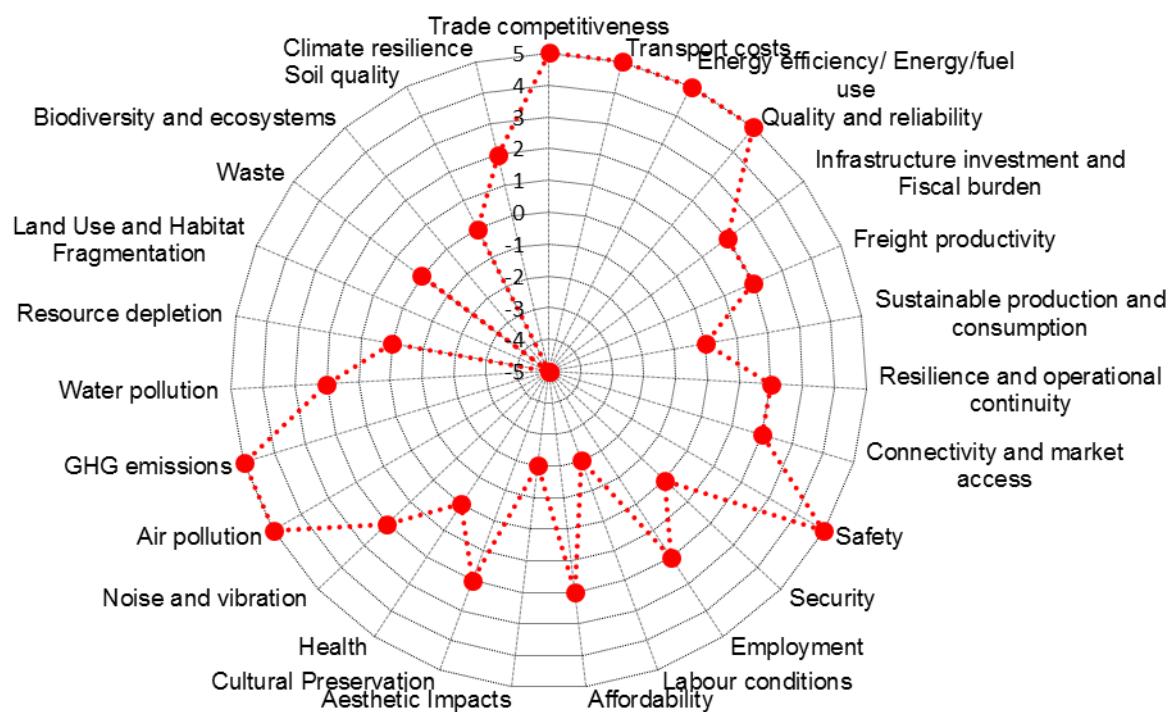
Environmental (G)	G.9. Climate Resilience	<p>Increased extreme weather events such as hurricanes, snow storms, floods, etc. will increase disruptions and damage freight transport infrastructure. Road pavements and bridges are especially vulnerable to temperature extremes and flooding. Seaports and other coastal transport infrastructure such as airports in SIDS are particularly vulnerable to sea level rises and storm surges.</p> <p>These problems are most intense in developing countries in Asia, Africa and Latin America. It is important to assess the vulnerability of freight transport infrastructure and services to climate change factors, determine impacts, devise adaptation strategies and response measures, quantify the costs of climate change in freight transport infrastructure, and consider economic benefits of climate adaptation in the decision making.</p> <p>Relevant indicators include climate change related incidents affecting freight transport (floods, droughts, sea level rise, precipitation, winds, etc.), the impacts and their type, damages and costs, disruptions and closures, trade diversion via different routes, insurance costs, etc.</p>	<p>Was there an improvement/deterioration/no change in the:</p> <ul style="list-style-type: none"> • number of climate change incidents /factors (floods, droughts, sea level rise, precipitation, winds, etc.) on freight transport? • impact of climate change incidents/factors on freight transport infrastructure, services and operations? • damages, losses and costs of climate change in freight transport? • number/intensity of climate change indirect impacts such as disruptions and closures, trade diversion via different routes, increased insurance costs, etc.? • number of climate change adaptation measures and resilience building? • costs of climate adaptation measures in freight transport? • strategies/measures/instruments/policies to support climate resilience building in freight transport? • any other applicable criteria/indicator?
-------------------	-------------------------	--	---

ANNEX 6: Examples of Findings Resulting from the Diagnosis

Example of an international freight transport corridor where greater emphasis is placed on the economic dimension/cost reductions rather than on the social and environmental aspects.



Example of a dedicated railway freight transport corridor where emphasis is put on the economic dimension as well as on some elements of the environmental dimension. In this case, there is a strong adverse impact on biodiversity and habitat.



Example of the performance of urban freight transport in a city located in a developing country. In this case, limited focus is put on several environmental and social aspects of freight transport.



ANNEX 7: Case: Metropolitan City “X”

City “X” is growing. Forecasts indicate that City “X” will have 50% more inhabitants by 2030. The City’s Vision 2030 describes what it should be like to live in, work in and visit City “X”. The city needs a transport system that connects people to jobs and allows people, goods and services to move easily within and through the capital. Around one million more people – and over one million more jobs – are expected in City “X” by 2030. This will lead to millions more trips each day, especially in terms of urban freight transport.

The overall vision of the city is to provide an inclusive, healthy, prosperous, and liveable habitat.

Goals of the government of City X:

1. Support economic development and population growth in the city.
2. Enhance the quality of life for the whole city population.
3. Improve the safety and security for the whole city population.
4. Improve transport opportunities for the whole city population.
5. Reduce the city’s contribution to climate change and improve its climate resilience.
6. Reduce citywide traffic congestion.

Objectives of City X: One of city’s main objectives is to “***reduce congestion by improving traffic flow on the designated freight network***”.

Targets: Some of the freight-related targets relating reducing congestion include:

- By ____, reduce truck delays by ____ hours
- By ____, increase peak hour truck speed by ____ %
- By ____, reduce road freight trips by ____ %.

Key Performance Indicators (KPIs): Some of the KPIs for monitoring congestion include:

- truck hours of delay,
- peak hour truck speed, and,
- number of freight trips.