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**Green Freight and Logistics in the Context of Sustainable Development  
Goals (SDGs)**

**(Background Paper for EST Plenary Session-11)**

**Final Draft**

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This background paper has been prepared by Friedel Sehleier, Anders Imboden, Sudhir Gota, and Kyra Hagge, for the Tenth Regional EST Forum in Asia. The views expressed herein are those of the authors only and do not necessarily reflect the views of the United Nations.



# Green Freight in Asia in the Context of the **Sustainable** **Development** **Goals**

Background Paper

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## Abbreviations & Acronyms

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CCAC	Climate and Clean Air Coalition
CO <sub>2</sub>	Carbon Dioxide
EST	Environmentally Sustainable Transport
GHG	Greenhouse Gas
ITS	Intelligent Transport Systems
NDC	Nationally Determined Contribution
NO <sub>x</sub>	Nitrogen Oxides
PM	Particulate Matter
SDGs	Sustainable Development Goals
SMEs	Small and Medium-Sized Enterprises
SO <sub>x</sub>	Sulphur Oxides
UNCTAD	United Nations Conference on Trade and Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific

## 1. Introduction to Green Freight

Over the past decades, economic development has transformed Asia. Rapid growth has lifted millions of people out of poverty and coincided with improvements in health, education and well-being. Unfortunately, these positive changes have been accompanied by a myriad of challenges including pollution, haphazard urbanisation, and a worsening climate crisis.

Growing freight transport has enabled the region's economic progress – but also endangered environmental sustainability. Asian economies can turn this trade-off into a win-win by taking action towards a more fuel-efficient, resource-productive, and less carbon-intensive freight transport system. This is the idea behind green freight.<sup>1</sup>

Green freight is a set of strategies, policies and practices targeted at the movement of goods with minimal environmental, climate and public health impacts. This is achieved by reducing freight transport's air pollutant and greenhouse gas (GHG) emission intensity across all modes, including road, rail, marine, inland waterway and air. Green freight also aims to facilitate economic development through improved energy efficiency, fuel security, and overall freight sector efficiency and competitiveness. These strategies may be developed and implemented in partnership by government, the private sector and other stakeholders.

Practically speaking, green freight offers a response to negative environmental impacts by pursuing two main goals: to reduce per-kilometre pollutant and GHG emissions from freight transport, and to reduce the amount of travel needed to meet demand for freight services. Both are necessary to achieve emission reduction in the long run.

Pursuing green freight requires engagement from a range of stakeholders. These groups may have different expectations, objectives and priorities with regard to development of the freight sector, and green freight in particular. Table 1 highlights some primary concerns often expressed by various stakeholder groups in developing countries.

In industrialised economies, private sector initiatives have been gathering momentum. There are many examples of companies reducing their environmental footprint. However, this trend has yet to move into the mainstream in emerging and developing economies in Asia. Such a paradigm shift will require both 'carrots' and 'sticks' – incentives and regulations – as well as investment by regulators; there is little evidence that markets alone will deliver an environmentally sustainable freight transport system. Government intervention is needed to put in place a suitable enabling environment for companies to adopt more sustainable practices (McKinnon, 2015).

Comprehensive green freight strategies (Table 2) are closely linked to the well-known 'avoid–shift–improve' approach towards sustainable transport. This approach calls for a combination of measures to **avoid** unnecessary transport trips, **shift** necessary trips to more efficient modes, and **improve** existing technologies, including vehicles and fuels. In order to facilitate such positive changes, governments need to employ a broad spectrum of policy measures including taxation; financial incentives; regulation; freight market liberalisation; management of state-owned enterprises; infrastructure and land-use planning; and advising.

Green freight programmes create a framework for putting these strategies into practice. Successful green freight programmes bring together businesses, governments and other stakeholders to design and carry out activities that help the freight sector achieve its sustainability goals while improving its operating efficiency. Recommendations for how to develop a green freight programme are included in the final section of this background paper.

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<sup>1</sup> The terms 'green freight' and 'green logistics' differ slightly in scope. The former focuses on freight transport while the latter also incorporates non-transport aspects of logistics operations, such as warehousing, packaging or supply chain management. In practice, both terms are used interchangeably, but for the sake of clarity and consistency this paper uses the term 'green freight'.

**Table 1: Green Freight Stakeholders**

Stakeholder Group	Main Concern in Green Freight Context
<b>Industry associations</b>	Sustainability and growth of the freight industry and/or infrastructure. Fuel efficiency is only incidental.
<b>Truck operators</b>	Fuel efficiency, but more generally, how to survive in the industry and make profits. Emission reduction is not a business priority.
<b>Government institutions</b>	<ol style="list-style-type: none"> <li>1. Environmental agencies: pollutant and GHG emissions.</li> <li>2. Energy-related institutions and agencies: fuel consumption and fuel imports.</li> <li>3. Transport institutions and agencies: operations, safety and infrastructure.</li> <li>4. Commerce ministries: freight costs, supply and demand of trucks, freight movement in general.</li> <li>5. Industry/auto-regulating industries: vehicle manufacturing and compliance with safety and usage regulations.</li> </ol>
<b>End consumers</b>	Except for in niche markets, product price tends to take precedence over 'greenness' of products. However, the general public perceives trucks as dirty and as an impediment to personal transport.
<b>Shippers</b>	Companies respond to consumer sentiment and regulations, but they ultimately select carriers and processes. Freight costs, delivery time and delivery condition are critical, while emission reduction is not yet a high priority, except for the growing number of multinationals with voluntary targets.

**Table 2: Aspects of a Green Freight Strategy**

Aspect	Explanation
<b>Reduce freight transport intensity</b>	De-coupling economic growth and freight growth (without adversely affecting development prospects) by reducing tonne-kilometres in an expanding economy. Can be facilitated through careful planning of supply chains and by encouraging companies to reduce their demand for freight movement by rationalising their logistics operations.
<b>Shift freight to greener transport modes</b>	From road to rail, inland waterways or maritime transport, relying on intermodal facilities and infrastructure as well as incentives and regulation to make mode shifting more attractive.
<b>Improve vehicle utilisation</b>	As road transport remains the dominant mode of freight transport, measures to facilitate a reduction of empty truck trips and optimised loading of vehicles can reduce vehicle-kilometres travelled.
<b>Increase energy efficiency</b>	Can be promoted through a combination of carrots and sticks such as: raising fuel duties, subsidising driver training schemes, enforcing speed limits, enacting higher standards for new vehicles, incentivising scrappage of older vehicles, conducting awareness campaigns and labelling.
<b>Switch to less polluting energy sources and vehicles</b>	e.g. higher EURO standards, electric trucks in urban areas, gaseous fuels.

*Adapted from McKinnon (2015).*

## 2. Trends, Drivers and Impacts of the Freight Sector in Asia

The freight sector – and logistics more broadly – is growing rapidly throughout Asia. Inefficiencies persist, however, leading to substantial economic losses, environmental damage and negative social impacts. Boxes 1 and 2 highlight some of the drivers, trends and impacts associated with the growth of the freight sector in the region.

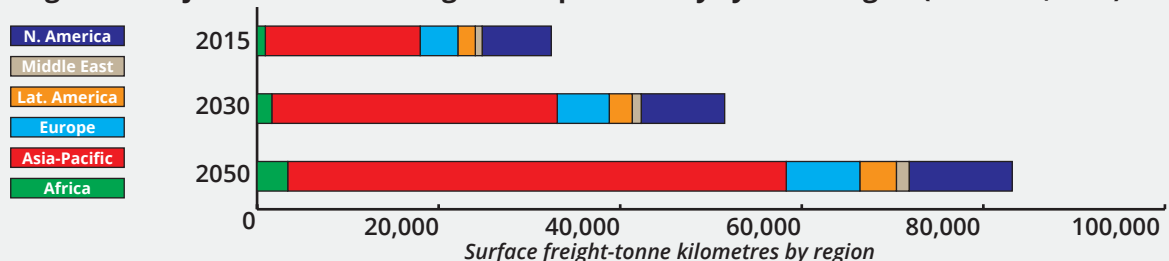
### Box 1: Drivers and Trends of Freight Growth in Asia

**Growing Industrial Production:** In emerging markets, industrial production has more than tripled in the last 20 years and will nearly triple again in the next 20 years.

**Trade:** World trade is estimated to grow at around 3.5% annually in coming years (compared with 6.9% over the period 1990-2007) (ITF/OECD, 2017).

**Growing Freight Transport:** The ITF Transport Outlook 2017 projects that 'tonne-kilometres from surface freight in Asia will increase by a factor of 3.2 from 2015 to 2050 accounting for over two-thirds of all surface freight globally. Growth is far from uniform within the broad region of Asia with a significant difference between growth in Japan (around 50%) and other Southeast Asian countries (growth by a factor of 3.5)' (ITF/OECD, 2017).

**Figure 1: Projected Growth of Freight Transport Activity by World Region (ITF/OECD, 2017)**



**Infrastructure:** Economies in Asia and the Pacific, led by the People's Republic of China (hereafter China) significantly upgraded the quality of their roads between 2004 and 2015, improving connectivity. However, projected future trade and freight flows in Asia highlight the need for infrastructure capacity increases, especially across modes. In 2050, infrastructure in Asia and Africa around ports, production centres and cities will need to almost triple (ITF/OECD, 2017).

**Growing Truck Fleet:** Asia has taken the lead as the fastest growing region for vehicle sales, and almost one in two commercial vehicle sales take place in Asia (KPMG, 2011). From 2001 to 2010, the size of the truck fleet in Asia doubled. There were 21.2 million heavy trucks registered in the region as of 2013 (ADB, 2016).

**Air Cargo Growth:** Air cargo traffic is expected to grow at 5.5% per annum over the next 20 years in the region. Nearly 30% of world air freight traffic will be to or from the Asia-Pacific region by 2032 (ITF/OECD, 2017).

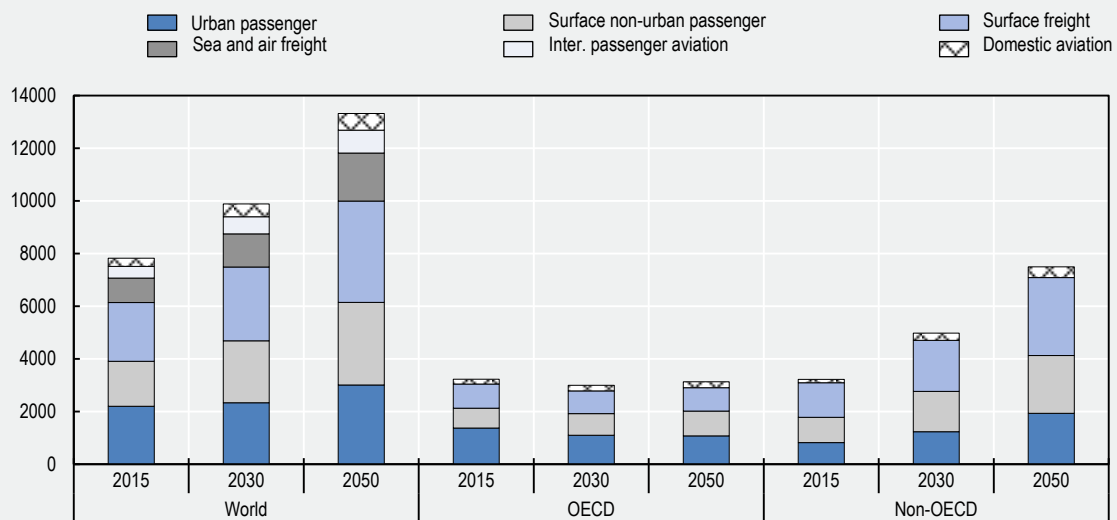
**Internationalisation:** Governments in Asia have signed a large number of bilateral and multilateral agreements in an attempt to open borders and domestic roads as well as railways for international transport. However, persistent non-physical barriers result in delays and high costs (UNESCAP, 2016).

**Urban Freight:** Goods traffic represents a considerable portion of urban traffic volume. In most cities, an average of only 15% to 25% of vehicle-kilometres (four-wheel and more) travelled are attributable to commercial vehicles, yet it is estimated that they occupy roughly 20% to 40% of motorised road space and cause 20% to 40% of carbon dioxide (CO<sub>2</sub>) emissions (Gota, 2015). Around half of freight related vehicle-kilometres travelled are estimated to take place in urban areas. Road congestion costs Asia's economies approximately two to five per cent of GDP each year, in part due to urban freight (ADB, 2017).

## Box 2: Environmental and Safety Impacts of Freight Transport in Asia

**Emission Impact of Trucks:** On average, trucks makes up nine per cent of the vehicle population in Asia but cause 54% of road transport CO<sub>2</sub> emissions (Clean Air Asia, 2012). Recent estimates from the World Health Organization suggest 2.6 million annual deaths are related to outdoor air pollution across most of Asia. And according to the U.S. Environmental Protection Agency, the transport sector is the third largest source of black carbon emissions in Asia and is expected to become the second largest source by 2030. By 2050, CO<sub>2</sub> emissions from freight transport could increase more than passenger transport and represent more than half of global non-OECD transport emissions (Figure 2). In 2015, heavy duty vehicles accounted for over 40% of emissions of nitrogen oxides (NO<sub>x</sub>) from the transport sector and more than 50% of fine particulate (i.e. PM2.5) emissions (IEA/OECD, 2016).

**Figure 2: CO<sub>2</sub> Emissions by Transport Subsector (Million tonnes, baseline scenario) (ITF/OECD, 2017)**



**Shipping Emissions:** International maritime shipping makes up approximately 2.7% of global CO<sub>2</sub> emissions and could increase by 150% to 200% between 2007 and 2050 under a business-as-usual scenario. Shipping is responsible for around 5-12% and 17-31% of emissions of sulphur oxides (SO<sub>x</sub>) and NO<sub>x</sub>, respectively (OECD/ITF, 2014). Estimates suggest that shipping is responsible for a significant share of air pollution-related deaths – 0.3% in India, 1.3% in China, 2.1% in Indonesia, 2.6% in Vietnam, 2.8% in Thailand, 4% in the Philippines, 4.7% in Sri Lanka, 21.5% in Malaysia and 35.6% in Singapore (Energy and Environmental Research Associates, 2016).

**Safety Impact of Trucks:** Trucks are involved in a disproportionate number of road accidents. In India and Bangladesh, trucks make up six per cent of on-road vehicles but are involved in 26% and 24% of road accidents respectively (UNCRD, 2014).



### 3. Green Freight for Sustainable Development

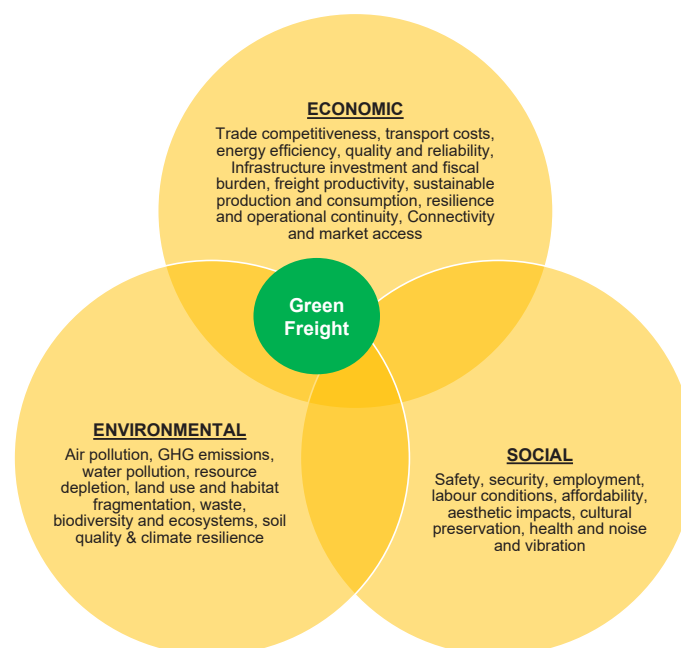
The 'conventional' green freight concept predominantly focuses on the environmental dimension of sustainability, seeking to manage trade-offs against social and economic objectives. Over the past two decades, the main drivers for green freight development in developed economies have been increasing concern for the environment and particularly climate change by the public and governments, as well as growing demand from leading shippers for greener freight transport.

However, in line with the notion of a 'people, planet, profit' triple-bottom line, it is increasingly acknowledged that green freight goes beyond emissions and environmental problems, as freight transport also impacts other dimensions of social and economic sustainability. Some environmental policies may also impose high additional costs and cause adverse consequences on businesses and people. Such policies are not considered a part of green freight. Rather, green freight policies and measures not only reduce adverse environmental impacts, but may also produce lasting economic and social co-benefits.

These co-benefits are many. Improving routing and scheduling efficiencies not only reduces energy consumption and emissions – it may also bring down overall logistics costs (a major constraint on economic growth). Through fuel efficiency or fuel switching, fleets – and countries – can achieve greater energy independence. Cities with clean air and improved mobility are healthier, happier and more economically dynamic than their polluted and congested counterparts. Policies towards green freight also need to be inclusive, as the trucking sector in most Asian countries is dominated by inefficiently operated small-scale companies using old vehicles with high GHG emissions relative to their capacities.

With these types of cross-cutting impacts, there is significant potential for green freight to contribute to a wide range of policy goals and to help achieve regional and global development targets – notably, including the Sustainable Development Goals (SDGs). Figure 3 illustrates how green freight benefits the three dimensions of sustainable development.

**Figure 3: Green Freight and Sustainable Development**



*Adapted from United Nations Conference on Trade and Development (UNCTAD) definition.*





## 4. Green Freight in the Context of the SDGs

In September 2015, the United Nations adopted the so-called 2030 Agenda, which then came into effect in January 2016. It is composed of 17 SDGs, which are supported by 169 targets. There is no single SDG that focuses on transport, though a number include transport-related targets and sustainable transport is implicit in most goals.

As a foundational component of economic development, freight transport is an area where improvements to efficiency, environmental impact or safety produce positive effects across large networks – serving as an ‘enabler’ for achievement of almost every SDG. Its benefits are not exclusively accrued by freight operators or individual nations, but rather serve multiple public policy goals locally, across borders and throughout supply chains.

While the potential impact of green freight is particularly strong on some SDGs (e.g. on responsible consumption and production or climate action), the breadth of potential is a compelling basis for investing in green freight programmes and initiatives. Green freight provides a foundation for sustainable development by facilitating economic growth, promoting trade, improving access and linking communities and societies to end poverty, protect the planet and ensure prosperity for all. Table 3 highlights some of the main ways in which green freight supports or influences the achievement of the SDGs.




**Table 3: Green Freight and the 17 SDGs (authors’ analysis)**

SDG	Relevance or Role of Green Freight
 <p><b>1</b> NO POVERTY</p>	<ul style="list-style-type: none"> <li>Efficient trucking facilitates trade, contributing to poverty reduction and prosperity.</li> </ul>
 <p><b>2</b> ZERO HUNGER</p>	<ul style="list-style-type: none"> <li>Increasing food availability and reducing post-harvest losses with improvements to transport, cold chains, packaging and storage.</li> <li>Development of inland dry ports as logistics centres for collection and distribution of rural production materials and products.</li> <li>Supporting self-sufficiency reduces ‘food miles’.</li> </ul>
 <p><b>3</b> GOOD HEALTH AND WELL-BEING</p>	<ul style="list-style-type: none"> <li>Eco-driving and defensive driving training leads to safer driving behaviours.</li> <li>Better maintained vehicles are less likely to experience critical failures.</li> <li>Telematics equipment improves both fuel-efficient driving and road safety.</li> <li>All green freight measures, particularly those in an urban context, reduce emissions of air pollutants and their associated health impacts.</li> </ul>
4. Quality Education	<i>No significant green freight contribution identified for this goal.</i>
5. Gender Equality	<i>No significant green freight contribution identified for this goal.</i>
 <p><b>6</b> CLEAN WATER AND SANITATION</p>	<ul style="list-style-type: none"> <li>Reducing spillage of fuel and other hazardous substances from vehicles by better maintenance practices.</li> <li>Minimising atmospheric deposition into water by reducing air pollutant emissions.</li> <li>Regulation and safer handling of dangerous goods reduces accidental discharge of toxic payloads.</li> </ul>

**Table 3, continued: Green Freight and the 17 SDGs (authors' analysis)**

SDG	Relevance or Role of Green Freight
 <p><b>7</b> AFFORDABLE AND CLEAN ENERGY</p>	<ul style="list-style-type: none"> <li>• Burn less: Improving energy efficiency is a top priority of green freight initiatives, both in logistics networks and in vehicles themselves.</li> <li>• Burn clean: Accelerating the adoption of low-emission propulsion technology for vessels, trains and trucks.</li> <li>• Developing infrastructure necessary for widespread adoption of advanced conventional fuels (e.g. new biofuels) or electric and other non-combustion engines.</li> </ul>
 <p><b>8</b> DECENT WORK AND ECONOMIC GROWTH</p>	<ul style="list-style-type: none"> <li>• Greener and more efficient freight transport brings down transport and logistics costs.</li> <li>• Efficient freight transport infrastructure and logistics support trade and market access at the national, regional and global levels and have positive impacts on economic growth and productivity throughout sectoral supply chains.</li> <li>• The freight transport sector is a significant employer and is dominated by small and medium-sized enterprises (SMEs).</li> </ul>
 <p><b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>	<ul style="list-style-type: none"> <li>• Further development of railway networks within and between countries promotes mode shifting and facilitates trade.</li> <li>• Promotion of dry ports and ports as an efficient intermodal interchange.</li> <li>• While new infrastructure is required in many countries, existing improvements (e.g. roads, ports, terminals, etc.) also can and should be maintained to prioritise efficiency, safety and a minimal environmental impact.</li> </ul>
<p>10. Reduced Inequalities</p>	<p><i>No significant green freight contribution identified for this goal.</i></p>
 <p><b>11</b> SUSTAINABLE CITIES AND COMMUNITIES</p>	<ul style="list-style-type: none"> <li>• Efficiency gains in urban logistics reduce the overall travel of freight vehicles in cities, reducing wear-and-tear on infrastructure, improving road safety for all users, combating congestion, reducing noise pollution and contributing to urban liveability.</li> <li>• Green freight improvements may also redistribute some freight transport to areas less likely to impact non-motorised transport and public transport modes.</li> <li>• Optimising urban logistics will involve making 'last mile' freight transport more efficient (e.g. through route planning and scheduling).</li> <li>• Investments in cleaner vehicles or fuels will reduce emissions per kilometre travelled within cities – thereby reducing emissions of harmful air pollutants.</li> </ul>
 <p><b>12</b> RESPONSIBLE CONSUMPTION AND PRODUCTION</p>	<ul style="list-style-type: none"> <li>• As part of greening logistics, companies also look at green packaging opportunities, reducing the environmental impact of warehousing and minimising waste through reverse logistics.</li> <li>• Training, technology, infrastructure and organisational improvements can help boost the efficiency of the transport of food from sources to processors, wholesalers and ultimately to consumers.</li> <li>• Supporting the safe transport of dangerous goods can help to ensure environmentally sound management of chemicals and other hazardous materials throughout their life cycle.</li> <li>• Vehicles contain hazardous materials; green freight programmes can address end-of-life disposal or recycling.</li> </ul>
 <p><b>13</b> CLIMATE ACTION</p>	<ul style="list-style-type: none"> <li>• Comprehensive green freight infrastructure should be planned, designed and built with climate resilience in mind.</li> <li>• Climate change mitigation is a core principal of green freight and logistics, and without addressing the freight sector, global climate goals cannot be realistically met.</li> </ul>

**Table 3, continued: Green Freight and the 17 SDGs (authors' analysis)**

SDG	Relevance or Role of Green Freight
 <p>14 LIFE BELOW WATER</p>	<ul style="list-style-type: none"> <li>• Environment-friendly practices in shipping, port operations and shipyards help to protect marine life.</li> <li>• Ballast water management standards and treatment systems.</li> </ul>
 <p>15 LIFE ON LAND</p>	<ul style="list-style-type: none"> <li>• New roads should be designed to minimise the fragmentation of habitats and complemented with afforestation efforts.</li> <li>• Eco-driving and defensive driving skills help to reduce roadkill.</li> <li>• Reducing air pollution from freight transport also mitigates the sector's impact on land habitats.</li> </ul>
16. Peace, Justice & Strong Institutions	<i>No significant green freight contribution identified for this goal.</i>
 <p>17 PARTNERSHIPS FOR THE GOALS</p>	<ul style="list-style-type: none"> <li>• Public-private partnerships and common platforms are needed to incentivise industry-wide change and can be integrated into green freight programmes.</li> <li>• Technology and know-how transfer to developing economies in Asia is a key ingredient to the necessary low carbon transformation of freight transport.</li> </ul>

*Based on a brainstorming activity with participants of the **Green Freight Day** at the **Better Air Quality in Asia Conference 2016**.*

## 5. Green Freight Links to Other International Processes

Green freight needs to be prioritised not only because it supports the achievement of the SDGs, but also due to its role in meeting the goals and calls for action of several other international processes that prioritise efficient freight movement for economic development and sustainable development across sectors.

These include, from the most recent:

The **New Urban Agenda** (Habitat III, Sep. 2016) envisages cities that promote 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 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.

The **Paris Agreement** adopted by the United Nations Framework Convention on Climate Change in December 2015 strengthens the global response to the threat of climate change by striving to keep global temperature rise in this century well below two degrees Celsius (compared to pre-industrial levels), and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change.

The **Addis Ababa Action Agenda** of the Third International Conference on Financing for Development (July 2015) considers the need 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.

The **Sendai Framework for Disaster Risk Reduction 2015-2030** (adopted March 2015) prioritises resilience of new and existing critical infrastructure, including water, transport and telecommunications infrastructure; educational facilities; and hospitals and other health facilities, to ensure that they remain safe, effective and operational during and after disasters in order to provide live-saving and essential services.

The **Vienna Programme of Action for Landlocked Developing Countries for the Decade 2014-2024** (adopted Nov. 2014) recognises that high transport and trade transaction costs remain a major stumbling block for landlocked developing countries hoping to achieve their trade potential. It prioritises the development of adequate transport infrastructure networks and efforts to complete missing links connecting landlocked developing countries.

The **SIDS Accelerated Modalities of Action (SAMOA) Pathway** (adopted Nov. 2014) prioritises the development of a strategy and targeted measures to promote energy efficiency and foster sustainable energy systems based on all energy sources, including renewable energy sources, in small island developing states.

Launched in May 2011, the **Decade of Action for Road Safety 2011-2020** has the official goal of 'stabilising and then reducing' global road traffic fatalities by 2020. It is backed by a comprehensive plan that includes activities to build road safety management capacity; improve the safety of road infrastructure and broader transport networks; further develop the safety of vehicles; enhance the behaviour of road users; and improve post-crash response.

The **Istanbul Programme of Action for the Least Developed Countries for the Decade 2011-2020** (adopted May 2011) aims to develop and implement comprehensive national policies and plans for infrastructure development and maintenance encompassing all modes of transportation and ports, communications and energy.

Translating these global initiatives into effective action and tangible benefits for people across the world will be a huge challenge. It will require the alignment of various processes and initiatives at the global, regional, national and local levels, as well as significant support to the national and local authorities responsible for implementation.

## 6. Current Status of Green Freight Initiatives in Asia

Fortunately, green freight transport has gained more attention in Asia in recent years. This is notable from conference agendas, national and regional strategies and policies, international initiatives and new cooperation projects across the region. The Environmentally Sustainable Transport (EST) Forums have been a notable driving force of this growing momentum.

**5<sup>th</sup> EST Forum, Bangkok, 2010:** Participating countries agreed on the 'Bangkok Declaration for 2020'. The declaration includes 20 sustainable transport goals and relevant indicators. The Forum agreed on the following for Goal 12, concerning freight transport: to 'achieve improved freight transport efficiency, including road, rail, air, and water, through policies, programs, and projects that modernize the freight vehicle technology, implement fleet control and management systems, and support better logistics and supply chain management'.

**6<sup>th</sup> EST Forum, Delhi, 2011:** The Chair concluded that green freight should become more prominent on Asia's policy agenda. In this forum, Green Freight Asia Network members announced the 'Private Sector Declaration on Green Freight in Asia towards

a Green Economy', acknowledging private sector responsibilities and lending support to governments for green freight initiatives and programmes that reduce fuel dependency and air pollutant and CO<sub>2</sub> emissions while maintaining economic growth.<sup>2</sup>

**7<sup>th</sup> Regional EST Forum, Bali, 2013:** Recommended core elements to be considered as part of a possible regional agreement, including but not limited to:

- a) Green freight programmes at the national or sub-regional level.
- b) A set of plans and policies for socially inclusive green freight.
- c) A standard set of indicators for green freight.
- d) A regional collaboration framework on green freight.

This forum led to the adoption of the 'Bali Declaration on Vision Three Zeros – Zero Congestion, Zero Pollution, and Zero Accidents towards Next Generation Transport Systems in Asia'.

**8<sup>th</sup> Regional EST Forum, Colombo, 2014:** Adopted the Colombo Declaration for Sustainable Transport, which reaffirmed the countries' determination towards further progress on environmentally sustainable transport in Asia.

**9<sup>th</sup> Regional EST Forum, Kathmandu, 2015:** The Chair's summary highlighted green freight's potential to cut CO<sub>2</sub> emissions and the need to dedicate funding and political attention to freight infrastructure and services in both rural and urban areas.

Aside from the EST process, further recent examples of green freight initiatives globally and in the region include:

#### **Global**

The United Nations Secretary-General's **High Level Advisory Group on Sustainable Transport** concluded its work in October 2016 with a report titled 'Mobilising Sustainable Transport for Development', and the UN's first **Global Sustainable Transport Conference** took place in November 2016 in Ashgabat, Turkmenistan. Both the report and conference acknowledged the importance of the sector's sustainability by addressing both passenger and freight transport in a balanced manner.

At the 14th Session of the United Nations Conference on Trade and Development (**UNCTAD 14**) in July 2016, a Ministerial Round Table on 'Sustainable Transportation for Agenda 2030' discussed the idea of a common International Framework for Sustainable Freight to ensure effective implementation of the 2030 Agenda and the Paris Agreement. UNCTAD increasingly mainstreams sustainability into its work on transport and logistics and has launched a technical assistance program to build capacities of developing countries to shift towards sustainable freight transport (including **a web portal**).

The **Global Green Freight Action Plan** initiated by the Climate and Clean Air Coalition in 2015 seeks to align and enhance existing green freight efforts, to develop and support green freight programmes globally and nationally, and to incorporate black carbon reductions into them. The plan has been endorsed by a large number of stakeholders from government, the private sector, civil society and international organisations. So far, the governments of Bangladesh, Japan, the Philippines, the Republic of Korea and Vietnam have also endorsed the plan.

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**2 Green Freight Asia** continues to provide a recognition scheme for companies in Asia taking green freight action and also engages in basic training activities.

## Regional

Strengthening regional transport connectivity is high on the policy agenda, in particular for states with unique needs, such as least developed countries, landlocked developing countries and small island developing states. Therefore, the UN Economic and Social Commission for Asia and the Pacific (UNESCAP) Transport Ministers Conference adopted a '**Regional Action Programme for Sustainable Transport Connectivity in Asia and the Pacific**' in December 2016 that aims to enhance regional and inter-regional intermodal transport corridors, including rail and maritime transport connectivity and logistics.

ASEAN's **Kuala Lumpur Transport Strategic Plan 2016-2025** calls for a regional framework towards green and efficient freight and logistics to support ASEAN Member States in implementing their respective policies. This framework is to consist of a database, a strategy, sharing of best practices, guidance and further promotion measures. ASEAN countries develop these elements in partnership with ASEAN-German<sup>3</sup> and ASEAN-Japan technical cooperation projects.

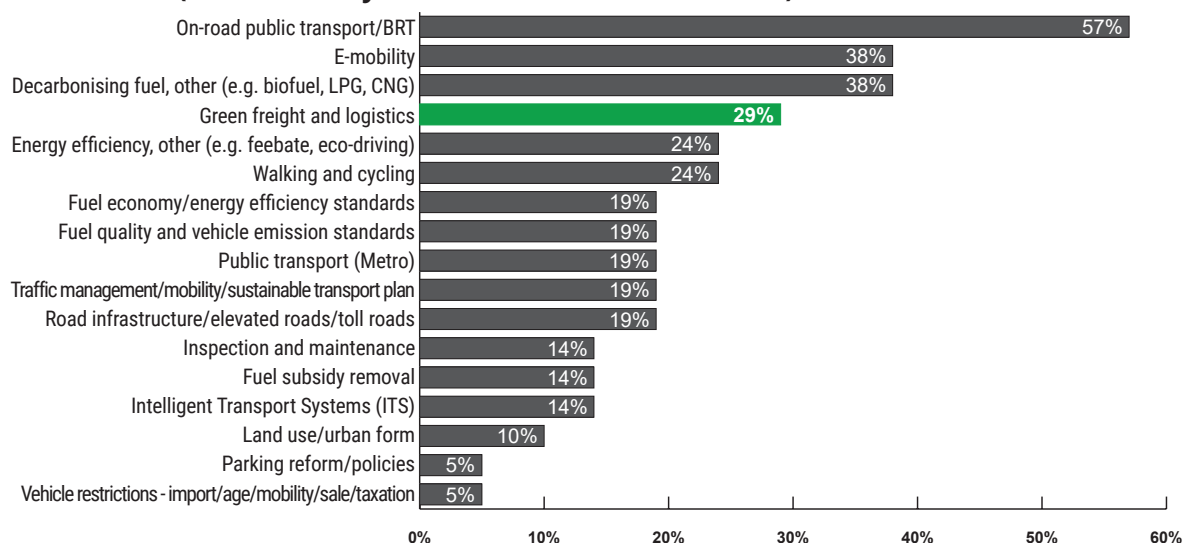
The **GMS Green Freight Initiative 2012-2016** of the Asian Development Bank's (ADB) Greater Mekong Subregion Core Environment Program pilot tested the fuel savings potential of various green freight interventions (i.e. eco-driving, aerodynamic equipment, the use of GPS, tyre pressure monitoring and logistics solutions to reduce empty backhauls) and identified SME financing models to upgrade green freight fleets.

At a regional conference on '**Green Freight in Southeast Asia**' co-organised by GIZ and ADB in June 2016 in Bangkok, delegates discussed the development of regional and national agendas for scaling up green freight approaches. At this event, GIZ also launched the EU-funded project **Sustainable Freight Transport and Logistics in the GMS Region** to provide capacity building to SME freight operators. In addition, the Asia Better Air Quality Forums in 2014 and 2016 included 'Green Freight Day' workshops.

## National

Compared to passenger transport, freight is underrepresented in the climate mitigation plans of Asian countries. Green freight measures feature in only 29% of the **Nationally Determined Contributions (NDCs)** put forth by EST countries under the 2015 Paris Agreement (Figure 4). In half of these cases, mode shift from road to rail or maritime is prioritised.

**Figure 4: Share of NDCs from Asia EST States with Green Freight and Other Transport Measures (authors' analysis based on data from SLoCat<sup>4</sup>)**



**3** In particular, the project 'Energy Efficiency and Climate Change Mitigation in the Land Transport in the ASEAN Region', implemented by GIZ with the ASEAN Secretariat.

**4** Partnership on Sustainable, Low Carbon Transport.

A review of strategies and case studies in Asian countries (Table 4) shows that at present, emphasis has been placed on road network improvement with some isolated projects and some dedicated programmes on railway and waterway development. A few countries have also established infrastructure targets for railways and waterways. Further, to manage freight movement, many countries have imposed restrictions (e.g. travel time, size or weight) and are carrying out enforcement to manage truck movement and to reduce congestion.

Efforts to support freight efficiency through an explicit national strategy are visible in many Asian countries, extending beyond freight transport policies.<sup>5</sup> Sustainable development or green concerns are in most cases not sufficiently addressed in these strategies, and are covered only through high-level statements or isolated actions. Promoting multimodal transport nevertheless appears to be a common concern (as is balanced public-private cooperation).

**Table 4: Case Studies of Green Freight Policies and Measures in Asia (authors' review)**

	Bangladesh	Central Asia	Re. of China	India	Indonesia	Japan	Lao PDR	Malaysia	Nepal	Pakistan	Philippines	Singapore	Sri Lanka	Thailand	Vietnam
Infrastructure															
Traffic management															
Vehicle size/weight restrictions															
Eco-driving training															
Inspection & maintenance															
Alternative fuels/vehicles															
Land use:															
a) Enhanced building codes															
b) Truck stops/parking outside metropolitan areas															
c) Relocation of large traffic generators															
Emission standard (EURO IV+)															
Low emission zones															
Congestion charging															
Anti-idling programmes															
Removing diesel subsidy															
Freight online exchanges															
Truck fuel economy standard															
Sustainable urban freight policy/plan															
Freight operators certification programme															
Developing green freight programmes															
Aerodynamic, telematics and tyre technology															

<sup>5</sup> Examples include Malaysia's Logistics and Trade Facilitation Master Plan (2015), Indonesia's National Logistics Blueprint (2013) and the Philippines' Logistics Master Plan (to be launched in 2017).



More comprehensive and ambitious policy initiatives are required in all countries to fill the multiple policy gaps and thereby deliver tangible and transformational change that can support achievement of the SDGs. Today, green or sustainable freight and logistics is still more rhetoric than reality.

## 7. The Way Forward for Green Freight in Asia

In most Asian countries, large amounts of freight and logistics infrastructure have yet to be built. Thus, there exist several untapped opportunities to reduce fuel use and emissions from presently fuel-intensive freight and logistics operations. Even with its current fragmentation, Asia's freight sector can rapidly adopt and implement green freight solutions – demonstrating that a quick shift to more efficient and environmentally benign freight is possible around in the world, including in developing countries.

As environmental concerns are often not a top policy priority for non-environment agencies in government, the substantial contributions that green freight can make towards the SDGs and other international commitments is a powerful argument that should be used to motivate policy-makers to take action. The paradigm shift that is required for environmentally sustainable freight transport development can be initiated only with **strong political will and commitment** across government.

Any such change process requires the establishment of a business-enabling environment built on well-functioning institutions, comprehensive laws and regulations, good practices and proper enforcement (World Bank/IRU, 2016). Addressing institutional issues is an important prerequisite, as neglect for freight issues stems in large part from a lack of dedicated institutions and insufficient coordination across the range of relevant agencies and organisations.

It is important to note that emerging markets in Asia do not have to follow the same logistics development pathways as western countries. They can learn from the experiences of other nations and try to integrate the three dimensions of sustainable development into their freight and logistics planning at an earlier stage. In addition to political will, knowledge exchange, technical and financial assistance will be vital to avoid long term logistical 'lock-in' to road transport and to optimise the comparative advantages of each mode of transport and enhance multimodal connectivity (McKinnon, 2016). At the same time, governments must improve the enabling environment for greening road transport (as the predominant and most polluting freight mode) while carefully considering the socio-economic situation of transport SMEs. For the economy and society of tomorrow, the considerable scope for information and communications technologies and intelligent transport systems (ITS) to make freight transport more efficient and smart requires more policy attention, knowledge exchange and technology adoption by logistics actors.

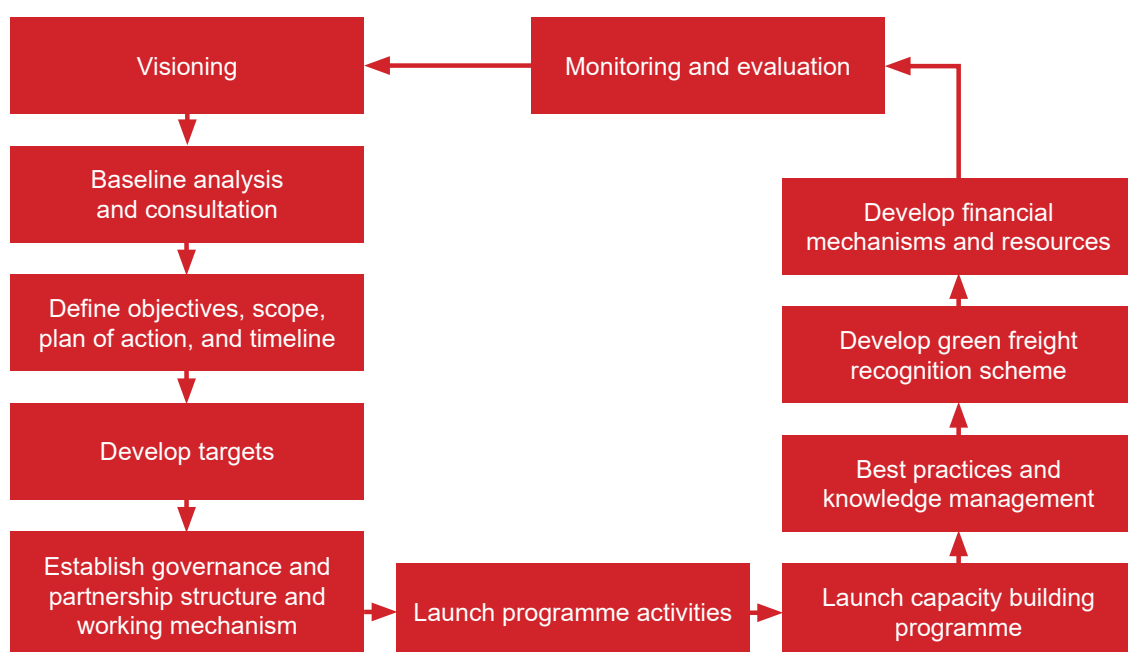
The lack of freight actions planned in countries' **NDCs** suggests the need to improve governments' understanding of the freight sector's emission reduction potentials and related co-benefits. This will help countries in increasing freight transport mitigation actions in successive iterations of NDCs and can boost national policy-makers' understanding of the contribution of transport mitigation actions to achieving the SDGs (GIZ, 2016). However, proper planning of actions needs to be based on a better collection of freight transport statistics, which is poor in many developing countries.

Freight movement goes beyond borders and transport markets are increasingly integrated at the regional level. As a result, standards and approaches have to be harmonised across countries, making regional cooperation a must. With global and regional processes already providing momentum for action on green freight, a logical next step at the regional level

could be to develop a **Regional Agreement on Green Freight** to collectively address freight issues under the framework of the Regional EST Forum in Asia. A draft for such agreement has been discussed in the EST process in previous years, yet would require renewed initiative to move forward.

Such a regional agreement can give impetus to the development of a coherent set of **Green Freight Programmes** at the urban, national and/or regional levels, providing an overarching framework for plans, policies, and regulations relevant to green freight. While several countries are taking the lead in pursuing green freight strategies, there is a remaining need for scaling-up and comprehensive action. New and expanded programmes need to be developed in consultation with all freight sector stakeholders (Figure 5).

**Figure 5: Development of a Green Freight Programme (authors' illustration)**



It is important to develop a **programmatic framework that builds on existing efforts and platforms**. Many countries have already-established relevant national targets for sectors and topics including transport, energy efficiency, logistics cost reductions (as a share of GDP) and air pollution reduction. These can be used as a basis for developing and implementing green freight programmes. This programmatic approach will only work if it is supported by different stakeholders, especially carriers, shippers, logistics providers and the government. Inspiration can be drawn from existing global efforts, such as the Green Freight Asia Network, China Green Freight Initiative, SmartWay in the U.S. and Canada, and Lean and Green in Europe.

City and sub-regional level actions for the freight sector can only be successful and sustained if an **integrated policy** is in place nationally. There is no single green freight policy mix for all countries and regions. There is a need to reconcile circumstances of a country's geography, economic development, industrial structure, transport infrastructure, labour force and degree of urbanisation with a suitable menu of green freight options developed based on local priorities.

A critical factor in mainstreaming green freight practices is access to and the **exchange of information**, expertise, success stories, good case studies and best practices. The freight sector's slow adoption of energy efficiency technologies and practices is a case of market failure arising from high initial costs, low awareness and the lack of dedicated policy support. **Financing mechanisms** must therefore be part of green freight programme design. With appropriate incentives, it will be easier to overcome these challenges and realise rapid penetration of fuel and emissions reducing technologies and logistics solutions.

There is a need to carry out further **pilot projects and demonstration studies** to understand investment potential, impact, strengths and barriers for implementation of new technologies and innovative measures. Though these experiments concern only a minor fraction of freight flows through a corridor or city or country, they may not only be very effective in convincing political leaders and policy-makers of possibilities, but also in changing the behaviour of consumers and the private sector, generating a snowball effect.

It is important to support policies and actions with a regional or national **recognition scheme** to drive innovation along the supply chain. The recognition schemes could be developed in the form of labelling schemes or awards. As companies evolve and improve their performance, they get a higher score. Similarly, innovative policies, actions and projects could be awarded to provide recognition to cities and stakeholders.

Finally, an integral component of any green freight programme is diligent **monitoring and evaluation** using standardised and trackable indicators. With the many practical challenges facing green freight initiatives, it is likely programmes will encounter unexpected difficulties requiring changes to planned activities or approaches. Any resulting course correction can be carried out while scaling up operations, helping to consolidate the programme's accomplishments and ensure timely progress towards programme objectives.

The drive to improve the environmental performance of the freight transport sector is largely motivated by regulations. Governments must therefore take the lead. Not seizing the opportunities provided by global and regional processes may lock-in freight along an unsustainable trajectory, making necessary future course correction all the more difficult and costly.

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## Annex: List of GIZ Publications on Green Freight

Title	Regional/Country Focus	Year	Link
Urban Freight and Logistics: A case study of practices in India	India	2016	<a href="#">download</a>
Report from ADB-GIZ "Regional Green Freight and Logistics in Southeast Asia Workshop"	South-East Asia	2016	<a href="#">download</a>
"Sustainable Logistics" An Introduction to the concept and case studies from Germany	Germany	2015	<a href="#">download</a>
GHG Mitigation Potential of European Rolling Resistance Labelling and Phase-out scheme for HDV truck tyres	Europe	2015	<a href="#">download</a>
GHG Mitigation Potential of a Green Tyre Programme for Road Freight in China	China	2015	<a href="#">download</a>
Green Freight India, Fuel and Emissions Saving Methodology	India	2015	<a href="#">download</a>
Urban Logistics (Factsheet)	Global	2014	<a href="#">download</a>
Freight Master Planning (Factsheet)	Global	2014	<a href="#">download</a>
Freight Vehicle Policy (Factsheet)	Global	2014	<a href="#">download</a>
Green Freight and Logistics: GIZ expertise and experience	Global	2014	<a href="#">download</a>
Proceedings of the ADB-GIZ Regional Green Freight and Logistics in Asia Workshop	Asia	2014	<a href="#">download</a>
Case Study Colombia	Colombia	2014	<a href="#">download</a>
Unilateral NAMA: Sustainable road-based freight transport Colombia	Colombia	2014	<a href="#">download</a>
Mexico International Freight Study – Research into GHG Mitigation Measures in the Smaller Freight Carrier Sector	Mexico	2013	<a href="#">download</a>
Sustainable Urban Freight in Asian Cities	Asia	2013	<a href="#">download</a>
Fuel efficiency and emissions of trucks in Germany – An overview	Germany	2012	<a href="#">download</a>
SUTP Module 1g - Urban Freight in Developing Cities	Global	2010	<a href="#">download</a>
SUTP Module 4f - Eco-Driving	Global	2005	<a href="#">download</a>