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# Sustainable freight transport systems: Opportunities for developing countries

## Note by the UNCTAD secretariat

*Executive Summary*

The year 2015 is a decisive year for global sustainable development which will set the path for a new post-2015 sustainable development agenda and likely see the adoption of a new climate change agreement at the twenty-first session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP21). Freight transport is, thus, at a critical juncture at which its role in achieving sustainable development objectives can be further defined and better understood. In this context, the year 2015 provides an unprecedented opportunity for the freight transport sector to (a) assert its strategic importance as an economic sector that generates employment and revenue, enables trade, supports supply chains, and links communities, and (b) underscore its potential to also generate value in terms of economic viability, social equity, resource conservation and environmental protection.

The present document highlights the potential for freight transport to emerge as an important sector that adheres to sustainable development principles and promotes people, prosperity, environment and sustainable partnerships. Some relevant issues that currently undermine the sustainability of freight transport are highlighted, together with selected examples of approaches and instruments used to implement sustainable practices in the sector. Some relevant national/regional experiences and industry-led initiatives are set out for the purpose of illustration and to help identify relevant best practices and lessons learned. Furthermore, the document considers the financial implications of implementing sustainable freight transport systems and explores potential new sources of finance and the role of the private sector, notably through public–private partnerships (PPPs) and other innovative procurement and financing schemes. The overall objective is to inform the deliberations at the expert meeting and stimulate discussions to generate insight and formulate conclusions for the way forward, within the context in particular of the post-2015 sustainable development agenda and the UNFCCC COP21.

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# I. Introduction

1. The year 2015 is a decisive year for global sustainable development which will set the path for a new post-2015 sustainable development agenda and likely see the adoption a new climate change agreement at the UNFCCC COP21.[1] Freight transport is, thus, at a critical juncture at which its role in achieving sustainable development objectives can be further defined and better understood. Freight transport underpins trade and its competitiveness and is essential for access, connectivity and economic integration at the national, regional and global levels. However, there is an untapped potential in the sector, as more value can be derived from freight transport by reducing its oil dependency and enhancing its ability to provide access while being reliable, efficient and resilient, as well as by mitigating its negative impacts on the environment and climate. In this context, the year 2015 provides an unprecedented opportunity for the freight transport sector to (a) assert its strategic importance as an economic sector that generates employment and revenue, enables trade, supports supply chains, and links communities, and (b) underscore its potential to also generate value in terms of economic viability, social equity, resource conservation and environmental protection.

2. Implementation of the post-2015 development agenda, including the new sustainable development goals (SDGs), will be further supported by the agreed outcomes and decisions formulated at other relevant international processes, including, the third International Conference on Small Island Developing States, the Vienna Programme of Action for Landlocked Developing Countries for the Decade 2014–2024, the third World Conference on Disaster Risk Reduction, the third International Conference on Financing For Development, the UNFCCCC COP21, the tenth Ministerial Conference of the World Trade Organization, as well as the fourteenth session of the United Nations Conference on Trade and Development (UNCTAD XIV), the quadrennial ministerial meeting to be held in Lima in March 2016.

3. Sustainable transport has long been recognized as a key development objective at various global forums, including the 1992 Earth Summit, the United Nations Conference on Sustainable Development (RIO+20), UNCTAD XIII, and, more recently, by the United Nations General Assembly resolution on the "Role of transport and transit corridors in ensuring international cooperation, stability and sustainable development" (A/RES/69/213).[2] In addition to recognizing the importance of sustainability in transport, a United Nations Secretary-General High-level Advisory Group on Sustainable Transport has been established to provide recommendations on sustainable transport that are actionable at global, national and local as well as at sector levels. The High-level Advisory Group will publish a report on the global transport outlook and convene the first international conference on sustainable development in 2016.[3]

[1] The UNFCCC COP21, which will take place in Paris in December 2015, has an objective to further increase international ambition on climate change issues before 2020, and to support the post-2020 implementation of a binding global agreement. It intends to contribute to closing the gap between climate change mitigation action committed or currently underway, and what science says is needed to limit global average temperature rise by less than 2°C above pre-industrial levels, as well as leading to greater action to strengthen resilience to the effects of climate change.

[2] The resolution is available at http://www.un.org/en/ga/second/69/proposalstatus.shtml (accessed 28 July 2015).

[3] See https://sustainabledevelopment.un.org/topics/sustainabletransport/highleveladvisorygroup (accessed 29 July 2015).

4. Against this background, the present document highlights the potential for freight transport to emerge as an important sector that integrates sustainable development principles and promotes people, prosperity, environment and sustainable partnerships.[4] Relevant issues currently undermining the sustainability of freight transport are highlighted together with selected examples of approaches and instruments used to implement sustainable practices. Examples of national/regional experiences and industry-led initiatives are set out for illustration purposes and to help identify best practices and lessons learned. Furthermore, the document considers the financial implications of implementing sustainable freight transport systems and explores potential new sources of finance and the role of the private sector, notably through PPPs and other innovative procurement and financing schemes. The objective is to inform the deliberations at the expert meeting and stimulate discussions to generate insight and formulate conclusions for the way forward in view of the SDGs and the UNFCCC COP21.

# II. Sustainable freight transport: A prerequisite for sustainable development

5. Existing definitions of sustainable transport may vary and promote one particular dimension such as the environment (green transport), society (inclusive transport) or the economic dimension (efficient and competitive transport). Generally however, sustainable freight transport aims to balance the economic, social and environmental dimensions of the sector in an integrated manner to ensure synergies, complementarities and coherence. While not intended as an exhaustive list, sustainable freight systems entail, among other features, the ability to provide transportation that is safe, socially inclusive, accessible, reliable, affordable, fuel-efficient, environmentally friendly, low-carbon, and resilient to shocks and disruptions, including those caused by climate change and natural disasters. Figure 1 illustrates the intersection between the economic, social and environmental dimensions of sustainable development as applicable to freight transport.

Figure 1
**The three pillars of sustainable freight transport**


*Source:* UNCTAD secretariat.

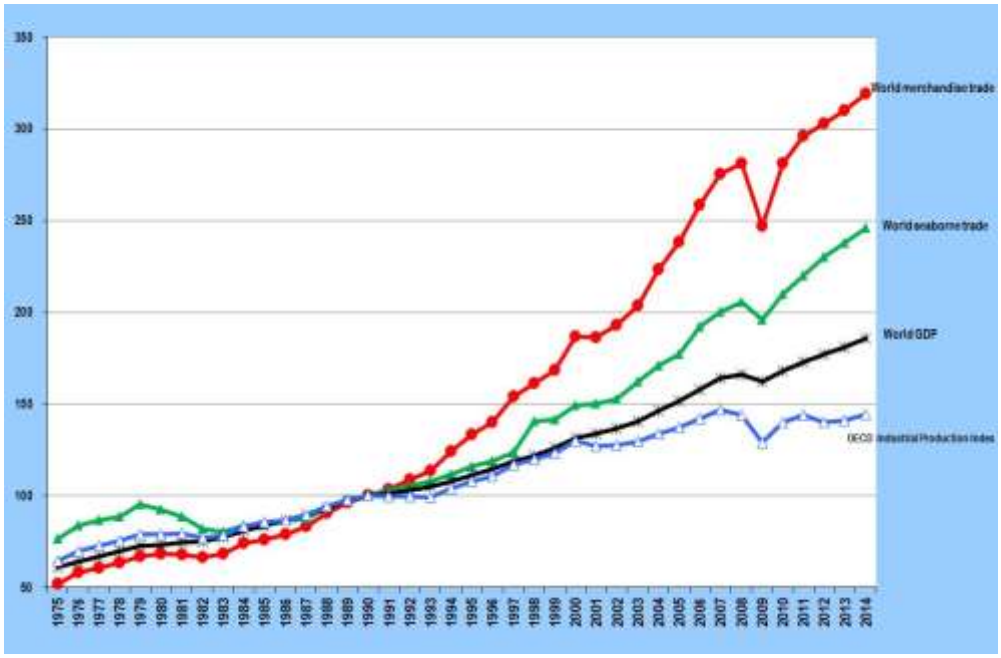
[4] United Nations, 2014, The road to dignity by 2030: Ending poverty, transforming all lives and protecting the planet. Synthesis report of the Secretary-General on the post-2015 agenda (4 December).

## A. Current trends in freight transport volumes

6. Freight transport grows in tandem with the growing world population, consumption needs, industrial activity, urbanization, trade, and economic growth. The close statistical association between gross domestic product (GDP), industrial production and trade has long been established,[5] as illustrated by figure 2 below.

Figure 2

**The Organization for Economic Cooperation and Development (OECD) Industrial Production Index and indices for the world: GDP, merchandise trade and seaborne shipments (1975–2014) (1990 = 100)**




*Source:* UNCTAD *Review of Maritime Transport 2015* (forthcoming).

7. Despite the slow-moving recovery in world merchandise trade since the big recession, trade flows continue to expand with projected growth set to accelerate in the coming years.[6] In tandem, trade-related international freight is expected to grow by a factor of 4.3 by 2050 (compared with 2010),[7] with patterns also shifting – one third of trade in 2050 will occur among developing economies (compared to 15 per cent in 2010).[8]

8. Led by growth in Asia, in particular China and India, road and rail freight volumes are expected to increase by 230 per cent and 420 per cent, respectively, by 2050 (compared with 2010), depending on freight intensity of GDP growth.[9] The share of road freight in international freight tonnage is expected to increase by 40 per cent by 2050.[10] Meanwhile, and accounting for over 80 per cent of world merchandise trade, sea freight volumes are

[5] OECD/International Transport Forum (ITF), 2015, *ITF Transport Outlook 2015* (Paris).
[6] UNCTAD, 2015, *Trade and Development Report, 2015* (New York and Geneva, United Nations publication) (forthcoming).
[7] OECD/ITF, 2015, *ITF Transport Outlook 2015* (Paris).
[8] Ibid.
[9] Ibid.
[10] Ibid.

estimated at 9.8 billion tons in 2014, an increase of 3.4 per cent over 2013.[11] Reflecting the shift in economic influence eastward and to the south, developing countries are contributing larger shares to world GDP and trade, and have emerged as major importers and exporters over recent years. In 2014, a total of 61 per cent and 60 per cent of global cargo were, respectively, loaded and unloaded in developing countries' ports.[12]

9. Growth patterns were supported by globalization and the fragmentation of international production processes, with supply chains and transportation networks linking regions and economic centres spread over long distances. Globalization, consumer empowerment and changing requirements affect transport freight patterns. They often result in frequent and small shipments leading to less than full containers, empty returns and increased demand for rapid energy-intensive transportation.[13] This affects load factors, space utilization, scheduling, packaging, handling systems, investment in infrastructure capacity and land use, as well as fuel consumption and air emissions including pollutants and greenhouse gases (GHGs).[14] A case in point is the impact on fuel consumption. Supply chain strategies that favour "just-in-time" delivery systems involve about twice the transport fuel use of "efficient non-just-in-time logistics".[15] Thus, the global freight transport sector is not yet on a sustainable path in several aspects. The sector is a major oil consumer and emitter of pollutants and GHGs, a trend which, if left unchecked, can be expected to increase (see figure 3).

## B. Current and future trends in energy consumption and air emissions

10. In 2012, the transport sector accounted for nearly 64 per cent of final global oil consumption[16] and is projected to account for 82 per cent of the increase in global liquid fossil fuel consumption over the 2008–2035 period.[17] Global energy demand is set to rise by 70 per cent from 2010 to 2040, driven by commercial transportation, across all modes.[18]

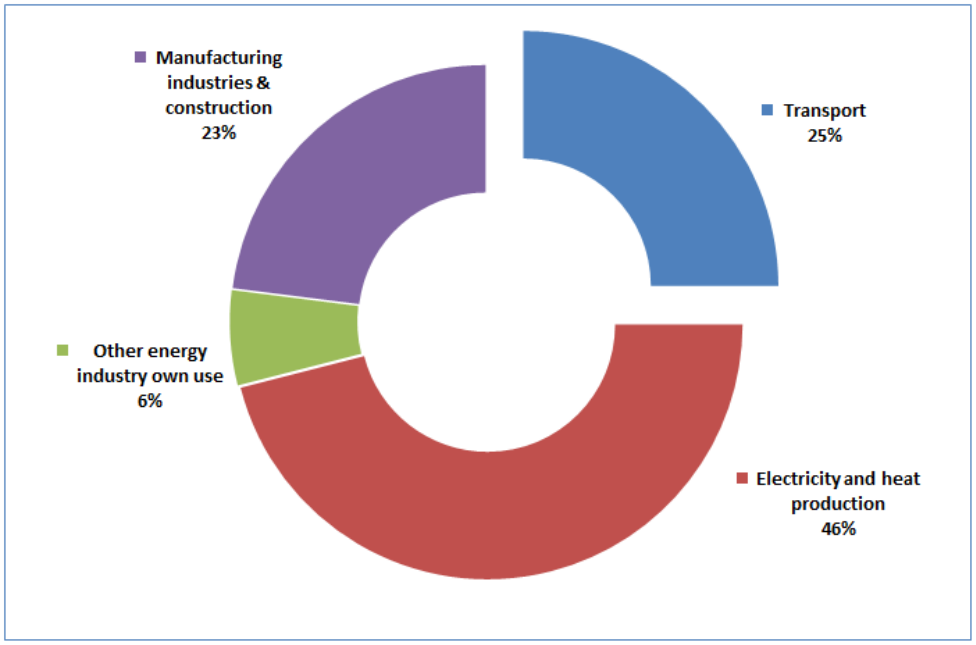
11. The sector's heavy reliance on oil for propulsion translates into significant air emissions of pollutants and GHGs. In 2012, the transport sector accounted for about 25 per cent of global carbon dioxide ($CO_2$) emissions from fuel combustion.[19] These are expected to increase by 1.7 per cent a year by 2030 with over 80 per cent of growth expected to occur in developing countries and with most of the emissions being generated by land transport.[20]

12. Overall $CO_2$ emissions from trade-related international freight are expected to increase by a factor of 3.9 between 2010 and 2050.[21] Emissions of $CO_2$ from road and rail transport are projected to increase by 240 per cent and 600 per cent, respectively, by 2050, depending on the composition of production, among other factors.[22] Meanwhile, $CO_2$ emissions from international shipping were estimated at 2.2 per cent in 2012 and projected

[11] UNCTAD, *Review of Maritime Transport 2015* (New York and Geneva, United Nations publication) (forthcoming).
[12] Ibid.
[13] K. Ruamsook and E. Thomchick, 2012, Sustainable freight transportation: A review of strategies. Fifty-third annual conference of the Transportation Research Forum, Tampa, Florida.
[14] Ibid.
[15] Ibid.
[16] OECD/International Energy Agency (IEA), 2014, *Key World Energy Statistics 2014* (Paris).
[17] See UNCTAD *Review of Maritime Transport 2012*, chapter 6.
[18] Ibid.
[19] OECD/IEA, 2014, *$CO_2$ Emissions from Fuel Combustion Highlights 2014* (Paris).
[20] See UNCTAD *Review of Maritime Transport 2012*, chapter 6.
[21] OECD/ITF, 2015, *ITF Transport Outlook 2015* (Paris).
[22] Ibid.

to increase by 50–250 per cent by to 2050, depending on economic growth and global energy demand.[23] As to air transport, the entire sector accounts for 2 per cent of global carbon emissions, with demand for jet fuel projected to grow by about 75 per cent by 2050.[24]

Figure 3
**World CO2 emissions from fuel combustion by sector, 2011**




*Source:* OECD/IEA (2014) *CO2 Emissions from Fuel Combustion Highlights 2014*.

## C. Selected issues challenging the sustainability of freight transport

13. As stated previously, although challenges to sustainability in freight transport span a broad range of issues, the following section will focus on the strong nexus between energy, air emissions and GHGs as well as on the persistent transport infrastructure gap and investment needs and related implications for access and connectivity. Other key sustainability issues, including labour conditions, health, noise, safety, and climate impacts, adaptation and resilience[25] also remain, however, critical to the sustainability and resilience debate in freight transport.

[23] International Maritime Organization (IMO), 2014, *Third IMO Greenhouse Gas Study 2014*. Executive summary and main report (London).

[24] Figures published in UNCTAD *Review of Maritime Transport 2012*, chapter 6, based on the fourth assessment report of the Intergovernmental Panel on Climate Change, 2007, *Climate Change 2007 Synthesis Report* (New York and Geneva, United Nations publication).

[25] For additional information about the science of climate change, the impacts of climate change on transport, including coastal transport infrastructure, see, for example, relevant documentation about UNCTAD work carried out in the field, available at http://unctad.org/en/Pages/DTL/TTL/Legal/Climate-Change-and-Maritime-Transport.aspx (accessed 29 July 2015).

### 1. Energy and transport costs

14. Freight transport relies heavily on oil for propulsion and is not yet in a position to fully switch to other cleaner alternative energy sources. This enhances the exposure of freight rates and transport costs to oil price volatility and surges in prices in particular. Although the mid-2014 drop in oil and bunker fuel prices may be a welcome development, the effect is likely to be short-lived given the projected growth in global energy demand and the risk of rapid cuts in oil production due to reduced investment in the oil extractive and refining industries.[26]

15. As developing countries are already facing disproportionately higher transport costs,[27] the negative implications of volatile oil and fuel costs for their sustainable development can be significant, as is the need to address the long-term implications of an overdependence on oil.[28]

16. Countries in the Pacific region, for example, are very dependent on imported fossil fuels where transport, mainly by sea, accounts for about 70 per cent of total fuel consumed.[29] Consequently, maritime transport becomes commercially unaffordable and unsustainable, and governments are often required to subsidize or service certain coastal shipping routes to maintain domestic and inter-island transport connectivity.[30]

### 2. Energy, environment and carbon emissions

17. The discussion on energy, transport and sustainability is linked to the current debate on addressing sustainable development imperatives and climate change. The negative environmental impact of oil consumption, including air pollution and GHG emissions, is a major concern. In this context, locking in fossil fuels and related technologies in freight transport systems will perpetuate unsustainable transport patterns and undermine efforts to maintain carbon emissions at manageable levels. According to IEA, a peak in global energy-related emissions needs to be reached by 2020 to ensure manageable global warming levels. To achieve this objective, the strategy proposed by IEA includes enhancing energy efficiency in the transport sector.[31]

18. Freight transport and related GHG emissions are at the centre stage of the current climate change debate, including under the UNFCCC and IMO frameworks. More specifically, international shipping is under greater pressure to be regulated by an international binding legal instrument. In 2011, IMO adopted a set of technical and operational measures under the mandated Energy Efficiency Design Index and the Ship Energy Efficiency Management Plan.[32] The international community is also considering the

[26] See UNCTAD *Review of Maritime Transport 2015* (United Nations publication, New York and Geneva) (forthcoming).

[27] UNCTAD estimates that in 2013, the average freight cost as a share of imports value was estimated at close to 7 per cent for developed economies, 10 per cent for developing economies and 8 per cent for the world average.

[28] See in particular, UNCTAD, 2010, Oil prices and maritime freight rates: An empirical investigation, technical report, UNCTAD/DTL/TLB/2009/2.

[29] A Newell, P Nuttall, E Holland, J Veitayaki and B Prasad, 2014, Turning the tide: The need for sustainable sea transport in the Pacific. Sustainable Sea Transport Research Programme, University of the South Pacific, Fiji.

[30] See UNCTAD, 2014, *Closing the Distance: Partnerships for Sustainable and Resilient Transport Systems in SIDS*, (New York and Geneva, United Nations publication), available at http://unctad.org/en/PublicationsLibrary/dtltlb2014d2_en.pdf (accessed 30 July 2015).

[31] OECD/IEA, 2015, *World Energy Outlook Special Report 2015. Energy and Climate Change* (Paris).

[32] See UNCTAD, 2012, *Review of Maritime Transport 2012*, chapter 5.

potential for using market-based instruments to further regulate GHG emissions from international shipping.

### 3. Access, connectivity and infrastructure

19. By underpinning global supply chains and linking consumers and producers, importers and exporters, efficient freight transport infrastructure and logistics are also supporting trade and market access at the national, regional and global levels and have positive impacts on economic growth. However, inadequate and poor conditions of transport infrastructure and services, including poor accessibility to rural areas, undermine the role of transport as an engine of trade growth, global integration and sustainable development for many developing countries.

20. Indeed, supply chain logistical bottlenecks and insufficient investment in the infrastructure has been repeatedly identified as a key challenge, including by experts at relevant UNCTAD meetings. The persistent transport infrastructure gap is raising costs, reducing access and undermining effective participation in regional global supply chains and transport networks. Today's global infrastructure demand is estimated at approximately US$4 trillion in annual expenditure, with a gap – or missed opportunity – of at least US$1 trillion every year.[33]

21. The public sector has traditionally played a key role in developing transport infrastructure. However, for many developing countries public financing for transport infrastructure faces a number of challenges, including competition with other high-priority areas for public funds such as health care, education and debt service, tight national budgets and limited ability of governments to borrow domestically and/or internationally. In Latin America and the Caribbean region, for example, investment needs required annually to meet infrastructure demands in the period 2012–2020 are estimated at 6.2 per cent of GDP, or some US$320 billion.[34]

22. In this context and bearing in mind the perspective of developing countries, ensuring appropriate transport policies and investment strategies (see section below on finance) to address prevailing physical and non-physical barriers such as in respect of infrastructure issues (for example, insufficiency, inadequacy, congestion, and maintenance requirements), missing links and interoperability of systems (for example, equipment, vehicles, technologies and standards) is key.

## D. Building the sustainability of freight transport

23. For developing countries, promoting sustainable freight transport systems provides an opportunity to work towards reducing their heavy reliance on oil and minimize the negative environmental externalities of freight activities while, at the same time, addressing the transport infrastructure needs and capacity requirements. Not seizing this opportunity may lead to increased future costs, including in terms of retrofitting existing infrastructure and equipment, shifting to new technologies and changing operating practices, given the long life cycles of transport infrastructure that can lock in unsustainable patterns. Timely action is therefore needed, with sustainability and resilience criteria to be integrated into

[33] World Economic Forum, 2013, *Strategic Infrastructure Steps to Prepare and Accelerate Public–Private Partnership* (Geneva).

[34] Economic Commission for Latin America and the Caribbean, 2014, *Fuente: Base de datos de inversiones en infraestructura económica en América Latina y el Caribe*, 1980–2012, and *Bolet ín FAL* N° 332.

broader transport development plans at the early stages of the relevant decision-making and investment processes.

24. Several governments and industry players have mainstreamed sustainability criteria into relevant planning processes, policies, and investment strategies. Salient measures can be associated with three approaches described as the "avoid–shift–improve approach",[35] which entails (a) avoiding inefficient freight transport and operations such as empty trips; (b) shifting to cleaner modes of transport such as rail and water transport where possible as well as to cleaner fuel sources and technologies and to appropriate vehicle sizes, loads and routes; and (c) improving infrastructure, logistics, and operations.

25. Strategic policies (for example, transport policy, energy efficiency, air quality), fiscal and economic instruments (for example, investment, taxation, pricing, and grants), legislative and regulatory measures, and other means including information-sharing and best practices can be relied upon to enable greater sustainability in freight transport (see table 1).

Table 1
**Examples of relevant sustainability-motivated intervention measures and actions**

| *Type of intervention measures and actions* | *Example of measures and actions* |
|---|---|
| Technology and innovation | - Intelligent transportation systems;<br>- Intelligent logistics solutions (e.g. optimization of e-freight initiatives);<br>- Electronic devices for monitoring engines;<br>- Computers to measure fuel efficiency;<br>- Computerized routing and scheduling;<br>- Software with GPS;<br>- Software to alert drivers to the most cost-effective fuelling locations;<br>- Devices that automatically switch off idling engines;<br>- Use of cleaner land-based cargo-handling equipment (such as IT-driven quay cranes and eco-friendly rubber-tyred gantry cranes). |
| Fuel-related measures | - Use cleaner fuels, cleaner-burning engines;<br>- Improve vehicle and propulsion technology;<br>- Invest in energy efficiency, wide-base tyres to increase rolling resistance, and more aerodynamic design to improve fuel efficiency;<br>- Adopt efficient routing practices, reduce idle time, and reduce speed. |
| Economic measures | Create a more optimal freight transportation market by reforming transport prices and investment practices, apply full-cost pricing, congestion pricing, carbon pricing, taxation, grants and subsidies (e.g. to speed up old engine turnover). |
| Modal shift | As applicable and feasible promote through a set of economic, regulatory and market measures a shift |

[35] The "avoid, shift and improve" approach to climate change mitigation, as introduced in H Dalkmann and C Brannigan, 2007, *Transport and Climate Change, Sourcebook Module 5e* (GTZ, Eschborn) and endorsed in the Common Policy Framework on Transport and Climate Change (Leather et al, 2009) aims to reduce GHG emissions and energy consumption and promote sustainable transport.

| *Type of intervention measures and actions* | *Example of measures and actions* |
|---|---|
| | toward less energy-intensive/carbon-intensive modes (e.g. from road to rail, short sea shipping and inland waterways). |
| Land use | Improve land use planning, change land use patterns to reduce travel distances and increase mode choice, port-centric logistics, use co- and intra-modal hubs to free land resources. |
| Strategic and operational | - Restructure the physical logistics network, locating manufacturing sites and/or warehousing facilities close to major customer concentrations and/or supply bases;<br>- Plan and organize routings and scheduling to reduce empty mileage and optimize operations;<br>- Promote links between different modes of transport to make more efficient use of existing infrastructure. |
| Regulatory | - Emissions standards;<br>- Design of vehicles and infrastructure;<br>- Speed limits;<br>- Targets for use of renewable energy sources;<br>- Targets for energy efficiency, emission and noise standards for vehicles;<br>- -Requirement for integrated transport and land use strategies;<br>- Traffic restrictions. |
| Other/soft measures | - Adoption of new packaging methods (e.g. reducing package size to the optimal size and weight for the contents, eliminate unnecessary packaging layers);<br>- Training programmes (e.g. driving techniques that maximize fuel efficiency), awareness raisings activities, enable greater access to information and communication technology. |

*Source:* UNCTAD, based on literature review (for example, Ruamsook and Thomchick, 2012[36]).

# III. Selected country and industry-led experiences

## A. Government/country-led initiatives

26. Governments can improve sustainability in freight transport and logistics through a "comprehensive and integrated approach". Subject to a considered cost–benefit analysis and assessment of trade-offs (energy efficiency gains, transport costs, speed and reliability of services), a number of integrated options can promote sustainability in freight transport.

27. An example of an integrated transport planning approach is the 2011 European Commission White Paper on Transport that defines a strategy towards competitive and

[36] K Ruamsook and E A Thomchick, 2012, Sustainable freight transportation: A review of strategies. Fifty-third Transportation Research Forum, Tampa, Florida, March.

resource-efficient transport systems and sets clear objectives and targets such as (a) optimizing the performance of multimodal logistics chains; (b) promoting more energy-efficient modes of transport at a larger scale, facilitated by efficient and environmentally friendly freight corridors; (c) instigating a 50 per cent shift in longer-distance freight journeys from road to other modes; (d) instigating a 40 per cent use of sustainable low-carbon fuels in aviation; (e) achieving at least a 40 per cent cut in shipping emissions. The objective is to achieve a 60 per cent reduction in both $CO_2$ emissions and oil dependency.[37]

28. The 2012 China Green Freight Initiative is another example. This national programme aims to improve fuel efficiency, reduce $CO_2$ and air pollutant emissions from road freight transport, and adopt cleaner technologies and smarter freight management practices.[38]

29. Indonesia has also introduced comprehensive policies to promote sustainable freight transport systems by improving fuel efficiency and reducing the transport burden on roads (which accounts for about 70 per cent of freight ton–kilometres) and related emissions. Main policies include a shift towards greener modes of transport such as rail and short sea shipping and the development of rail-based logistics in Jakarta to relieve freight traffic congestion.[39]

30. Approaches in other countries, such as in Australia and India, include dedicated freight corridors that aim to ensure efficient freight movements and shift freight traffic from roads to rails,[40] and urban logistics centres in Germany and the United Kingdom of Great Britain and Northern Ireland, which aim to promote efficient delivering and collecting of goods in town and city centres while mitigating congestion and environmental externalities. Further initiatives include rural transport and logistics networks (such as in China, India and South Africa) to improve transport infrastructure deficits in rural areas, including logistics practices.[41]

## B. Industry-led initiatives

31. The drive to improve the energy, environmental and social performance of the freight transport sector is largely motivated by regulation, including rules adopted under the auspices of IMO. Furthermore, the industry sees improvement in energy efficiency and greater technology use, including fuel technologies, as drivers of competitive advantages. A significant potential for energy efficiency exists in emerging economies, with increased efficiency being able to cut up to US$90 billion in global transport-related fuel costs by 2020 while reducing local air pollution.[42] Industry is also motivated by customers' demands for greater corporate social responsibility in global supply chains, transparency, reliability, and a lighter environmental footprint. Customers across the supply chains are increasingly expecting that freight transport providers act as strategic partners that can help them

[37] European Commission, 2011, *Roadmap to a Single European Transport Area – Towards A Competitive and Resource-Efficient Transport System*.

[38] See http://cleanairasia.org/portal/node/8335 (accessed 30 July 2015).

[39] See http://unctadxiii.org/en/Presentation/uxiii2012sdSFT_SUSANTONNEO.pdf (accessed 30 July 2015).

[40] For example, the "carbon footprint analysis" conducted by the Dedicated Freight Corridor Corporation for the Eastern corridor in India shows that moving goods by rail would be much more environment friendly despite the higher load it would have to handle. The corridor is expected to generate 2.25 times less carbon emissions when compared to a scenario where the freight is transported through existing roads network. See http://www.globalrailnews.com/2011/07/25/indias-eastern-freight-corridor-receives-975m-loan/ (accessed 30 July 2015).

[41] See UNCTAD *Review of Maritime Transport 2012*, chapter 6.

[42] IEA, 2014, *Energy Efficiency Market Report 2014* (Paris).

achieve economic benefits as well as value for both the environment and society. Box 1 illustrates relevant actions taken at the industry level.

Box 1
**Examples of voluntary self-regulation in freight transport**

- The Clean Cargo Working Group has developed tools and methodologies to help understand and manage sustainability impacts. Relevant measures include the average trade lane emissions data that can be used for a benchmarking of carriers' performance based on their carbon emissions, as well as for more informed decisions by both carriers and shippers.[43]
- The World Ports Climate Initiative under the International Association of Ports and Harbors: The 50 participating ports in the Initiative are engaged in reducing GHG emissions from their activities, including by influencing the sustainability of supply chains.[44]
- International Association of Ports and Harbors Air quality and Greenhouse Gas Tool Box and work relating to climate adaptation in ports, such as the Climate Protection Plan Development.
- The Sustainable Shipping Initiative that brings together leading companies from across the industry and around the world with the view to a sustainable future. Relevant activities include the launch of the "Case for Action" report in 2011 and efforts to promote greater uptake of sustainable shipping rating schemes to provide transparency and comparability and to enable cargo owners, charters and shipowners to integrate sustainability into commercial decisions.[45]
- Many shipping companies have been investing in and ordering eco-ships that are generally referred to as a new generation of vessels that are eco-friendly and at the same time fuel efficient.
- Charterers representing 20 per cent of global shipped tonnage are adopting policies to avoid using inefficient ships based on their GHG emissions performance.[46]
- In 2014, Maersk launched a new sustainability strategy to address sustainability challenges in a way that creates value for society and for business. The strategy, which runs from 2014 to 2018, has three focus areas: enabling trade (by improving conditions for businesses and industries to participate in global trade); energy efficiency (by enhancing $CO_2$-efficiency and promoting efficient supply chains and infrastructure); and investing in education (by investing in relevant training and education, contributing to building the skills base in growth markets).[47]
- In March 2015, six companies in the railway industry have launched the "Railsponsible" initiative focusing on sustainable procurement to

[43] Business for Social Responsibility, Clean Cargo Working Group, 2014, Global maritime tradelane emissions factor, see http://www.bsr.org/en/our-insights/report-view/global-maritime-trade-lane-emissions-factors (accessed 4 August 2014).

[44] International Association of Port and Harbors World Ports Climate Initiative; see http://wpci.iaphworldports.org (accessed 30 July 2015).

[45] Sustainable Shipping Initiative; see http://ssi2040.org/ (accessed 30 July 2015).

[46] *International Transport Journal*, 2015, Charterers to exclude inefficient vessels, 29 May.

[47] See http://www.maersk.com/en/the-maersk-group/sustainability (accessed 4 August 2015).

improve sustainability throughout the entire supply chain, through sharing best practices and processes, driving a common understanding across the industry, and using and sharing common tools to create efficiencies.[48]

- The CO-GISTICS (COoperative loGISTICS) project for sustainable mobility of goods, which aims at increasing energy efficiency by reducing fuel consumption and equivalent $CO_2$ emissions in addition to bringing additional benefits to road safety and cargo security. The project brings together key logistics stakeholders from seven European cities and intermodal hubs to deploy, validate and integrate five cooperative logistics services ($CO_2$ footprint estimation and monitoring; multimodal cargo; intelligent truck parking and delivery area management; eco-drive support; priority and speed advice).[49]
- The road transport industry has specifically and on a voluntary basis committed to improve infrastructure and use innovative technologies and practices (e.g. innovative engine and vehicle technology investments, driver training and innovative logistic concepts) to reduce $CO_2$ emissions by 30 per cent by 2030 – compared to the base year 2007 (see IRU "30-by-30" Resolution").[50]
- A number of manufacturers and retailers (e.g. Wal-Mart, Nike, Starbucks, Aveda, HP, and Apple) have implemented packaging reduction initiatives. Wal-Mart's initiative to reduce packaging has led to a saving of US$3.5 million in transportation costs.[51]
- Cooperation between shippers such as the "Empty Miles Program" that enables transport pooling; collaboration between shippers and their customers such as a realignment of customer/store-service delivery schedules; and collaboration between shippers and carriers such as the use of drop yard, allowing 24-hour delivery and/or providing a mechanism for the delivery of freight that arrives early so that dock load/unload times at shippers' facilities are reduced.[52]
- In the Netherlands, EVO, the employers' organization for logistics and transport, organizes courses and training programmes to teach drivers to drive more economically. Drivers who follow these courses can achieve fuel consumption reductions of up to 10 per cent.[53]

32. Both industry and governments are leveraging sustainability strategies in freight transport to derive economic, social and environmental gains. While sustainability-driven initiatives may result in initial adjustment costs, a sustainable development policy framework that also supports industry efforts can help further advance the sustainability

[48] See http://railsponsible.org/about-us (accessed 30 July 2015).
[49] See http://cordis.europa.eu/project/rcn/191843_en.html.
[50] International Road Transport Union, 2009, The "30-by-30" resolution.
[51] See reference Ruamsook and Thomchick, 2012, footnote 36.
[52] Ibid.
[53] The above three examples originate from the presentation on "Best European practice in freight and logistics", by J Perschon at the Green Logistics Conference, Singapore, 31 August 2011. See also http://www.eia-ngo.com/wp-content/uploads/2010/01/Best-Practice_Bestlog.pdf (accessed 30 July 2015).

agenda. Thus, integrated public and private initiatives that promote greater policy coherence and synergies are key to achieving an optimum outcome.

# IV. Financing the shift to sustainable, greener, low-carbon and more climate-resilient transport

33. Financing transport infrastructure is a major challenge with capital expenditure currently estimated at between US$1.4 trillion and US$2.1 trillion annually.[54] Further investment requirements will be needed to improve the sustainability of freight transport. The net transitional investment requirements over the 2015–2035 period are estimated at over US$3 trillion; over 80 per cent relates to low-carbon modes such as railways.[55] This would positively impact the global financial system over the same period, with net benefits averaging US$3.5 trillion.[56] Depending on policy choices made, however, this could entail a cost of US$2.5 trillion.[57]

34. Shifting investment to low-carbon transport could also result in a positive impact with savings in operating costs providing investors additional cash that could then be invested back into the economy. Lower risk frees up reserves and releases further investment, and longer asset life means that investments need not be replaced as often, freeing cash for investment that would otherwise be needed for asset replacement.[58] For instance, the development of global land transport infrastructure alone is expected to reach as much as US$45 trillion (in capital construction) by 2050 ("4°C scenario" business as usual).[59] When combined with operations, maintenance and repairs, land transport investment is expected to reach nearly US$120 trillion by 2050 under the same scenario.[60] By 2050, the potential shift to sustainable transport (2°C scenario) could result in as much as US$20 trillion (over baseline projections) worth of savings in terms of global land transport infrastructure investments and maintenance costs.[61] Over 20 per cent of these cumulative savings could result from reduced roadways investment and maintenance costs.

35. The sections below provide a brief overview of some of the relevant sources and mechanisms of financing that can help scaling up further funding for sustainable freight transport development.

[54] B Lefevre, B Leipziger and M Raifman, 2014, The trillion dollar question: Tracking public and private investment in transport, working paper (Washington, D.C., World Resource Institute).

[55] D Nelson, M Herve-Mignucci, A Goggins, S Szambelan and J Zuckerman, 2014, *Moving to Low-Carbon Economy: The Financial Impact of the Low-Carbon Transition*. Climate Policy Initiative Transition Series, table 1. Available at http://climatepolicyinitiative.org/wp-content/uploads/2014/10/Moving-to-a-Low-Carbon-Economy-The-Impacts-of-Policy-Pathways-on-Fossil-Fuel-Asset-Values.pdf (accessed 30 July 2015).

[56] Ibid.

[57] Ibid.

[58] Ibid.

[59] IEA, 2013, Global land transport infrastructure requirements: Estimating road and railway infrastructure capacity and costs to 2050 (Paris); IEA estimates transport sector energy consumption under a 4ºC scenario (which assess what announced policies can deliver) and under a 2ºC scenario for reaching global climate change objectives.

[60] Ibid.

[61] Ibid.

## A. Public finance

36. Transport is shaped by financial flows from various sources – public and private, national and international. Countries typically spend 2–13 per cent of their public budgets on transport.[62] In 2010, domestic flows (public and private) were the most important source of finance in the transport sector (around US$583 billion), followed by foreign direct investment (around US$149 billion) and international debt finance (US$150 billion). The contribution of official development assistance amounted to 2 per cent of public investment (around US$8 billion). Other sources of finance, such as climate finance, are even less significant, representing around US$1.25 billion.[63]

37. Public finance remains an essential source of finance for transport infrastructure construction and maintenance. Governments must take a leading role in ensuring a shift to financing sustainable and efficient freight transport infrastructure and services. This would entail, for instance, (a) determining national frameworks and policies for investment in sustainable transport; (b) providing incentives and market signals to trigger the shift in investment to sustainable freight transport systems (these can take various forms, such as phasing out fuel subsidies as deemed appropriate; and applying appropriate transport pricing mechanisms – such as in road pricing taking into account actual externalities; (c) assuming certain risks and providing appropriate guarantees to promote sustainable transport projects; (d) promoting and participating in regional trade and transport development.

38. Other incentives may involve dedicated financing schemes that would support the shift towards sustainable freight transport. For example, the Department of Transport in the United Kingdom has developed two freight grant funds (the Mode Shift Revenue Support Scheme and the Waterborne Freight Grant Scheme) to support modal shift from road to rail or inland water and improve environmental and social benefits from reduced lorry journeys on United Kingdom roads. Both funds assist companies with the increased operating costs of running rail or waterways freight transport instead of road.[64]

## B. Private finance: The role public–private partnerships

39. Given the limited availability of public sector funds, developing countries have been increasingly leveraging public contribution with private sector investment and expertise through PPPs. Such partnerships have, in the last two decades, emerged not only as new sources of finance but also as means to access specialized skills, innovations, and new technologies associated with infrastructure development, operation and maintenance. As today's transport systems require highly specialized managerial and operational skills, as well as cutting-edge technologies, the expertise of private partners for building, operating and maintaining transport infrastructure and services is significant and constitutes an important resource to draw from, in addition to finance.

[62] See UNCTAD *Review of Maritime Transport 2012*, chapter 6.

[63] See K Sakamoto, H Dalkmann and D Palmer, 2010, *A Paradigm Shift Towards Sustainable Low-carbon Transport: Financing the Vision ASAP*, (New York, Institute for Transportation and Development Policy), available at http://www.policyinnovations.org/ideas/policy_library/data/01592/_res/id=sa_File1/A_Paradigm_Shift_toward_Sustainable_Transport.pdf (accessed 4 August 2015).

[64] See https://www.gov.uk/government/publications/mode-shift-revenue-support-msrs-scheme-2015-to-2020 (accessed 3 August 2015) and https://www.gov.uk/government/publications/waterborne-freight-grant-scheme-guide-2015-to-2020 (accessed 3 August 2015).

40. Public–private partnerships combine the skills and resources of the public and private sectors to deliver facilities and services that are traditionally procured and delivered by the public sector. While there is no one universal definition of PPP, a widely accepted definition refers to PPP in infrastructure as a mechanism for the "creation and/or management of public infrastructure and/or services through private investment and management for a predefined period and with specific service level standards".[65] As such, PPPs can vary in shape and size, ranging from small service contracts to large scale concessions, greenfield projects and divestitures.

41. Global PPP projects in transport infrastructure increased from 36 in 1990 to 49 in 2014. Reflecting the mega size of projects in transport development, investment in transport infrastructure showed a significant increase from US$7.6 billion in 1990 to US$55.3 billion in 2014 (representing 51 per cent of total global investment).[66] Brazil was the main player in global PPPs for transport projects in 2014, representing 59 per cent of global transport investment share (US$32.6 billion).

42. Public–private partnership contribution to sustainable transport is still lagging and to date most PPP projects remain focused on roadways development (51 per cent), followed by railroads (19 per cent), seaports (16 per cent) and airports (14 per cent). As the contribution of private sector investment in the transport industry is greatly influenced by the trends in public finance flows and international support, the public sector should, where possible, ensure proper reorientation of investment strategies into sustainable modes of transport as well as ensure that environmental and climate criteria are well integrated into PPP projects.

43. Development of PPP still faces several barriers, including the lack of proper regulation, and data to build bankable projects as well as high transactions costs. Governments can build on the various extensive PPP models and make them a viable and effective tool to support sustainable freight transport systems.[67]

## C. New sources of finance

### 1. Climate finance

44. Climate finance can be used to support climate change mitigation and adaptation activities. It includes both public and private sources of finance and can support activities in all sectors of the economy in both developed and developing countries. Consequently, climate finance can help achieve the shift and scale-up funding for sustainable low-carbon freight transport. However, climate finance use in the transport sector remains limited compared to others sectors such as energy. Relevant barriers relate to the size, scope and complexity of the sector itself. The narrow approach to measuring the mitigation potential of policy actions (and the associated incremental costs), together with the lack of data to allow for the measurement, reporting and verification of mitigation actions, limits the sector's access to climate finance. [68]

45. As of April 2015, the Nationally Appropriate Mitigation Actions Facility had the highest transport-related funding share (29 per cent) of projects – a share relatively

[65] From the presentation by A Mayram, former Additional Secretary of the Ministry of Rural Development, Government of India, at the UNCTAD Multi-year Expert Meeting on Investment for Development, February 2011 document reference – https://www.kdi.re.kr/data/download/attach/8812_4-5.pdf?.

[66] See http://ppi.worldbank.org/explore/ppi_exploreSector.aspx?sectorID=3 not found .

[67] See http://unctad.org/meetings/en/SessionalDocuments/cid34_en.pdf (accessed 3 August 2015).

[68] UNCTAD, 2012, *Review of Maritime Transport 2012*, chapter 6.

proportional to the sector's contribution to the global energy-related GHGs (23 per cent). The Clean Technology Fund and the Nordic Development Fund accounted for 15 per cent and 10 per cent, respectively. Other climate finance instruments such as the Clean Development Mechanism, the International Climate Initiative, and the Joint Crediting Mechanism have funded a relatively small number of projects in the transport sector.[69]

46. Climate finance has mostly been used to implement the "shift" (to low carbon modal transport) and the "improve" (technology oriented) strategies. Further investment should be allocated to "avoid" strategies for optimal results.[70]

47. Despite the recent pledge by developed countries, as part of the international climate negotiations under the UNFCCC, of US$9.3 billion for the new Green Climate Fund, the future size of climate finance remains uncertain. Nevertheless, climate finance can be used to complement and leverage investment and cooperation in connection with sustainable freight transport. Relevant activities may include raising awareness, building capacity, supporting national assessment and policy reforms, implementing pilot measures, identifying and implementing pilot projects, and leveraging/blending other sources of funding.

### 2. Infrastructure bonds

48. Building on an improved macroeconomic environment, governments have succeeded in mobilizing finance from different sources, such as the capital market and institutional investors, through the development of innovative financing tools such as infrastructure bonds.

49. Infrastructure bonds are a debt instrument issued by governments or private companies to raise funds from domestic or international capital markets for infrastructure development, provided they have sufficient credit enhancements or underlying project allows for an investment-grade rating.[71] The performance of the bonds is subject to certain project-specific risk. The interest payments associated with infrastructure bonds (and repayment of the principal debt) are secured by, or serviced from, the cash flows generated by the underlying specific project or a portfolio of projects – such as a toll road.[72] The typical applications of bonds are mainly in the operations phase of a project's life cycle where risks are less and cash flows from operations are more certain. It is less feasible in the construction phase, given that most cash flows are not feasible. The investment base best suited for this financing tool includes the pension and insurance sectors, as these investors favour low-risk long-term assets in the local currency.[73]

50. Countries/territories such as Brazil, Chile, Hong Kong (China), Malaysia and the Republic of Korea have been successful in using project finance domestic

[69] Konrad Adenauer Foundation and Partnership on Sustainable Low Carbon Transport, 2015, Alternative financing sources for sustainable transport: Public–private partnerships and institutional investors, available at http://www.kas.de/wf/doc/kas_41752-1522-1-30.pdf?150618121432 (accessed 3 August 2015).

[70] See http://www.slocat.net/news/1447 (accessed 3 August 2015).

[71] World Economic Forum, 2013, Strategic infrastructure in Africa. A business approach to project acceleration. May.

[72] CA Mbeng Mezui, 2013, Unlocking infrastructure development in Africa through infrastructure bonds, *GREAT Insights*, 2(4), May–June.

[73] World Economic Forum, 2013, Strategic infrastructure in Africa. A business approach to project acceleration. May.

currency bonds as a way to catalyse investor interest in infrastructure projects.[74] In most cases their governments implemented reforms in the pension and insurance sectors to unlock long-term investors. This has created a pool of institutional investors with demand for low-risk, long-dated assets in the domestic currency. In addition, governments have implemented crucial economic policies that prioritize macroeconomic stability, particularly by bringing down inflation and prevailing interest rates.[75]

51. In Africa, Kenya is a pioneer in the use of infrastructure bonds, with its first issuance in 2009.[76] In 2014, the Government issued infrastructure bonds to finance infrastructure needs, including the expansion of transportation networks in roads, railway and ports. The Government offered 12-year bonds worth 15 billion shillings (US$168 million) at a fixed rate of 11 per cent. With investment needs estimated at US$4 billion a year to deliver infrastructure pledges, Kenya is one of the largest investors on the continent.[77]

52. Other countries such as Cameroon and South Africa have issued government bonds with a promise to invest the funds in infrastructure development, including transport. As the bonds have no income stream associated with the underlying assets, cash flows for the bonds are paid directly out of government tax revenues. In this context, government credibility is a critical factor to ensure investor confidence, particularly when issuing future bonds and creating a viable infrastructure bond market. To encourage bond purchases, governments have also made use of incentives such as tax exemption. [78]

53. Infrastructure bonds can be applied in financing transport infrastructure, as they reflect the long-term nature of the financing, which is often not available or difficult to obtain from other sources of finance. Best practices have shown that sound and long-term strategy of macroeconomic policies, reliable fiscal plans, appropriate legal and regulatory frameworks, well-developed local institutions, bankable projects, as well as a dynamic private sector, are important for the promotion of sustainable infrastructure bond markets and as such, constitute a lesson for other developing countries to consider.[79]

54. Recent years have seen the emergence of green bonds and climate-theme bonds. These are similar to traditional bonds, except that their proceeds are exclusively used to raise funds for climate-mitigation and adaption and other environmentally friendly projects. These bonds can be issued by governments, the private sector, commercial banks and international financing institutions and development banks and increase sources for new funding.

## D. The role of development banks

55. Regional, subregional and national development banks have been playing an important role in enabling finance or facilitating access to finance for sustainable transport development.

[74] CA Mbeng Mezui and B Hundal, 2013, *Structured Finance Conditions for Project Bonds in Africa Markets* (Tunis, African Development Bank Group).

[75] World Economic Forum, 2013, Strategic infrastructure in Africa. A business approach to project acceleration. May.

[76] V Agarwal, 2013, Infrastructure finance: Uncertainty and change in sub-Saharan Africa, PricewaterhouseCoopers.

[77] See http://www.bloomberg.com/news/articles/2014-10-09/kenya-sells-bonds-dedicated-to-covering-infrastructure-deficit (accessed 3 August 2015).

[78] CA Mbeng Mezui, 2013, Unlocking infrastructure development in Africa through infrastructure bonds, *GREAT Insights*, 2(4), May–June.

[79] CA Mbeng Mezui, 2012, Accessing local markets for infrastructure: Lessons for Africa, Working Paper No. 153 (Tunis, African Development Bank Group).

56. The Rio+20 commitment of eight development and multilateral banks[80] to provide more than US$175 billion of loans and grants for transport in developing countries over the period 2012–2022 is on target. Between 2012 and 2013, approximately US$45 billion have been already allocated for transport projects.[81] Other initiatives include the Inter-American Development Bank's fast disbursing fund (InfraFund), which aims to identify, develop and prepare bankable and sustainable infrastructure projects in Latin America and the Caribbean,[82] and the Caribbean Development Bank's US$1.2-million Regional PPP Support Programme to assist governments in adopting sound PPP policies, and provide advisory assistance to implement projects, including in transport.[83]

57. In addition to financing sustainable transport, development banks play an important role in providing risk mitigation, guarantees and other credit-enhancement mechanisms especially for projects that require large initial investments or regional coordination.

# IV. Conclusions and way forward

58. Freight transport is at the core of sustainable development as it enables economic growth, promotes trade, improves access, and links communities and societies. Safe, secure, energy-efficient, affordable, reliable, low-carbon, environmentally friendly, climate-resilient and rule-based freight transport systems contribute to achieving an economically efficient, socially equitable and environmentally sound development. Consequently, freight transport has a critical role in helping implement an effective and workable post-2015 sustainable development agenda. Given the multiplicity of stakeholders involved in freight transport across all modes and supply chains, greater coordination and consultation within and between governments as well as with key stakeholders such as the freight transport industry and the trade community, as well as the financial and lending partners, are essential in moving the sustainable development agenda forward.

59. UNCTAD has long recognized the many dimensions of freight transport and over recent years, in particular since UNCTAD XII and UNCTAD XIII, has carried out work under its three pillars to assist developing countries with initiatives to achieve a shift towards greater sustainability and resilience in freight transport and trade facilitation. UNCTAD will continue to assist developing countries in making informed policy choices to address the emerging environmental and social challenges in relation to transport strategies, and to provide associated capacity-building needs and appropriate policy responses.

60. In this context, and bearing in mind some of the considerations raised in this document, experts at the meeting are invited to take note of the strategic role of freight transport for the sustainable development agenda and help address some of the following questions:

- What is the current state of play in terms of the sustainability of freight transport, including in the light of the SDGs and post-2015 development agenda?

[80] The eight financial institutions taking part are the African Development Bank, the Asian Development Bank, the CAF-Development Bank of Latin America, the European Bank for Reconstruction and Development, the European Investment Bank, the Inter-American Development Bank, the Islamic Development Bank and the World Bank.

[81] MDB Working Group on Sustainable Transport, 2015, Progress report 2013–2014, February.

[82] See http://www.iadb.org/en/topics/transportation/infrafund,1635.html (accessed 3 August 2015).

[83] See http://www.iadb.org/en/news/news-releases/2015-05-21/cdb-idb-mif-wb-create-caribbean-ppp-support-program,11163.html (accessed 3 August 2015).

- What are the barriers, obstacles and challenges to sustainability in freight transport?
- What are the relevant experiences and measures/methods reflecting efforts to implement sustainable freight transport systems, including by governments and the private sector?
- What are the good practices, successful experiences and opportunities associated with the wider dissemination and potential replication of sustainable freight transport systems in developing countries?
- What are the enabling factors, including financing, capacity-building, technology, research and cooperation?

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Item 3 of the provisional agenda

## Sustainable freight transport systems: Opportunities for developing countries

### Note by the UNCTAD secretariat

**Corrigendum**

**1. Paragraph 18**

The first sentence *should read*

Freight transport and related GHG emissions are at the centre stage of the current climate change debate, including under the IMO Framework and the UNFCCC.

**2. Table 1, column headed "Example of measures and actions"**

The entry for "Fuel-related measures", third point in list for this entry *should read*

Invest in energy efficiency, wide-base tyres to lower weight and rolling resistance and deliver improved fuel efficiency, and more aerodynamic design also to improve fuel efficiency;

**3. Footnote 35**

For the existing footnote *substitute*

The "avoid, shift and improve" approach to climate change mitigation, as introduced in H Dalkmann and C Brannigan, 2007, Transport and Climate Change, Sourcebook Module 5e (GTZ, Eschborn), aims to reduce GHG emissions and energy consumption and promote sustainable transport.

**4. Footnote 65**

For the existing footnote *substitute*

From the presentation by A Mayram, former Additional Secretary of the Ministry of Rural Development, Government of India, at the UNCTAD Multi-year Expert Meeting on Investment for Development, February 2011.

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**5. Footnote 66**

For the existing footnote *substitute*

See http://ppi.worldbank.org/~/media/GIAWB/PPI/Documents/Global-Notes/Global 2014-PPI-Update.ashx (accessed 5 August 2015).

**6. Paragraph 49, first sentence**

*Add* the *before* underlying

**7. Paragraph 49**

*Delete* the sentence

It is less feasible in the construction phase, given that most cash flows are not feasible.