



# MOBILIZING SUSTAINABLE TRANSPORT *for DEVELOPMENT*


*Analysis and Policy Recommendations from the United Nations  
Secretary-General's High-Level Advisory Group on Sustainable Transport*





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A yellow truck is driving on a dirt road through a lush palm tree plantation. The truck is carrying a large load of coconuts on its bed. The road is surrounded by tall palm trees and green grass. The sky is clear and blue. The text is overlaid on the right side of the image, enclosed in a yellow border.

“Transport is not an end in itself but rather a means allowing people to access what they need: jobs, markets and goods, social interaction, education, and a full range of other services contributing to healthy and fulfilled lives.”

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# FOREWORD BY THE SECRETARY-GENERAL



Sustainable transport is fundamental to progress in realizing the promise of the 2030 Agenda for Sustainable Development and in achieving the 17 Sustainable Development Goals. Sustainable transport supports inclusive growth, job creation, poverty reduction, access to markets, the empowerment of women, and the well-being of persons with disabilities and other vulnerable groups. It is also essential to our efforts to fight climate change, reduce air pollution and improve road safety.

Yet despite this critical role, sustainable transport has not been given adequate recognition. It was in this context that I formed the High-Level Advisory Group on Sustainable Transport to develop recommendations to help the world address rising congestion and pollution, particularly in urban areas, and to better tap into the tremendous opportunities that sustainable transport can make possible.

This report sets out forward-looking recommendations. It is also meant to serve as a contribution to the first-ever Global Sustainable Transport Conference, which I will convene in Ashgabat, Turkmenistan, on 26-27 November 2016.

I thank the Members of the High-Level Advisory Group for their efforts and dedication, and encourage all partners to work together for progress on this key global endeavour.

New York City, October 2016

United Nations Secretary-General  
Ban Ki-moon





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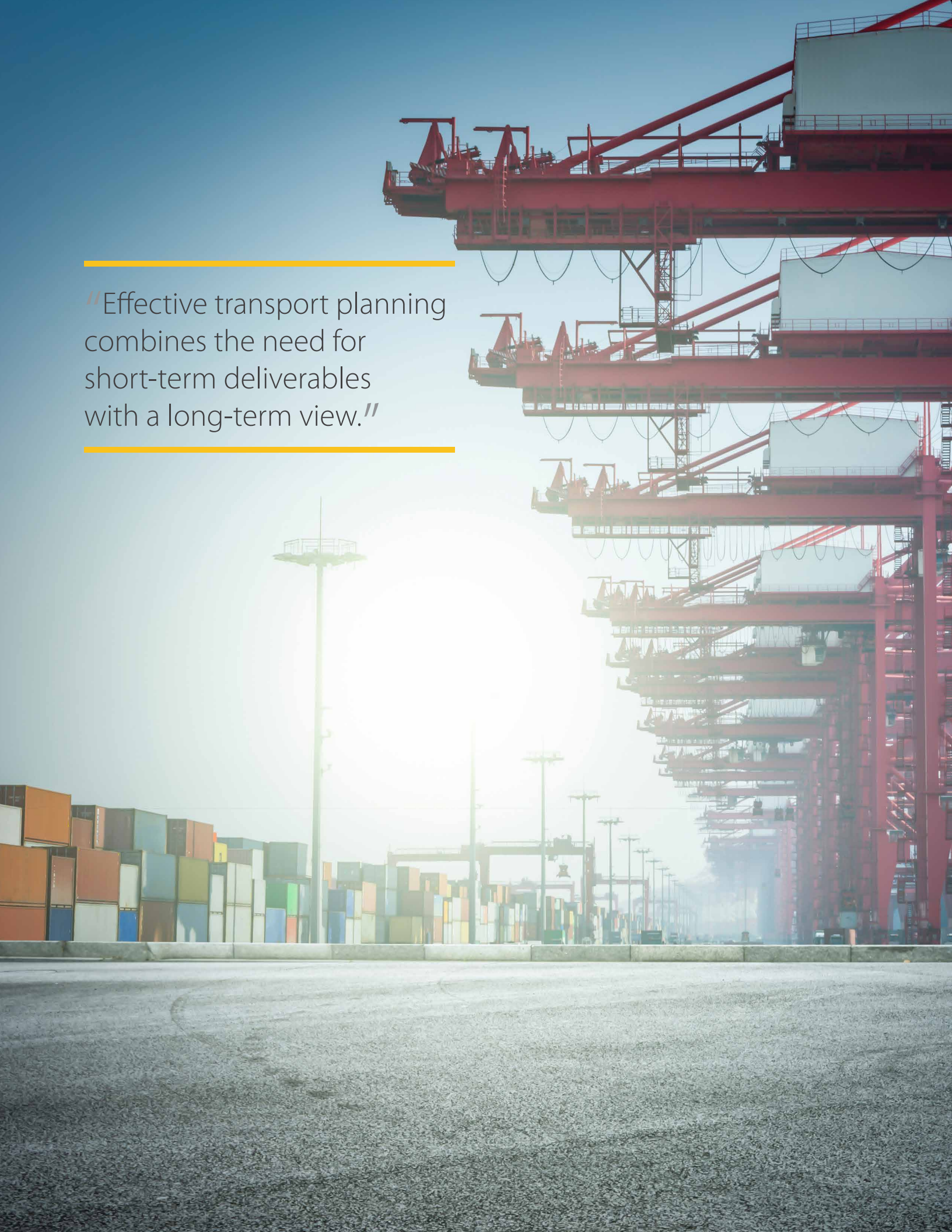
“Technology advancing clean fuels and clean energy is a high priority, and when considering the scale of the health and climate challenges, it is an imperative.”

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“Effective transport planning combines the need for short-term deliverables with a long-term view.”

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# HIGH-LEVEL ADVISORY GROUP CALL TO ACTION

In 2015, the world's community came together to determine what kind of future we would leave to the next generation. The world set bold, transformative goals in sustainable development, financing for development and climate change, proclaiming in all of these contexts that 'business as usual' is no longer a viable option.

As members of the High-Level Advisory Group on Sustainable Transport, we represent developed and developing countries and a wide range of modes and sectors, including the public sector, non-state actors and private companies.

We see a strong economic case for sustainable transport complemented by a compelling human argument. Every member of the Advisory Group, in spite of our disparate perspectives and backgrounds, agrees that all decisions made on transport must have people and their quality of life at the centre.

We submit that the achievement of the Sustainable Development Goals depends on the determined and innovative pursuit of sustainable transport, with ambitious action by governments and businesses alike. The transport sector is large, diverse and complex, and infrastructure decisions and investments have an especially long lifespan. This makes our choices today critically important for tomorrow. We are resolved to advocate for bold choices, seizing this moment in time, engaging the public and private sectors and all relevant stakeholders, and taking advantage of new approaches in transport planning and policy development, new technology, and the global resolve toward achieving the 2030 Agenda for Sustainable Development and the Paris Climate Agreement.



## EXECUTIVE SUMMARY

In 2014, United Nations Secretary-General Ban Ki-moon appointed an independent High-Level Advisory Group on Sustainable Transport to provide a focused set of recommendations on how the transport sector can advance sustainable development with poverty eradication at its core, promote economic growth, and bolster the fight against climate change. The outcome of this effort is *Mobilizing Sustainable Transport for Development*, the first ever Global Sustainable Transport Outlook Report, addressing all modes of transport, in developing and developed countries.

Transport drives development, links people, connects local communities to the world, builds markets and facilitates trade. In turn, **sustainable transport drives sustainable development**, fundamental to meeting the needs of people in their personal and economic lives, while respecting the ability of future generations to meet their needs.

The High-Level Advisory Group defines sustainable transport as **“the provision of services and infrastructure for the mobility of people and goods—advancing economic and social development to benefit today’s and future generations—in a manner that is safe, affordable, accessible, efficient, and resilient, while minimizing carbon and other emissions and environmental impacts.”**

Transport is not an end in itself, but rather a means allowing people to access what they need: jobs, markets, social interaction, education, and a full range of other services and amenities contributing to healthy and fulfilled lives. The report moves away from a focus on providing mobility based on individual motorized transport and improved traffic speed, to the idea of **access through transport**, prioritizing people and their quality of life, with strong attention to safety and social equity. The 2030 Agenda for Sustainable Development charts this kind of course. Through sustainable transport, we can make significant progress on the Sustainable Development Goals and the Paris Climate Agreement, improving the lives of billions of people around the world.

The report addresses global trends, including urbanization, demographic shifts, and globalization, as well as technological progress in digital connectivity and propulsion solutions.

There is an urgent need for action to address the staggering social, environmental, and economic costs associated with ‘business as usual’: every year 1.24 million people die in road accidents and a further 3.5 million people die prematurely due to outdoor pollution, including from transport sources; 23%

of energy-related greenhouse gas emissions come from transport; and road congestion is a tremendous burden on the economy, currently accounting for 0.7% of the GDP in the United States, 2% of GDP in Europe, 2–5% of GDP in Asia, and as high as 10% of GDP in some cities of emerging economies, including Beijing, São Paulo and Lima.<sup>1,2</sup>

There are also enormous opportunities presented by sustainable transport: saving hundreds of thousands of lives every year through improved road safety and reduced air pollution, and reducing carbon emissions by 7 gigatonnes.<sup>3</sup> The transformation to sustainable transport requires a redirection, rather than any substantial increase, in infrastructure expenditure and can be realised through an annual investment of around US\$2 trillion, similar to the current ‘business as usual’ spending of US\$1.4 to US\$2.1 trillion.<sup>4</sup> When considering full transport costs, including fuel, operational expenses, losses due to congestion, and vehicles, sustainable transport can deliver savings of US\$70 trillion by 2050.<sup>5</sup> In addition, improvements in border administration, transport and communication infrastructure could increase global GDP by US\$2.6 trillion, or 4.7%.<sup>6</sup>

The High-Level Advisory Group promotes a tailored ‘Avoid-Shift-Improve’ approach as a useful framework for assessing transport measures and for taking action in support of sustainable passenger and freight transport. Applying these principles will promote a combination of multimodal, collective-shared mobility solutions and sustainable transport systems. The concept of enabling is a critical addition to the framework, and it is in the realm of enabling that many of this report’s recommendations have been developed. Throughout the Advisory Group’s analysis, certain themes recur, including the paramount importance of taking an integrated, holistic approach to policy and investment decisions and the benefits of engaging with a wide range of stakeholders and funding sources. The Advisory Group recognizes that technology promoting clean fuels and clean energy are of high priority, and the Group gives the needs, challenges and opportunities in developing countries particular weight.

The Advisory Group submits the following ten recommendations for *Mobilizing Sustainable Transport for Development*. These are further elaborated in the report:

1. Make transport planning, policy and investment decisions based on the three sustainable development dimensions—social development, environmental (including climate) impacts and economic growth—and a full life cycle analysis.



2. Integrate all sustainable transport planning efforts with an appropriately-balanced development of transport modes: integration vertically among levels of government and horizontally across modes, territories and sectors.
3. Create supportive institutional, legal and regulatory government frameworks to promote effective sustainable transport.
4. Build technical capacity of transport planners and implementers, especially in developing countries, through partnerships with international organizations, multilateral development banks, and governments at all levels, to ensure equitable access to markets, jobs, education and other necessities.
5. Reinforce efforts toward preventing road traffic deaths and injuries.
6. Foster an informed, engaged public as a crucial partner in advancing sustainable transport solutions.
7. Establish monitoring and evaluation frameworks for sustainable transport, and build capacity for gathering and analyzing sound and reliable data and statistics.
8. Promote diversified funding sources and coherent fiscal frameworks to advance sustainable transport systems, initiatives and projects.
9. Increase international development funding and climate funding for sustainable transport.
10. Promote sustainable transport technologies through outcome-oriented government investment and policies that encourage private sector investment and action through various incentive structures.

Carrying forward the recommendations set out in this report will require leadership and concerted, coordinated action from public authorities at all levels together with private sector actors, the research community, civil society, and international organizations. The United Nations has an important role to play in this context. In this respect, the report also includes reflections on the kinds of arrangements that could strengthen the organization's contributions to advancing sustainable transport.



## INTRODUCTION

Imagine cities with quiet streets, clean air, easy and equitable access to work and school, and vibrant community life. Imagine families that travel from their rural home to a city centre and then on to visit relatives in another country, using a combination of road, rail, waterborne and air transport—moving from one to the next seamlessly and efficiently, taking advantage of the strengths of each mode. And imagine goods crossing borders efficiently, reaching their destination on time, with minimal environmental impact—so that people get what they need and economies develop without compromising opportunities for future generations. This vision can be realised through a widespread, ambitious and genuine commitment to advancing sustainable transport systems.

Transport is fundamental to development in a large-scale, global sense. At the same time, it has a profound and personal impact on individual lives. In many cases, transport involves choice—whether to move or to stay in place, whether to walk, cycle, take public transport or a private car, whether to ship a product overnight or with more flexible deadlines—but choice is also in many situations severely limited by poverty; social exclusion; and national, regional, or local circumstances. The transport options available in a country reflect its level of development. At the same time, transport is a driver as well as a marker of economic development. It enables individuals and communities to rise out of poverty and

overcome social exclusion, connecting goods to markets and linking rural areas and market towns to large cities and the global marketplace.

In 2015, the Member States of the United Nations embraced a global vision for sustainable development with the 2030 Agenda and its 17 Sustainable Development Goals.<sup>7</sup> The goals acknowledge that development decisions and actions must consider the social, economic and environmental benefits and negative impacts. Also in 2015, the international community adopted the Paris Climate Agreement, which “aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty.”<sup>8</sup> These two milestone outcomes are reinforced by other important international agreements, including the Addis Ababa Action Agenda on Financing for Development,<sup>9</sup> the Sendai Framework for Disaster Risk Reduction,<sup>10</sup> and the Habitat III New Urban Agenda.<sup>11</sup> All of these agreements are intrinsically linked, and progress in one will be achieved only with progress in the others. Real changes in transport systems around the world will be vital to success.

The current report presents proposals by the Advisory Group for consideration by the current and future UN Secretary-General and in turn by decision makers around the world. It takes an integrated approach to sustainable transport—including short- and long-range, intra- and



inter-city, urban and rural, and passenger and freight transport, and all modes. The aim is not to present an exhaustive picture of the transport universe, but rather to focus on areas where the Advisory Group's particular set of perspectives and expertise can add real value—in policy, in financing, and in technology. The report contains examples of existing action and innovation in key areas to convey what is already being achieved and what best practice exists in the sustainable transport arena. It also contains reflections on United Nations institutional arrangements, and offers proposals on which the Secretary-General could act directly.

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While there is not a universally recognized definition of sustainable transport, this report operates with the following understanding, developed by the Advisory Group:

***Sustainable transport is the provision of services and infrastructure for the mobility of people and goods—advancing economic and social development to benefit today's and future generations—in a manner that is safe, affordable, accessible, efficient, and resilient, while minimizing carbon and other emissions and environmental impacts.***

With the people-centred approach of the 2030 Agenda for Sustainable Development, safety must be the prerequisite of all sustainable transport efforts. And to engender progress toward the Paris Agreement goals, reducing greenhouse gas emissions and advancing climate adaptation should be prioritized. Achieving sustainable transport will need a broad coalition of stakeholders—from industry, policy and research institutes, local and national governments, and sector organizations—to engage, challenge the status quo and push for real progress. Transport systems will need to be addressed in a holistic manner, at a scale commensurate with the size of the challenges.

## 1. SUSTAINABLE TRANSPORT - WHAT IT DELIVERS

Transport drives development, linking people, connecting local communities to the world, building markets and facilitating trade. In turn, sustainable transport can drive sustainable development.

The transport landscape varies greatly as one moves around the world and even within a given country or region. Almost everywhere in the developed world, people currently have transport options, though transport is not always available in an equitable or environmentally sensitive manner. In the developing



The challenges are immense. They are particularly acute in large cities in emerging economies and in the urban and rural landscapes of the developing world in general. Fundamental changes are needed. If current trends continue, congestion, air pollution and traffic fatalities will continue to rise, moving the human family away from the sustainable future envisioned in the 2030 Agenda for Sustainable Development. Bold shifts now will allow these cities and societies to change course, and the recommendations contained in this report can help bring this urgently needed change.

Implementing the recommendations will be a challenging and rewarding task. Now is not the time for inertia, or pushing the problem down the road to the next generation. It is the time for action, to bring to life the ambitious pledges of the 2030 Agenda for Sustainable Development. This includes, notably, initiatives launched by private sector companies, international organizations and other non-state actors. When a wide range of stakeholders work together in partnership, sustainable transport will foster economic development, encourage equitable social development and protect the planet for generations to come.

world, there is great diversity within and among countries, but overall the demand for mobility for people and goods is growing significantly every year. In spite of this, the World Bank estimates that one billion people in developing countries lack access to an all-weather road.<sup>12</sup> Some groups of countries including least developed countries, landlocked developing countries, middle-income countries, post-conflict countries, and small island developing states face specific challenges based on their structural vulnerabilities. And safety is a particular concern in



developing countries around the world: currently 1.24 million people die every year in road crashes, with more than 90% of these road fatalities in low- and middle-income countries.<sup>13</sup>

The challenges are great, but so are the opportunities, in developed and developing countries alike, for visionary decisions now and in the coming years in the realm of transport that will set cities and nations on a sustainable development path. This path will be shaped by ambitious goals, targets and indicators. Progress will need to be monitored and evaluated, with course corrections where necessary.

The 2030 Agenda for Sustainable Development charts this kind of path to sustainable development more generally, and the guideposts are the 17 Sustainable Development Goals (SDGs).

Accomplishing the SDGs will rely on advances in sustainable transport. Global progress in reducing greenhouse gas emissions cannot be realised without decisive action in sustainable transport, and countries cannot provide food security or healthcare without providing reliable and sustainable transport systems to underpin these advances. Young people cannot attend school, women cannot be assured opportunities for employment and empowerment, and people with

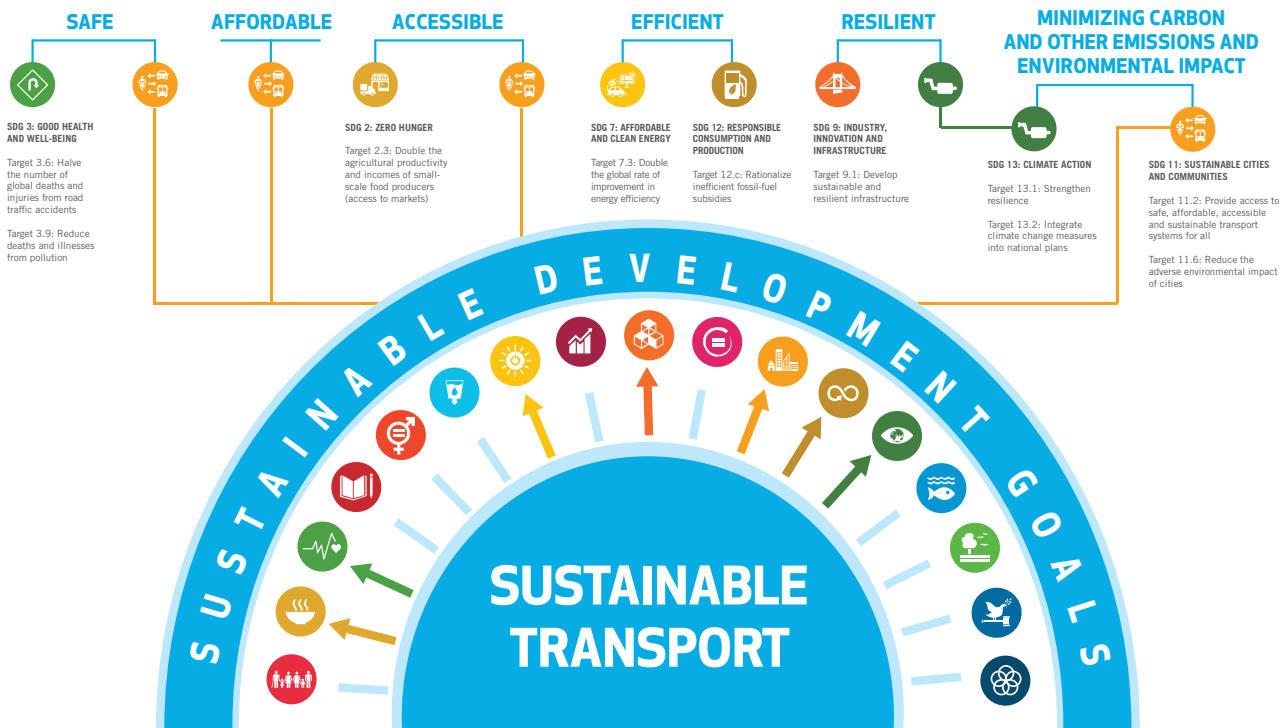


disabilities and elderly people cannot maintain their independence and dignity without safe transport that is accessible itself and that enables access to all that people need. Personal security for all passengers is critical. Goals of biodiversity and ocean health also have significant intersections with the promotion of smart, sustainable transport practices across regions and across modes.

In addition to these systemic connections, some SDGs are directly and indirectly connected to sustainable transport through targets and indicators, as illustrated in the figure below.<sup>14</sup> The SDG on ensuring health and well-being includes a target addressing deaths and injuries from road crashes (3.6), and the SDG on inclusive, safe, resilient and sustainable cities includes a target on expanding public transport (11.2).

## SUSTAINABLE TRANSPORT IMPACTS ON ACHIEVING THE SDG'S

### SUSTAINABLE TRANSPORT IS:



## 1.1 ACCESS—AT THE HEART OF SUSTAINABLE TRANSPORT

Transport is not an end in itself, but rather a means allowing people to access what they need: jobs, markets and goods, social interaction, education, and a full range of other services contributing to healthy and fulfilled lives. This broader concept of “access” is a useful lens for approaching the SDGs, which all can be achieved when people are able to access what they need: sustainable livelihoods, food, healthcare, education, safe communities and spaces, and opportunities for sustainable economic growth.

In some cases, other means of access are available—telecommuting, remote education and health consultations, e-commerce, and perhaps in the near future, 3-D printing, can all make some transport less necessary or at least change the tempo and nature of the demand. In addition, compact, well-planned cities and towns can offer people the ability to access what they need without long trips.

Nonetheless, moving people and freight over short and long distances remains vital to development. Transport connects the hinterland to urban centres. Road, rail and inland waterway transit corridors crossing national borders, maritime shipping, and air freight routes all enable trade, which, in turn, fosters development.

**The key is meeting the needs of people in their personal and economic lives while respecting the ability of future generations to meet their needs: the essence of sustainable development.**

For decades, transport policies focused on providing mobility based on motorized transport and improving traffic speed. Using the word ‘access’ in the context of transport was synonymous with building new roads and other infrastructure mainly benefitting the use of private cars. The motivation was access to transport. With the shift to sustainable transport comes a paradigm-shifting focus on people and their quality of life—the concept of access through transport, as well as increased attention to safety and social equity in transport.



### Leaving No One Behind

The 2030 Agenda will succeed only if it reaches all countries, all communities and all people—if no one is left behind. As Bénédicte Frankinet, the Permanent Representative of Belgium to the United Nations, said, “the success of the [Sustainable Development] Goals will be determined by how much the lives of the most vulnerable are improved.”<sup>15</sup>

Sustainable transport plays a fundamental role in overcoming the social exclusion of vulnerable groups. SDG target 11.2 explicitly calls on the international community to work toward sustainable transport for all people: *By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.*

By enabling women to access markets and jobs, as well as a range of social and health services, transport promotes women’s economic empowerment and social inclusion. Essential to this is that transport systems are designed to safeguard the personal security of all travelers. Station and route planning, community awareness raising, and effective policing are critical to increase the confidence of both young and older women to move freely in public places and use public transport.<sup>16</sup>

Transport services themselves must also be physically accessible to older and disabled people. Article 9 of the UN Convention on the Rights of Persons with Disabilities sets out the imperative that “in order to enable persons with disabilities to live independently and participate fully in all aspects of life, appropriate measures should be taken to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas.”<sup>17</sup>

It is increasingly recognised by transport authorities, service providers and operators that improvements to the accessibility of the transport system as a whole mean a better quality of transport for all users. Higher quality vehicle design, infrastructure, driver training, information and many other factors contribute to a more equitable system, and, in this way, accessibility is a key element in ensuring the social sustainability of the transport sector.<sup>18</sup>

For all vulnerable groups, as well as for migrant communities and people living in remote and low density rural areas, safe, accessible and reliable transport services are a lifeline.



## 1.2 GLOBAL TRENDS AND CHALLENGES

The discussion of sustainable transport must take place with an understanding of larger trends of urbanization, demographic shifts, and globalization, as well as technological progress in digital connectivity and propulsion solutions.

### Urbanization and urban-rural integration

By 2050, the world's urban population is expected to have grown by 2.5 billion people, reaching 66% of the total global population.<sup>19</sup> Africa and Asia together will make up nearly 90% of this increase until 2050, and, with this boom, economic mass will continue to shift from the mature economies toward the emerging markets.<sup>20</sup> In 2015, there were 29 megacities of over 10 million people, and by 2030 there will be an additional 12 megacities, with ten of them in Africa and Asia.<sup>21</sup> In addition, recent decades have seen the rise of polycentric metropolitan regions consisting of a number of connected large urban areas, which present a new set of challenges for transport planning.<sup>22</sup>

Currently, in much of the world, urban growth is poorly planned or managed, and the result is often sprawl and inadequate transport and infrastructure. 'Informal' transport options—unregulated private operators running small- to medium-capacity low-performance vehicles such as collective taxis and mini-buses—often fill the gaps, but on their own they cannot meet the needs of all people.<sup>23</sup> Formal and informal transport

both contribute to a host of challenges in cities, in terms of safety, personal security, congestion and pollution, disproportionately affecting the poor.

In many cities in developed and developing countries alike, congestion, pollution, shifting economic centres and demographic patterns present imminent threats to lives and livelihoods. The transport landscape in urban agglomerations is often highly inequitable, with poor and disabled people left with inadequate means to access the economic and social centres of the cities. The burden of climate change adds another layer of urgency and complexity to the problems decision makers must address in their quest to create sustainable cities.

Urbanization must be considered in the context of the entire global population, remembering that today, in some developing regions, the majority of the population is still residing in rural areas. Also, it is important to note that in some developed countries, urban centres, in fact, have diminishing populations and pockets of very low density. In both developing and developed countries, rural connectivity is an ongoing challenge, especially as economic and social activities and opportunities are often based in cities, towns and markets.





### The 'Last Mile' Challenge

When considering the transport landscape in any part of the globe, special attention must be paid to the 'last mile.' Transporting goods via rail, truck, ship or aircraft can be efficient and cost-effective. However, when goods arrive at a high-capacity freight station or port, they must then be transported to their final destination. This last leg of the supply chain is often less efficient, comprising a significant portion of the total cost to move goods. This has become known as the 'last mile' logistics challenge. The 'last mile' is also a conundrum for passenger transport, one that will need to be addressed to achieve sustainable transport.

The 'last mile' is a challenge everywhere, but it is particularly acute in the rural context in developing countries, where the 'last mile'—the distance from a transport hub—may, in fact, be a hundred miles or more. Communities in rural areas of developing countries are often completely disconnected from the major roads, rail lines, and public transport options that enable access to the economic and social activities and opportunities in cities. Addressing these circumstances will be needed in order to fulfil the 2030 Agenda for Sustainable Development promise to 'leave no one behind.'

### Demographic changes

In some parts of the world, the population is shrinking and aging, while, in other parts, it is growing rapidly and getting younger. For example, the median age in 2015 in Germany was 46.5 years while in India it was 27.3.<sup>24</sup> Many German cities, especially in the eastern part of the country, have experienced significant population declines after reunification, posing the opposite transport challenges to those experienced in Indian cities where the population is growing every year.

Demographic trends at both ends of the spectrum have consequences for transport. Broadly speaking, issues of accessibility and proximity are crucial in particular for elderly people, while younger generations are driving trends including the "sharing economy" and other approaches dependent on smart phone connectivity. However, these trends vary according to the region and level of development, and all policy decisions must take account of the specific context.

### Global supply chains and trade routes

Transport of goods and people is becoming an increasingly global activity, with research and development, raw material sourcing, design, production,

### Inclusive Transport for Low-Density Rural Areas in Chile



Chile is a country of contrast. 87% of its population lives in high density urban areas with an average of 6,000 people per km<sup>2</sup>, while more than two million people are living in rural areas with an average density of 3 people per km<sup>2</sup>. For the rural population, access to opportunities and services in urban areas such as healthcare, education and other services at a reasonable price and travel time is an issue of social inclusion. The Chilean Ministry of Transport and Telecommunication implemented a 'connectivity subsidy program' to assure transport to all people to these opportunities and services. The annual inclusive transport investment of about US\$60 million translates to an average subsidy of US\$2.66 per passenger and trip. The connectivity subsidy program has created a more competitive environment for transport operators serving rural areas and has enabled, for example, inclusive waterborne transport in extremely low-populated areas in the southern parts of Chile and free bus transport for handicapped children from remote areas throughout the country.

(See page 66 for all case study references)

Connected to Recommendations: 1, 2, 4, 8

and marketing potentially each located in a different country, or in several different countries.<sup>25</sup>

National governments and private sector entities are preparing for the challenges and opportunities arising from more globalized supply chains, including through trade facilitation via regional integration, and the creation



### Shipping Information Pipeline



It takes 200 interactions and more than 20 documents to transport a container of avocados from Mombasa, Kenya to Rotterdam in the Netherlands, and the cost of the documentation process equals the cost of the actual shipping. A partnership of public authorities, supply chain operators and information technology corporations is developing a 'Shipping Information Pipeline' (also known as 'Trade Logistics Information Pipeline'). This Pipeline provides a digital infrastructure, in which supply chain partners and authorities can share and access original information required for a trade, creating supply chain transparency and a flow of information that facilitates the flow of goods. The Shipping Information Pipeline is being tested in East Africa, and its potential for trade enhancement and growth is global.

Connected to Recommendations: 2, 4, 7

### Octopus Smart Card in Hong Kong



Hong Kong has one of the most advanced public transport systems in the world, and 93% of transport trips are made by public transport (48%) or walking (45%). The Octopus Smart Card is a contactless smart card payment system that started as a public transport fare collection system in 1997. It has since developed into contactless smart card application usable as a payment card in public transport and beyond with commercial partners all across Hong Kong. Today, Octopus has high standards for personal data protection, collecting only the minimum information needed for payment and settlement purposes. The Octopus Card includes access control functions for residential and commercial buildings and support for various facilities in schools. In Hong Kong, over 14 million transactions are made every day via the smart card system, and more than 99% of people aged 15 to 64 possess an Octopus Card.

Connected to Recommendations: 1, 2, 4, 8

of transport corridors. In Asia and Africa, governments are allocating more resources to long distance transit corridors, using high-capacity transport systems and simplified border crossings. In all regions, ports and airports are vital hubs enabling international freight transport.

The efficiency of the global supply chain depends also on 'last (and first) mile' deliveries at the local level. Progress toward more sustainable options is underway, for example, with the growing use of cargo bicycles and new technologies such as drone deliveries on the horizon.

### Digital connectivity

The digital revolution transforming all aspects of life will have a major impact on mobility and transport, in both demand and supply. In terms of demand, information and communication technology (ICT) is enabling

telecommuting, and video- and audio-conferencing can replace longer-distance travel. ICT innovations have also given rise to the sharing economy, making bike sharing, car sharing and transport on demand systems more viable and attractive.

In terms of supply, ICT improves the efficiency of transport networks through passenger information systems, real-time traffic management centres, integrated electronic ticketing systems, automated control systems allowing vehicles and track side or roadside equipment to communicate, and others. Many of these developments enhance the performance and attractiveness of public transport for consumers.<sup>26</sup> In freight transport, ICT facilitates the implementation of intermodal solutions, as precise tracking systems ease coordination and the development of smart hubs. ICT also facilitates load optimization, whether of passengers or freight, and



autonomous vehicles—which will be discussed later in the report—are showing promise. The mere presence of ICT-driven solutions does not mean that the old problems will vanish, however, and any roll-out of new technologies must be accompanied by comprehensive awareness-raising efforts and policy frameworks.

### Development of greener, more efficient propulsion technology

As the international community confronts the climate crisis, and cities around the world face unprecedented levels of pollution, there are signs of a widespread shift—slow though it may be—away from a fossil fuel-based transport system. There are vastly different approaches and rates of uptake in different countries and regions, but as the Paris Climate Agreement shows, the world agrees that action must be taken. This fundamental change will accompany a parallel global energy revolution. The question is not whether the transport and energy sectors will transform, but rather when and how.

Congestion and pollution—with accompanying twin health crises of traffic fatalities and health impacts of poor air quality—together with the climate imperative, are major drivers toward clean, green and smart transport technology. Effective technological innovation always needs to be linked to sustainable transport policies, because, as the Chairman of Ford Motor Company said, “a green traffic jam is still a traffic jam.”<sup>27</sup> Alongside new technologies, it is also vital that existing technologies, for example those improving fuel economy in cars, are more fully utilized across the globe. Technology developments specific to the transport sector will be discussed in Chapter 2.

## 1.3 THE ‘AVOID-SHIFT-IMPROVE’ APPROACH

The traditional approach to meeting the demand in passenger and freight transport has been the provision of additional infrastructure, but this supply-side oriented approach has not delivered sustainable outcomes. As an alternative, the concept known as ‘Avoid-Shift-Improve’ is built on the principles of sustainability, and the current report posits that a nationally- or context-tailored version of the approach provides an appropriate guiding framework.<sup>28</sup>

- ▶ **Avoiding** inefficient or unnecessary travel or transport, where appropriate, e.g. by improved and integrated urban planning, compact city form, transport demand management, less complex and extended supply chains, and e-communication options (mobile phone use, teleworking),
- ▶ **Shifting** travel/transport to improve trip efficiency through most efficient or environmentally friendly mode or combination of modes, capable of meeting the travel/transport needs, and/or shifting to off-peak travel, and
- ▶ **Improving** the environmental performance of transport through technological, operational, regulatory or pricing, and/or infrastructure improvements to make transport vehicles and equipment and the provision of transport more energy efficient and less carbon intensive.

The approach does not dictate that there must be “avoidance,” “shifting” or “improvement” in any particular instance. Rather, each should be considered and advanced as means to enhance sustainability. The model is most applicable to the urban context and to

### Bogota Declaration on Sustainable Transport Objectives

In 2011, representatives of the national transport and environment agencies of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay and Uruguay met in Bogota, Colombia and outlined key priorities and objectives in sustainable transport, adopting a working definition of sustainable transport as “the provision of services and infrastructure for the mobility of people and goods needed for economic and social development, and improved quality of life and competitiveness. These services and transport infrastructure provide secure, reliable, economical, efficient, equitable and affordable access to all, while mitigating the local and global negative impacts on health and the environment, in the short-, medium- and long-term, without compromising the development of future generations.”

The Bogota Declaration also embraced the ‘Avoid-Shift-Improve’ approach to align transport more fully with the principles of sustainable development. The signatories promoted cross-cutting strategies on enhanced road safety, mitigation of greenhouse gas emissions, adaptation of infrastructure and services to climate change impacts, consideration to vulnerable users, allocation of adequate financial resources to sustainable transport services, and good governance. The Declaration was bolstered by an explicit call on the participating countries to monitor their progress against the enumerated objectives and to make voluntary reports on successes and ongoing challenges.



long distance or international freight transport, where multiple transport modes and options are likely to be available. In rural areas, where options are often limited, 'shifting' is less relevant, at least in the short-term. Other imperatives, including the speed demanded by consumers, may also mean that some freight or shipping operators, for instance, focus more on the 'improve' approach, though there are instances where freight may be shifted from road to rail or waterways or from conventional delivery trucks to electric vehicles. Ultimately, however, the world as a whole can work toward 'shifting' to a reality where efficient and effective intermodality is achieved and all modes contribute to a better system.

The concept of **enabling** is a critical addition to the 'Avoid-Shift-Improve' framework, and it is in the realm of enabling that many of this report's recommendations have been developed. Essentially, as a prerequisite to effectively employ 'Avoid-Shift-Improve,' sound policy and governance structures and basic technical and financial capacities at all levels must be in place. While most developed states tend to have such structures and capabilities at least in some form, many countries, especially in the developing world, need capacity building to create or enhance them.

In terms of its understanding of the 'Avoid-Shift-Improve' framework and other concepts of sustainable transport, the current report builds on important work already undertaken by a range of stakeholders in academia, industry and policy circles. The Bogota Declaration on Sustainable Transport Objectives is one such milestone that provides an important foundation.<sup>29</sup>

### The Climate Change Imperative

Transport is responsible for 23% of global energy-related greenhouse gas emissions, so it will be impossible to address climate change without promoting sustainable transport.<sup>30</sup> Recognizing this, members of the transport community came together in 2014, as part of the Secretary-General's Climate Summit, and announced four transport initiatives to help combat climate change through expanding use of electric vehicles, increasing the efficiency of rail transport and air travel, and enhancing public transport in cities around the world.<sup>31</sup>

Linked to these initiatives is the efficient, clean and responsible freight movement, known as 'Green Freight,' which aims to protect the environment and public health, contribute to energy and cost savings, and support the vitality of the global economy and communities by reducing greenhouse gas emissions and air pollutants. The "Global Green Freight Action Plan" of the Climate and Clean Air Coalition uses

### Dedicated Freight Corridor in India



The Dedicated Freight Corridor (DFC) is one of the largest transport infrastructure projects implemented in India, conceived to meet the needs of India's rapid economic growth while inducing further regional economic development. The DFC project signifies a major transition in the freight transport sector by increasing the relative share of rail as an energy efficient, environment friendly and less carbon-intensive mode of transport. It is expected that DFC will save more than 450 million tons of CO<sub>2</sub> in first 30 years of operation.

In 2016, construction is well advanced on both the Western & Eastern sections. When complete, these will add over 3,360 route kilometres of electrified high capacity rail lines with connections to multimodal logistics parks, freight terminals and ports. Benefits include freeing up of capacity on the existing network for passenger services.

The cost for the project will be funded by a combination of debt from bilateral/multilateral agencies, equity from Ministry of Railways and public-private partnership.

Connected to recommendations 1, 2, 3, 4, 6, 8, 9

sector assessments, technology pilots, demonstration projects, and training programs to support reductions in the emissions of greenhouse gases, black carbon and air pollutants in the freight sector through a greener and more energy efficient multimodal global supply chain.<sup>32</sup>

These efforts, and others, including the Dedicated Freight Corridor in India (described above), illustrate the potential effectiveness of partnership approaches to tackling the climate crisis.

Transitioning to a sustainable transport system is essential in order to reduce carbon emissions by the 7 gigatonnes<sup>33</sup> required to meet the 2 degree climate change scenario.



## Making the economic case for sustainable transport

The transformation to sustainable transport requires a redirection rather than any substantial increase in infrastructure expenditure and can be realised through an annual investments of around US\$2 trillion, similar to the current 'business as usual' spending of US\$1.4 trillion to US\$2.1 trillion.<sup>34</sup>

Specifically in the urban context, according to the New Climate Economy Report by the Global Commission on the Economy and Climate, "more compact and connected urban development, built around mass public transport, can create cities that are economically dynamic and healthier and that have lower emissions." The study finds that such an approach to urbanization could reduce urban infrastructure capital requirements by more than US\$3 trillion over the next 15 years.<sup>35</sup> These savings come from costs associated with sprawl—expanded public services over larger areas, infrastructure to facilitate longer commuting distances, higher crash and pollution rates, and lower resource productivity rates—that are avoided with the compact urban model.<sup>36</sup> Looking at a longer time horizon, the International Energy Agency has predicted that shifts to sustainable transport patterns could save US\$70 trillion until 2050 in reduced spending on fossil fuels and lower capital investment and operational expenses related to vehicles and road infrastructure.<sup>37</sup>

Development of sustainable freight and passenger transport, including through integrated port terminals, well-planned airports and harmonized standards and regulations for efficient border crossings, will also enable economic growth. Estimates show that improvements in border administration, transport and communication infrastructure could see a global GDP increase by US\$2.6 trillion (4.7%).<sup>38</sup>

Air pollution in particular has a steep economic cost, in addition to the staggering human cost. In China, India, and the 35 OECD countries the cost is estimated to be US\$3.5 trillion annually in terms of ill health and lives lost. Data from OECD countries shows that approximately half of that economic burden results from road transport pollution. While air pollution in OECD countries has fallen recently, in part due to emission controls, there has been an increase in China and India as the growth in road traffic outpaces tighter emission regulations. Reducing air pollution from transport and other sources would clearly represent a boon to some of the largest economies in the world.<sup>39</sup>

In addition, reduction in road congestion would translate into a powerful economic benefit for many countries. Congestion is currently a tremendous burden on the economy (0.7% of the GDP in the United States, 2% of GDP in Europe, 2–5% of GDP in Asia, and as high as 10% of GDP in some cities of emerging economies, including Beijing, São Paulo and Lima).<sup>40, 41</sup>

Public transport is central to reducing road congestion and the associated costs in cities. It also creates value for individuals, businesses and public authorities by increasing the competitiveness of cities in terms of: economic strength, by allowing higher job density and productivity; human capital, by providing opportunities to build competences and skills more quickly; physical capital, by supporting urban regeneration efforts; global appeal, by increasing the attractiveness of the city for business and tourism; and quality of life by addressing congestion and improving public health.

As one example, elaborated below, the Johannesburg Bus Rapid Transit system is responsible for nearly US\$900 million in economic benefits to the city of Johannesburg and its people.

The economic benefits of sustainable transport are sometimes evident only when decisions are made with a long-term perspective, as is the case for many sustainable choices. Private sector companies can find a transport-related business case for all of the SDGs, if they consider a long-time horizon, as investment in sustainable transport will have associated benefits to education, healthcare, and gender equality that will in turn help to build an educated, healthy and empowered customer base and workforce. The challenge is communicating these longer-term benefits to companies in a way that will encourage their current engagement and commitment.





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“Well-intentioned policies formulated at the global or national level may not be adopted or properly implemented at the local level if they are not coherent with local priorities.”

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## 2. HOW TO MAKE TRANSPORT SUSTAINABLE

Providing access through sustainable transport will require advances in three key areas: policy development and implementation, financing, and technological innovation. If rigorous action is pursued in each of these areas, together they will drive change and help individuals, businesses and governments mobilize sustainable transport.

### 2.1 POLICY DEVELOPMENT AND IMPLEMENTATION

Design and implementation of policies aligned with the 'Avoid-Shift-Improve' guidelines will depend on integrated institutions, enhanced governance frameworks, short- and long-term planning taking into account the business case for sustainable transport and development, capacity building including for developing countries and countries in special situations, stakeholder engagement, and monitoring and evaluation.

#### An integrated approach to transport policy

Because transport is a complex space with implications for a wide range of sectors and populations, economic actors, and individuals, policy makers are most successful when they pursue an integrated approach to achieve sustainable transport—integration horizontally among sectors, institutions and modes, and vertically among levels of jurisdiction and authority.

#### Cross-sector integration and institutional cooperation

The need to effectively integrate transport and land use policy and planning has long been recognized, but in too many cases, policy development and planning is still carried out in silos. By approaching land use and transport planning as two sides of the same (access) coin, decision-makers will be able to create more effective transport corridors, parking and street designs, efforts to enhance multimodal transport, and 'placemaking'—creating public spaces to foster community interaction and enhance the quality of life. Integrated planning will help cities develop low-carbon, affordable, resilient mobility solutions, advancing the goal of compact, connected and coordinated cities to address the challenge of urban sprawl and the associated public and farmland grabbing that undermines the economic viability of rural areas.<sup>42</sup>

Transport planners must work in concert with a number of other sectors as well, including the energy, technology, housing and health sectors. Progress in greener transport will be meaningful only with concurrent progress in alternative energy production, and as transport technologies advance, the policy

#### Sustainable Urban Mobility Plans – Adaptation of the European Concept in Brazil



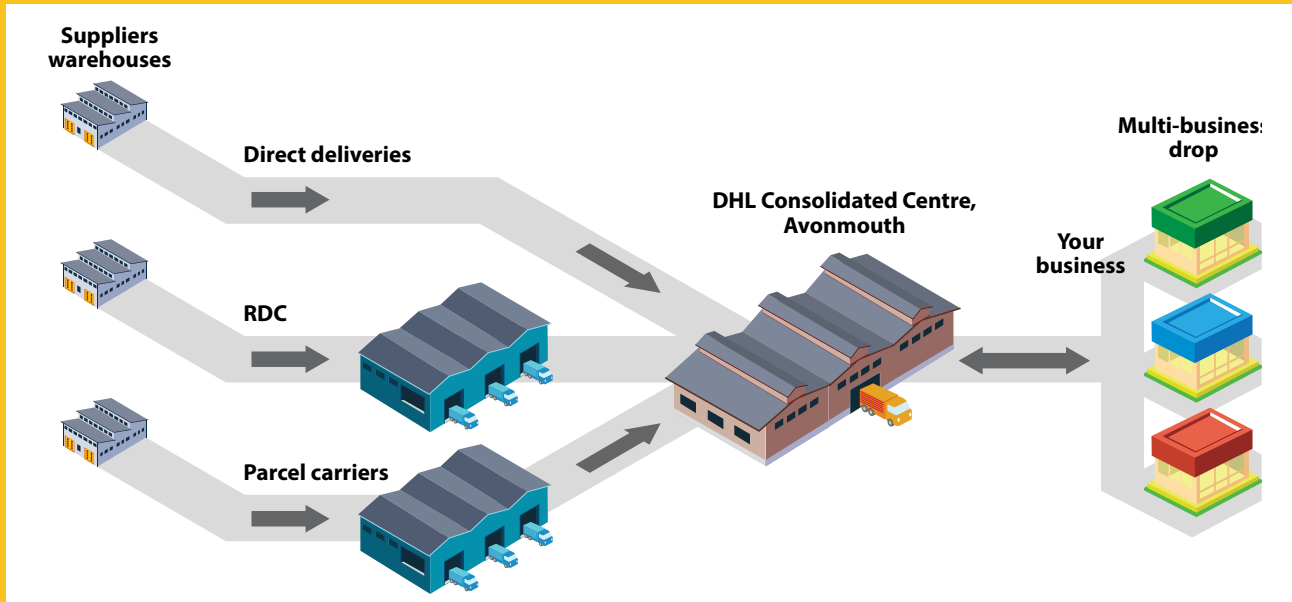
The concept of Sustainable Urban Mobility Plans originated in Europe under the slogan 'planning for people,' recognizing the need to align transport policies with people and their quality of life rather than the traditional focus on traffic and traffic speed optimization. Adapting the European model, Brazil has made urban mobility plans a legal obligation for 3,300 cities and a precondition for receiving transport infrastructure financing.

According to a 2016 survey of nearly 1,500 cities by the Brazilian Ministry of Cities, however, only 5.9% of the eligible cities had an urban mobility plan in place (26.7% were in the process of developing such a plan), and the survey made it clear that many municipalities do not have the technical and financial capacities to develop such plans. The Ministry of Cities recognized this deficit and worked with the WRI Ross Center for Sustainable Cities in Brazil to further adapt the European planning guidelines to the Brazilian context. The guidelines have now been downloaded more than 10,000 times. Many cities are using them to develop urban mobility plans, including, for instance, Joinville (560,000 inhabitants), which is particularly notable for its complementary active transport plan promoting the increased use of cycling and walking as the most sustainable urban transport modes.

Connected to Recommendations: 1, 2, 3, 4, 5, 6, 7



### City Centre Freight Consolidation in the United Kingdom



Cities in the United Kingdom have long dealt with road congestion, emissions, pollution, road crashes and related costs. Recent programs have deployed a consolidation centre model for freight deliveries at several sites in the United Kingdom that work to address these challenges. The model relies on the effective cooperation between city councils, freight delivery companies and local businesses/retailers.

Neighbouring cities of Bristol and Bath share a centre with consolidated deliveries and electric trucks to serve 139 businesses in their respective city centres. This consolidation centre reduced 78% of the delivery trips to retailers, 196 tons of carbon dioxide (CO<sub>2</sub>), and 6 tons of nitrogen oxide (NO<sub>x</sub>) emissions.

This model has also been applied to large airports in London. The London “Gatwick Direct Service” utilizes a single distribution centre off airport property. It provides its retail locations inside the London Gatwick airport with the option of a single drop-off location where goods can be consolidated and delivered to concessionaires in one trip. This has cut the number of vehicles going airside from 68% to 48% and further reductions are expected as additional concessionaires come on board. This has reduced transport costs, alleviated road congestion, and substantially reduced carbon emissions of the airport. Meanwhile, London’s Heathrow Consolidation Centre serves 320 retail and catering outlets, pubs and restaurants within the airport by consolidating 700 in-bound deliveries each week into 300 outbound vehicle deliveries to save 218 tons of CO<sub>2</sub> emissions per year as well as significantly reduce congestion.

Connected to Recommendations: 1, 2, 8

frameworks will need to adapt and respond to the new technology landscape—as noted below in the context of autonomous vehicles. Transport planning benefits also from engagement with local housing and health ministries, with integrated approaches to address road safety, air pollution and noise, and even to combat obesity through walking and cycling.

The Sustainable Urban Mobility Plan concept is built around a holistic approach to transport and urban planning and in many cases includes ambitious quantitative modal share targets to attain balanced sustainable local mobility. For example, Copenhagen’s long-term vision is that at least 1/3 of all driven traffic

in the city should be made by bicycle, at least 1/3 by public transport and not more than 1/3 by car. In Dubai, the Roads and Transport Authority is targeting the share of public transport trips to be 20% of total trips in 2020 and 30% in 2030 – a significant increase from the public transport modal share of 15% in 2015. Targets can also be set at the national level to guide local mobility planning. For example, Malaysia has set a goal to achieve a public transport target of 40% of all trips in urban areas by 2030.<sup>43</sup>

The Sustainable Urban Mobility Plan methodology has multiple benefits, but in the transition phase, city governments may face challenges in breaking down silos





and changing the way decisions are made to allow for truly integrated policy making. It is therefore crucial that capacity development and financial support, especially at the municipal level, accompany the roll-out of Sustainable Urban Mobility Plan requirements and other integrated approaches.

Integrated approaches are crucial for effective freight planning as well, through strategic placement of shipping hubs, for instance, to reduce urban congestion created by deliveries.

### *Intermodality*

Intermodality is a key feature of integrated transport systems and policy, and it is the principle underlying

the 'Avoid-Shift-Improve' approach. Transport systems that are integrated to meet the needs of urban and rural users—including the need to travel or move goods the 'last mile'— offer substantial efficiency increases. A precondition of intermodality is the cooperation among different transport operators, for example through a metropolitan or regional transport authority as an effective central institution.

In the long-range movement of freight and people, it is important that standards and administrative procedures are harmonized across countries, and intermodal interfaces are smooth and efficient to optimize connectivity. Whether a shipment is crossing a national border, or a passenger wants to transfer from an aircraft or ferry to train to car, the infrastructure and

### **Bus Rapid Transit System in Johannesburg**

The designation of Johannesburg as one of the hosts of the 2010 FIFA World Cup in South Africa provided the impetus to improve public transport in the city, including through the first full Bus Rapid Transit (BRT) system in Africa. The system, Rea Vaya, was designed by the city administration to be both functional and attractive, with pre-paid boarding, aesthetically-pleasing weather-protected stations, and buses running in designated lanes. To promote multimodality, Rea Vaya is connecting to Gautrain's dedicated bus link and rail system. In an example of south-south cooperation, city planners also took study tours to Bogota, Colombia to learn from the BRT experience in that city.

A central challenge in Rea Vaya's development was resistance from owners of informal minibuses and taxi drivers, but by including these groups through a taxi industry steering committee, the city encouraged them to become critical stakeholders helping to find solutions together with the city. Taxi representatives also participated in the Bogota study tours.

Rea Vaya was designed with a number of development objectives in mind, including enhanced economic growth, poverty alleviation, sustainable development and good governance. Financed through a public-private partnership approach, the direct economic returns of Johannesburg's BRT system (initial Phase 1A), over the period 2007-2026, are approximately US\$143 million in net present value (NPV). The total cost was estimated at US\$749 million in NPV, and if considering wider benefits, the economic returns are estimated to be almost US\$900 million in NPV.



The economic benefits of the Rea Vaya BRT system (period 2007-2026)

Components of economic benefit	Net present value (US\$ millions 2012)
Travel time savings	331
Improved road safety	268
Increased physical activity	141
Operating cost reduction	170
Travel time lost during construction	-38
CO <sub>2</sub> emissions reduction	18
<b>Total economic returns</b>	<b>892</b>

Connected to Recommendations: 1, 2, 4, 6, 10



operational links and connections among modes should be well-conceived and as seamless as possible. Safety, accessibility, and environmental concerns are paramount.

Landlocked countries and small island states face particular challenges in intermodal interfaces. For landlocked countries, dry ports—inland facilities where multimodal shipping containers brought in from a seaport by road or rail can be processed and their contents shipped on to their final destinations—are one mechanism to increase efficiency. For small islands, often far away from major shipping routes, regional or sub regional hub ports can reduce freight costs that are often otherwise prohibitive.

In cities and urban regions, seamless intermodal links will help to shape customer choice and enhance consumer satisfaction. Especially in developing countries and emerging markets, intermodal systems incorporating informal and formal transport systems, with public transport services connected to shared transport can allow cities to leapfrog the conventional models of car-centric development. ‘Mobility on Demand’ options, enabled by fleets of lightweight electric vehicles or bicycles stationed in hubs around a city that can be returned to another nearby hub, can be key links in the intermodality chain. And if the links improve the accessibility of the various modes for all—regardless of economic status, disability, age and gender—effective intermodality will advance equity and ensure a people-centred approach to transport and to development more broadly.

It is important to note that even under the best conditions of intermodality, if a passenger must change modes or trips too many times, there are risks that he or she reverts to the single mode approach—usually the private car for those who can afford one. This reinforces the importance of pursuing well-planned systems.

#### ***Governance frameworks for effective policy making***

Well-intentioned policies formulated at the global or national level may not be adopted or properly implemented at the local level if they are not coherent with local priorities. This is particularly important for the SDGs, as they will need to be implemented on the ground, in many cases at the sub-national and local levels. As an associated problem, many countries lack guiding national policy frameworks for cities. The ‘New Urban Agenda,’ an outcome of the Habitat III Conference, calls for “a renewed local-national partnership, in which stakeholders and local and sub-national governments are strategic partners of national governments, building a strong national system of cities and well- balanced territorial development, in support of national development targets.”<sup>44</sup> National urban policies that focus on mixed land use, compact city forms and transit-oriented development can advance sustainable transport objectives.

### **Territorial Integration in Landlocked Developing Countries – Northern Corridor**



The Northern Corridor connects the landlocked countries of Burundi, Rwanda and Uganda with Kenya’s maritime port of Mombasa and also serves the Eastern part of the Democratic Republic of Congo, Ethiopia, Southern Sudan and Northern Tanzania. The Northern Corridor includes road, rail, inland waterways and pipelines. A governing transit agreement provides a common framework on the movement of people and goods, customs control, documentation and procedures, and infrastructure development. As a result, transit times between Mombasa and Burundi’s capital Bujumbura have been reduced from over 30 days to about 15 days, and transit charges have dropped along the Corridor as well. In addition, the Northern Corridor initiative seeks to provide services and support to both truck drivers and the Corridor communities, with roadside stations that include health care centres, hotels, banks, supermarkets, police outposts and green public spaces. To build capacity in advancing sustainable freight policies and plans for the Northern Corridor (and the Central Corridor), United Nations organizations including the UN Conference on Trade and Development, the UN Environment Program, and the Economic Commissions of Africa and Latin America, and regional economic communities including the Common Market for Eastern and Southern Africa and the East African Community are developing toolkits, training workshops, best practice handbooks and other materials.

Connected to Recommendations: 1, 2, 3, 4, 9



Sub-national and municipal authorities, with their knowledge of local communities and the contours of the local business landscape, are often well-positioned to shape passenger and freight transport planning and organization. To take advantage of this, building effective governance and technical capacity at the local or urban level will be critical, as will ensuring that local authorities have adequate financial resources. Effective frameworks for the procurement of public transport services are likewise fundamental.

Territorial integration—aligning goals and responsibilities of neighbouring cities and towns, and countries—can also help create effective governance frameworks and policies.

**Short- and long-term planning taking into account the business case for sustainable transport and development**

Effective transport planning combines the need for short-term deliverables with a long-term strategic view, incorporating the social, economic and environmental aspects of transport and of development more broadly. While consideration of both short- and long-term needs is common sense for all planning, it is particularly relevant for transport because of its multi-faceted nature and the resource-intensive, locked-in quality of many transport infrastructure and systems decisions.

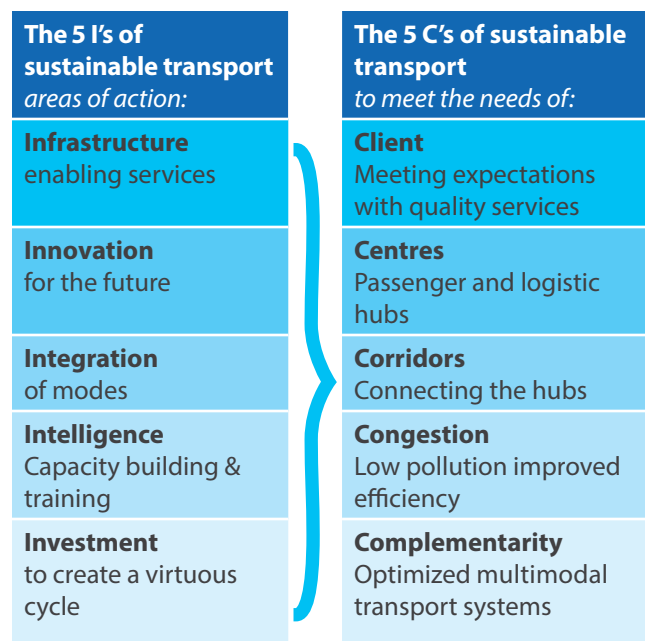
The business case for sustainable development becomes increasingly clear with longer time horizons. Investing in green energy, or resilient infrastructure, for instance will save—and earn—money for companies over the long-term. For private sector companies, and even, as noted above, for local and national governments, competition is a powerful driving force, and competing to become more sustainable will pay dividends over the long-term for the companies, the governments and the world at large.<sup>45</sup>

Resilience planning is an important feature of sustainable transport development, ensuring that passenger and freight transport networks including infrastructure, service and operations are able to adapt well to climate change-related events and other chronic stresses, such as high unemployment and endemic violence and acute shocks, such as earthquakes and terrorist attacks. According to UN-Habitat, 80% of the largest cities are vulnerable to severe impacts from earthquakes, 60% are at risk from storm surges and tsunamis, and all face new impacts caused by climate change.<sup>46</sup>

In cities, resilience planning highlights that relying on one transport mode for mobility can put cities at risk, and emphasizes that all modes should be optimized in their respective areas of strength. For example, ferry systems have proven critical in emergency situations, when other modes of transport have been completely

or partially disabled, including in the aftermath of the terrorist attacks of September 11, 2001, and Hurricane Sandy in New York in 2012. In part as a result of this experience, and with the aim of improving access to underserved communities in the outer boroughs, New York City is currently investing in a major expansion of its ferry system.<sup>47</sup> Cities in the developing world including Bangkok, Istanbul, Manila, Mumbai and Lagos are also exploring expanding their ferry systems to enhance the resilience and effectiveness of their transport mix.<sup>48</sup>

Looking through the bifocal lens of sustainable development—short- and long-term, for current and future generations—the preamble of the 2030 Agenda for Sustainable Development frames the SDGs in terms of “5 Ps”: People, Planet, Prosperity, Peace and Partnership. It is one of many conceptual frameworks or illustrations that can help people understand and remember the imperatives around the sustainable development agenda. Similarly, there are many ways to present the objectives of sustainable transport, and the below framework—the “5 Is and 5 Cs”—is one such approach.



**Building capacity, especially in developing countries, to enhance safety and access**

Many developing countries are undergoing massive urbanization, which brings with it social, economic and environmental challenges. In all three areas, transport can be both part of the problem and part of the solution, depending on the approach the governments and their international partners take.

From the perspective of global equity, the current transport situation leaves much to be desired in multiple ways, with the developing world bearing the



brunt of the negative outcomes. The fact that more than 90% of road fatalities take place in low- and middle-income countries is a tragic and untenable situation. In 2014, the World Health Organization estimated that 7 million people die prematurely every year due to air pollution, with half of them due to outdoor pollution, and with low- and middle-income countries in South-East Asia and Western Pacific Regions carrying the bulk of this burden.<sup>49</sup> In addition, in both developing and developed countries, the levels of inequity of access to jobs and key public services within individual cities are not acceptable.

Private vehicle ownership tends to increase as nations and cities develop, particularly given the cultural and societal pressures that equate car ownership with success.<sup>50</sup> In urban areas in developing countries in

particular, this model enhances access for the wealthier parts of the population and not for the rest. But there are ways to balance these trends with targeted policies that enhance more diversified land use and multimodal public transport systems. These include capacity building for the effective procurement of public transport systems, that meet the needs of people, advance the objective of equitable access, lower air pollution and road deaths, and increase quality of life.

The models of development that defined urbanization in the developed world are not the only option, and developing countries have the chance now, with the support of development partners, to pursue a better path. More than half of all urbanized land has yet to be developed, which means that there is a great opportunity now to pursue compact and connected models.<sup>51</sup>

### SaveKidsLives Campaign of the United Nations



Worldwide, 3,400 people die on the road every day. 500 of them are children.

While the road safety challenge is a global one, the children most likely to die in a road traffic crash live in the world's low- and middle-income countries, where 95% of road traffic fatalities among children occur. The SaveKidsLives campaign aims to raise global awareness of the dangers children face every day when they go to school and back home. The campaign, coordinated by the United Nations Road Safety Collaboration and co-led by children, is based on the Child Declaration for Road Safety. The campaign has collected more than one million signatures, including from government officials, citizens, and prominent figures such as His Holiness Pope Francis and the United Nations Secretary General, Ban Ki-moon. SaveKidsLives is calling for urgent action.

The five priorities are:

1. A safe journey to school for every child including safe roads and speed management around every school;
2. Safe school transport including seatbelts on all school buses;
3. Vehicles safe for children and action to promote child restraints;
4. Motorcycle helmets for all children where two-wheelers are the main family transport;
5. Enforcement and action against drunk-driving.

An example of promoting safe journeys to school comes from Tanzania where the road safety NGO Amend is implementing a program to systematically assess areas around schools and improve road safety in collaboration with schools, the civil society and local authorities. Amend is targeting schools in poor and overcrowded neighbourhoods where at least 1 out of 25 children have suffered injuries on the road every year.

Connected to Recommendations: 2, 4, 5, 6



The starkly different statistics in road deaths and injuries between developed and developing countries point to the urgent need to build capacity in developing countries. SDG 3 on health includes a target on road safety, calling on the global community to cut road deaths by half by 2020. This short time frame is appropriate considering the critical nature of the problem. Reaching this target will take concerted efforts from a range of actors.

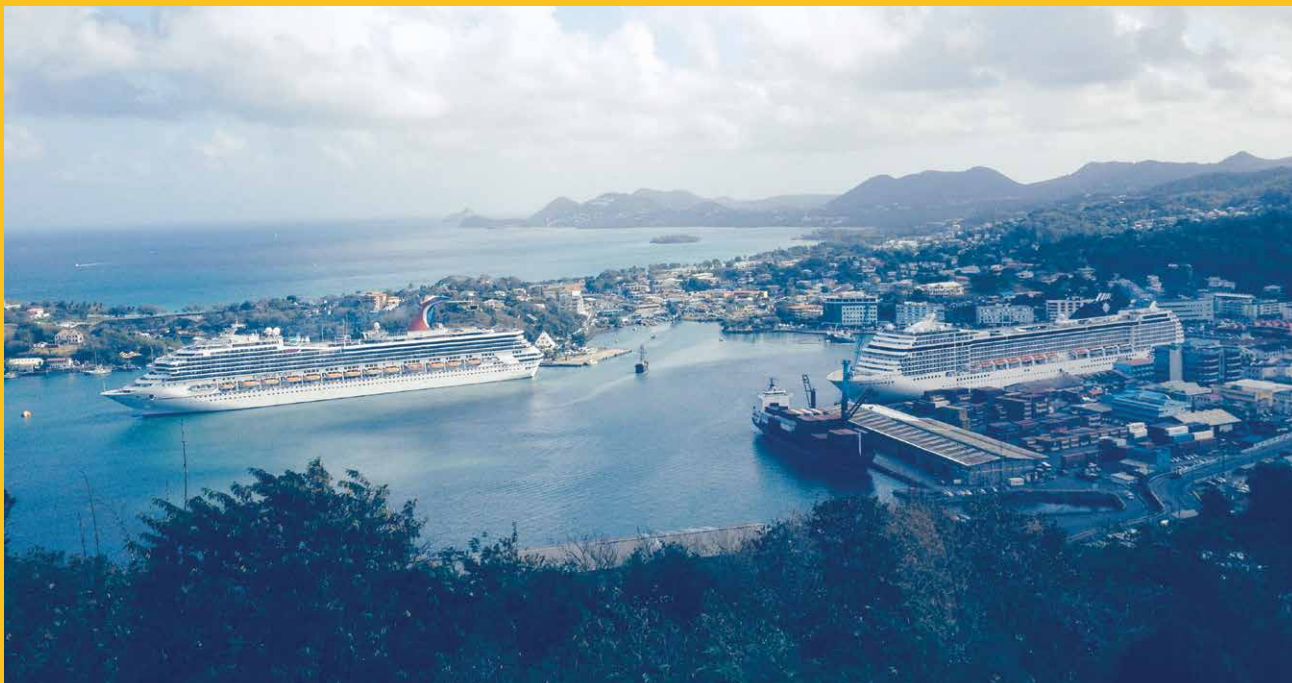
Safety is critical for all modes. For rail systems, intersections with roads represent one of the most significant safety risks. Each year, there are millions of near misses and over 6,000 deaths at level crossings (almost all due to intentional or unintentional violation of traffic rules by the motorist, cyclist or pedestrian).<sup>52</sup> According to the Worldwide Ferry Safety Association, every year between 1,500 and 2,000 fatalities<sup>53</sup> occur, a rate of approximately 1 per million riders, and over 95% of the fatalities are in the developing world.<sup>54</sup> Overall, public transport travel has about a tenth the traffic casualty (death or injury) rate as automobile travel, and residents of transit-oriented communities have about a fifth the per capita crash casualty rate as in automobile-oriented communities.<sup>55</sup>

#### ***Advancing sustainable transport in countries in special situations***

Landlocked developing countries and small island developing states face particular challenges in advancing sustainable transport solutions.<sup>56</sup> Inter-modality, as noted above, is difficult to achieve in landlocked countries and small island developing states, because of their geographical realities. Landlocked countries depend on transit through neighbouring countries to reach seaports, and the border crossings and sheer distances, especially with infrastructure that is often inadequate, undermine the competitiveness of these countries.<sup>57</sup> For small island developing states, highly dependent on food and energy imports, and often relying heavily on tourism for revenue and livelihoods, transport is critical. With their remoteness and small size, these island states are often underserved by transport providers, and their vulnerabilities are exacerbated by the growing impacts of climate change.<sup>58</sup>



## Climate Change Adaptation and Resilience Building for Transport Infrastructure in Small Island Developing States – the Cases of Saint Lucia and Jamaica



In Saint Lucia and Jamaica, like in many other small island developing states (SIDS), ports and airports constitute critical transport infrastructure, for food, energy, trade and tourism, which contributes significantly to the national GDP. The Hewanorra International Airport in Saint Lucia is the primary international access point for international tourists. In Jamaica, over 80% of international tourist arrivals are through the Sangster International Airport. Cruise ship tourism in both countries also depends crucially on ports (Castries and Falmouth).

Recent extreme climatic events have shown the vulnerability of ports and airports to a variety of climatic factors, such as heavy downpours, flash floods and storm surges. These have had very significant impacts in both countries, flooding of key infrastructure and access roads, severely impairing transport connectivity. Such impacts are likely to be exacerbated by the projected climatic changes in the region; extreme precipitation is projected to intensify, as are mean sea level rise, storm waves and surges.

Based on an assessment of criticality and vulnerability of key transport assets, in Saint Lucia and Jamaica, the United Nations Conference on Trade and Development (UNCTAD) is developing a methodology to enable transport policymakers, planners and operators to assess vulnerabilities, set effective priorities in adaptation planning and take appropriate adaptation response measures. The methodology takes into account available climate data, historical information on asset damage, as well as projections of future climatic factors under different scenarios, and includes recommendations for effective adaptation planning. The methodology will, subject to location-specific adjustments, be transferable for use in other SIDS in the Caribbean region and beyond.

Connected to Recommendations: 1, 2, 4

### Stakeholder engagement and public awareness

Transport policies shape and are shaped by a wide range of stakeholders, including governments, transport authorities and operators, financial institutions, businesses and enterprises of all sizes, community organizations, research institutions and individual experts. Public consultation is a mandated element

of transport legislation in many countries, and some countries are pursuing participatory budgeting. Most basically, stakeholder engagement helps to identify need and demand for transport services. These approaches also help ensure that a range of perspectives is considered, adding legitimacy to decisions, enabling co-decision making and creating a sense of ownership among stakeholders and citizens.



## Transparent Communication of Policy Progress in Copenhagen



The Danish capital Copenhagen aims to become the “eco-metropolis” of the world and the world’s best city for cyclists, and to be CO<sub>2</sub>-neutral by 2025. Copenhagen puts considerable effort into monitoring and evaluating progress towards its strategic eco-metropolis vision, using “Green Accounts,” publications targeted at “everyone interested in the City’s environmental initiatives, including citizens, enterprises and local politicians, as well as other decision makers in Copenhagen and other cities.” The Green Accounts are published as a printed booklet as well as an online publication and are complemented by thematically-focused “Bicycle Accounts” and “Urban Life Accounts.” Progress towards policy goals is communicated through easily understandable green, yellow and red icons.

GOALS FOR 2015	CAN WE ACHIEVE THE GOAL?	HOW FAR HAVE WE COME?
<b>THE WORLD’S BEST CITY FOR CYCLISTS</b>		
At least 50% of people to cycle to their workplace or educational institution in Copenhagen.		The percentage of people who commute by bicycle increased from 41% in 2012 to 45% in 2014. This increase involves a certain statistical uncertainty; however, the continued expansion of the cycle grid, another mild winter and the extensive construction work on the metro probably led to a certain shift from car to bicycle.
<b>A CLEAN AND HEALTHY BIG CITY</b>		
Copenhageners to be able to sleep peacefully, free from noise harmful to health from street traffic.		Noise-reducing asphalt, traffic planning and speed reduction have reduced traffic noise in general in the city. In addition, the municipality subsidizes noise insulating windows in urban renewal projects
<b>A GREEN AND BLUE CAPITAL CITY</b>		
90% of Copenhageners to be able to walk to a park, a beach, a natural area or sea swimming pool in less than 15 minutes.		Today, 96% of Copenhagen are able to walk to a large green or blue recreational area in less than 15 minutes. This means that we have achieved the goal. However, Copenhagen will continue to improve access to its blue and green recreational areas. In 2013, two new pocket parks opened.

Connected to Recommendations: 1, 2, 3, 4, 5, 6, 7

Public education and public information campaigns represent important tools also to achieve behaviour change. If young people—and people of all ages—can learn in school and through the media and outreach campaigns about the benefits of sustainable transport, they will be more likely to make sustainable choices in the future. These choices will be reinforced further if the public transport options are attractive, accessible and safe.

Raising awareness is the first step, and other incentives can help translate this new awareness into decision making. Transport Demand Management (TDM) encourages better use of existing infrastructure and promotes public transport, ridesharing and teleworking through tools including public information campaigns, infrastructure design and transit-oriented development. Making public transport attractive and universally accessible also drives

demand. Market-based tools and other tools for adjusting behaviour such as pricing and tolling, limiting road space, and parking policies will be presented below.

### Monitoring & Evaluation

Measuring transport performance is becoming more effective, as new indicators and targets are being introduced to the global community reflecting the people-centred and sustainable approach in transport.<sup>59</sup> In addition, public transport usage itself is a source of data on mobility and citizen behaviour patterns in cities.<sup>60</sup> However, a wider monitoring and evaluation or tracking framework for sustainable transport encompassing all modes in passenger and freight transport is still missing. Urban data, particularly on existing and future urban travel



demand and land use and their interactions, remain sparse, inconsistent and often of overall poor quality. Developing countries, in particular, often need capacity development support in this area.<sup>61</sup>

Digital connectivity presents great opportunities, but technological progress must be accompanied by innovation in regulatory settings to ensure that the value created is not tarnished by intrusions in privacy.<sup>62</sup>

In relation to the SDGs, the UN is introducing new indicators that relate to some aspects of transport (e.g. access to public transport), and each country will choose indicators that are best suited to track its progress in relation to national priorities and needs. Capacity building will be important to track progress in sustainable transport, particularly at the urban level, and enable evidence-based decision making to set the right policies and allocate the right resources.

Private sector companies can work in partnership with governments and civil society organisations to advance monitoring frameworks. For example, the Global Logistics Emissions Council, a group of companies and industry organizations, recently launched a framework offering a universal approach to calculating logistics emissions.<sup>63</sup> This effort will help companies to accurately benchmark and select suppliers based on comparable emissions data, empowering both the public and private sector buying transport services to meet sustainability goals.

Recognizing the value of targets also in improving road safety, governments have mandated the UN Economic Commission for Europe to launch a project to assist governments in low- and middle-income countries to develop regional and national road safety targets and to exchange experiences on good practices for achieving these targets.<sup>64</sup>

## 2.2 FINANCING

The global investment needs for transport infrastructure are estimated at between US\$1.4 and US\$2.1 trillion per year, and recent studies have estimated that a low-carbon pathway is attainable given these current flows, if this transport investment is directed to sustainable transport.<sup>65</sup> Policy makers, multi-lateral development banks and other financial institutions are in the position to push development toward sustainable transport by setting criteria and standards and creating a favourable investment climate.

### *Effective funding, charging and fiscal frameworks*

The development of appropriate funding frameworks will be a key step in aligning different sources of transport funding and financing and encouraging a significant

scaling up of financing for sustainable transport. National governments will need to empower cities, addressing outdated laws that prevent many cities from utilizing local tax revenues or borrowing money on their own or accessing funding from international organizations. Currently, only 4% of the 500 largest cities in developing countries are rated creditworthy by international financial markets.<sup>66</sup> However, this is slowly changing. For example, recently, the Peruvian capital Lima worked with international banks to get a better credit rating, which enabled it to issue bonds to invest in low-carbon mass transit.

### Government funding

The bulk of infrastructure and other transport investments comes from traditional government sources. As noted above, government decisions, including those on funding, should be made with both long- and short-term perspectives and, whenever possible, linked

#### Delhi Metro: A Low Carbon & Sustainable Urban Transport Solution



The first section of the Metro in Delhi, India, was commissioned in December 2002. Today the network covers 210 kilometres and is expected to be about 325 kilometres long by 2017. Delhi Metro carries 2.8 million passengers a day, replacing 400,000 vehicles on the road, saving 300,000 tons of oil import per year, and preventing 70 tons of pollutants being let into the air every day. Each commuter saves 32 minutes in his/her journey, and about 135 road fatalities are avoided per annum. Delhi Metro is funded 40% by the Governments of India and Delhi, and the balance through debt. Delhi Metro Rail Corporation is also financially sustainable, able to service and pay back the loans out of its own operational earnings in spite of the fact that Delhi Metro has one of the lowest fare structures in the world (25 cents for a travel of 10 kilometres).

Connected to recommendations: 1, 2, 3, 8





to the existence of sustainable transport plans and the application of the 'Avoid-Shift-Improve' approach. As noted above, this may mean that planning authorities, especially on the municipal level, need to receive technical and financial assistance to develop high-quality sustainable transport plans.

### Engagement with the private sector

The 2030 Agenda for Sustainable Development points to partnerships, including with the private sector, as one important means of implementing the SDGs. Public-private partnerships (PPPs) present the opportunity to leverage expertise, innovation, financial resources and policy mechanisms. In addition, national governments can establish frameworks to encourage PPPs at the local level, by providing support to the local governments and enhanced confidence for the private companies.<sup>67</sup>

PPPs can pose challenges, because, by definition, the financial interests of the different parties are not completely aligned. While individual businesses often make decisions based on the impetus for corporate social responsibility, or on the owner's personal ethical commitments, the overall driving force is profit. Safeguards must be enacted to ensure that the principles of sustainable development are respected, that contracts are balanced, and that governments select and design projects appropriate for PPPs with care.

When defined broadly, any private investment in a public infrastructure project or initiative constitutes a public-private partnership. From this perspective, governments have a range of incentive-based tools at their disposal to encourage investment, including tax breaks and other positive incentives. Local business communities may be motivated by these incentives as well as, more generally, an understanding of the long-term benefits that can come from public-private collaboration in the transport sector. In order to encourage investment in the transport sector, risk must be held to an acceptable level, governance structures must be in place to create an enabling environment, and national governments should support and empower local level authorities to engage with private sector partners in a constructive manner. "Crossrail" in the Greater London area, for instance, mobilized private sector funding to help defray the costs of a major rail infrastructure project by making the argument that the local business community would ultimately profit from enhanced public transport services.<sup>68</sup>

### Fiscal- and market-based measures

Innovative user charges and other fiscal instruments can both raise revenue and manage transport demand, shifting demand from the private motorized vehicle

## One Belt, One Road



China's One Belt, One Road Initiative (OBOR), launched in 2013, aims to connect major Eurasian economies through infrastructure, trade and investment. The initiative contains two international trade connections: a land-based "Silk Road Economic Belt" and an ocean-going "Maritime Silk Road."

The OBOR encompasses over 65 countries, accounting for half the world's population and 40% of GDP. Investment for the OBOR is estimated between US\$4 and US\$8 trillion. China's Silk Road Fund, the Asian Infrastructure Investment Bank, and public-private financing are all regarded as potential sources of investment.

While its objectives for transport relate mainly to the multilateral construction of infrastructure (transport lines and facilities), the OBOR has a broad focus. It covers surface transport, shipping, and aviation—and seeks to deliver investment to enhance multimodality and mode integration, road safety, customs clearance, and the development of standardized policies and regulations. The OBOR will also promote green and low-carbon infrastructure construction and operation management, taking full account of the impact of climate change in its projects.

Connected to Recommendations: 2, 3, 4, 8, 9

options to walking, cycling, and public transport; and freight from exclusively road to multimodal solutions combining road, rail and waterways. In aviation, user charges are being implemented for air traffic control, airport access, and other facilities and services, which make the aviation sector accountable for much of its infrastructure costs. Aircraft operators may be required to pay noise or emissions charges under certain circumstances consistent with aviation taxes and charges policies. Market-based measures can be used to create or enhance a "market signal" and provide economic



incentives for preferred behaviour and use of low-emission transport options. It is important to deploy these measures in a manner that keeps the goal of access in mind, and to set up national instruments from different countries affecting the movement of people and goods in a way that guarantees a level playing field and avoids market distortions.

Opportunities include:

- ▶ Infrastructure use charges reflecting the marginal social costs of travel (e.g. associated with congestion and level of emissions);
- ▶ Vehicle registration and ownership charges properly structured to reflect the emissions, road damage and congestion they cause;
- ▶ Fuel taxes, and generally moving from fixed charges to charges that vary with use;
- ▶ Carbon pricing;
- ▶ Parking regulations and fees;
- ▶ Land value capture and other “indirect beneficiary pays” measures to reflect the beneficial impacts of transport and other sectoral investments beyond those who are directly involved in the transport;
- ▶ Public-private partnerships that give businesses the opportunity to voluntarily contribute to the funding of transport systems, because the businesses ultimately benefit from the systems;
- ▶ High Occupancy Tolling (HOT lanes) on high-traffic roads;
- ▶ Social impact investment: capturing the long-term financial benefits of improved road safety to fund the up-front capital improvement of road infrastructure;
- ▶ Across all modes, adjustable combinations of pricing, regulatory and market-based measures that steer transport systems to commonly agreed targets of emissions and other negative externalities while preserving multiple choices for clients.

Improving the internalization of the social and environmental costs and benefits of transport would revolutionize the sector.

One measure that receives considerable policy attention is the subsidization of fossil fuels. SDG 12, reflecting the complexity of the fuel subsidy questions, calls on the international community to “rationalize

### Coordinated Transport Policies in Moscow



Following 20 years of almost uncontrolled development of urban traffic, the city of Moscow introduced a rigorous and comprehensive set of policies to address gridlock on its streets. Within five years, the complementary measures put in place have reduced the number of cars in central Moscow by 25%, despite 600 new cars being registered in the agglomeration each day. Measures include the introduction of 67,000 paid parking spaces generating EUR 90 million in revenues since 2012 that are invested in neighbourhood improvements, as well as the further development of the public transport network and the introduction of an electronic travel card facilitating intermodal trips in the city. Cycling has been kicked-off via the addition of over 200 kilometres of bicycle paths to the City that had just 2.3 kilometres of such paths in 2011. A bicycling sharing system, a car sharing system, the regulation of taxi services as well as improved freight logistics in Moscow’s centre have been introduced. Finally, a governance reform in public transport now allows for open and competitive tenders. For their coordinated urban transport policies and resulting accomplishments, Moscow received the 2016 Transport Achievement Award of the International Transport Forum.

Connected to Recommendations: 1, 2, 3, 8

inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities.”<sup>69</sup>





### Finance from international financial institutions

The scale of investment required for sustainable transport in developing countries is enormous, and represents a great challenge for the years ahead. Most of these resources will have to be provided by developing country governments and the private sector. However, the international financial institutions also have a vital role to play. Multilateral and bilateral financing institutions respond to the demands from national and local governments, as well as the private sector, for financing sustainable transport infrastructure, especially in countries with limited access to investment finance. Beyond the provision of finance, they often help countries to implement key recommendations. These include recommendations referred to in the present report, for example, on the development of sound policies for sustainable transport and funding, support for demonstration projects through innovative finance mechanisms, and dissemination of best practices and capacity development.

### Climate funds

As the scale of the climate change emergency has become clear, countries around the world have responded with pledges and contributions in a variety of climate funds. The total amount pledged as of May 2016 was nearly 36.5 billion dollars.<sup>70</sup>

The landscape for climate finance is varied and complex, and international funding mechanisms to support

### Engagement of Multilateral Development Banks in Sustainable Transport

On the occasion of the Rio+20 United Nations Conference on Sustainable Development, eight multilateral development banks (MDBs)\* issued a joint statement on their “Commitment to Sustainable Transport” and announced that they would provide more than US\$175 billion of loans and grants for transport in developing countries over the coming decade, and that this support will be increasingly oriented towards sustainable transport. Recognizing the need for a results-based approach to supporting sustainable transport, the MDBs also committed to introducing annual reporting on their sustainable transport-related lending and to developing common arrangements for this purpose. Since then, through their Working Group on Sustainable Transport, the MDBs have been developing a common framework for assessing sustainability of transport sector operations in MDBs, drawing upon the original Sustainable Transport Appraisal Rating (STAR) framework developed by the Asian Development Bank, and have been publishing results annually in a joint report.

\* African Development Bank, Asian Development Bank, CAF - Development Bank of Latin America, European Bank for Reconstruction and Development, European Investment Bank, Inter-American Development Bank, Islamic Development Bank, and World Bank.



low-carbon and green transport projects include the Clean Technology Fund, the Green Climate Fund, the Global Environment Trust Fund and others. In addition, MDBs have agreed on a common methodology to track the share of their portfolio with climate mitigation or adaptation benefits.

Climate funds across these various institutions tend to focus on energy projects rather than transport projects, partly because the impacts of a change of energy carrier are more direct and partly because the climate benefits of transport projects are more difficult to calculate. To direct funds to the transport sector, criteria would need to expand, addressing not only GHG emissions reductions but also co-benefits, and not only short-term impacts but also longer time horizons.

### 2.3 TECHNOLOGICAL INNOVATION

Technology can drive progress in each dimension of sustainable development and play an essential role in advancing the 'Avoid-Shift-Improve' approach. From a social perspective, technology can improve the safety and affordability of transport options and can enhance transport accessibility for people with reduced mobility due to disability, age or other factors. From an environmental perspective, technology offers new and enhanced opportunities for cleaner, more climate-friendly transport, emitting less pollution. And the economic drivers are clear: with more efficient transport technology and systems cutting down on waste and wait times, comes higher potential for economic growth.

#### Enabling transformative technology

Technology has always advanced through partnership between public and private entities—through private company use of publicly funded research, through the public infrastructure needed to integrate new technologies into everyday life, and through the public policy frameworks that serve as the context for progress.

Looking at the innovation chain, it is clear that development and deployment of new technology has different drivers at each stage of innovation, and different policy mechanisms will be most effective depending on where the technology is in the innovation chain.

As an innovation moves down the line from research to uptake, it is critical that policy and investment frameworks adapt to the new reality, and that decision makers work to integrate technological innovations into society in a strategic way, with long-range vision and an emphasis on safety, equity and environmental sustainability.

#### ElectriCity - Innovative Collaboration for New Clean Public Transport Solutions in Göteborg



Göteborg, Sweden's second largest city, is the site of "ElectriCity" – a collaborative venture of 15 stakeholder organizations from industry, academia, authorities and politics to develop new solutions for sustainable public transport. "ElectriCity" is testing 100% electric buses on one of the most modern routes in the world. The buses are completely silent and emission-free, and being run on electricity from wind and hydro power.

Standard investment appraisals often do not take into account all of the costs and benefits that impact society and the environment, and "ElectriCity" seeks a more complete picture. It calculates the monetary value of the electric bus line and also considers socio-economic and environmental factors such as noise, travel time, emissions, energy use, taxes and the use of natural resources. If all of the 400 buses in Göteborg were run on electricity instead of diesel, the total annualized societal saving would be up to EUR 10 million. Among other areas, the savings stem from reduced noise and air pollution, which is estimated to lead to substantially decreased health care costs. The annual reduction in CO<sub>2</sub> emissions would total 33,000 tons, corresponding to emissions from about 3,000 Swedish households. The linear comparison from small cities to mega-cities shows immense GHG reduction potential.

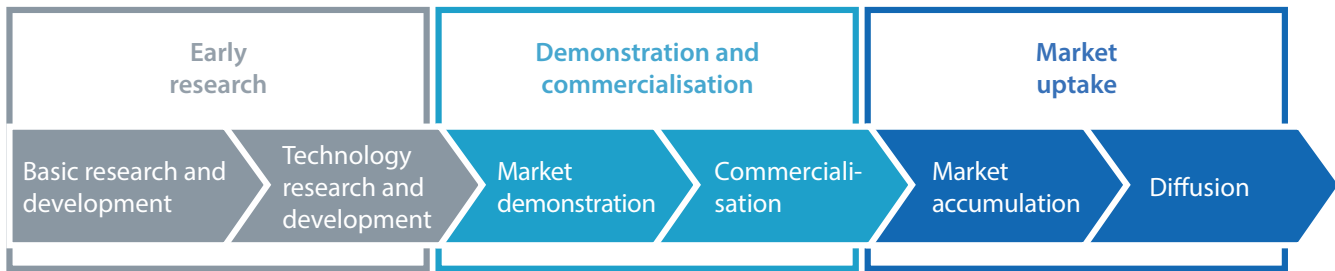
The 15 stakeholder-strong "ElectriCity" public-private-partnership (PPP) comes to the conclusion that all cities can reduce noise and pollution, while also creating socio-economic benefits in a sustainable and innovative way through collaborative business case thinking for public transport.

The PPP model is open and inclusive. Since its launch in 2015, it has been shared with thousands of city developers, mayors and policy makers in developed and developing parts of the world.

Connected to recommendations: 1, 2, 6, 8, 9, 10



### Innovation Chain



Autonomous vehicles are an example of a technology that will need to be integrated into policy frameworks in a holistic and inclusive manner. If driverless cars become common in cities, it is predicted that crash rates would drop significantly, and current vehicles ownership patterns would change; when combined with new sharing trends and remote parking could be used, the number of active vehicles in a city at a given time could fall significantly if appropriate policy and regulatory frameworks were developed simultaneously.<sup>71</sup> As a sign of the coming transport transformation, European Union ministers of environment and transport pledged in April 2016 to develop a coordinated approach for automated driving.<sup>72</sup>

It is essential that technological innovation should serve the vision for the city or society, and not the other way around. The last several decades have seen an explosion in innovation in transport technologies that can advance a sustainable vision: power, vehicles, and operating systems.

#### Power

Technological innovations in transport power can reduce carbon and local emissions of nitrogen oxides (NOx), sulphur oxides (SOx), and particulate matter (PM2.5 / PM10), and provide access to fuels and power generated locally.

Transition to very low carbon fuels is a central part of a long-term climate strategy. The development of alternative fuels for heavier and longer transport, including biofuels for aviation as well as compressed natural Gas (CNG) and liquefied natural gas (LNG) for heavy trucks with centralized refuelling systems all show promise.

Electrification of vehicles for short distance transport and commuting (passenger cars, buses, light rail, and waterborne transport) is a growing trend. Over the past 20 years, China has introduced between 200 million and 250 million electric two-wheelers in its cities. Thanks to tax incentives for hybrid and electric vehicles, Colombo, Sri Lanka, currently has more hybrid and electric vehicles per capita than any developing country

city. On the other side of the world, Norway reports that, in response to tax incentives and the prevalence of charging stations, 25% of all newly registered cars are plug-in electric vehicles. And the Association of German Transport Companies (VDV) is exploring ways that public transport infrastructure could be used to charge private electric vehicles. Major investment is currently being made also in electric buses in developed and developing countries. Furthermore, a significant, but so far untapped potential for electro mobility exists in rural areas in developing countries, for example through electric outboard engines for short distance travel and commuting along inland waterways (e.g. in the Amazon basin) in combination with rural electrification efforts based on renewable energy sources.<sup>73</sup>

When considering the benefits of electrification anywhere, it is crucial to factor in the way that electricity is produced. The global trend toward electrification will ultimately yield benefits only with a concurrent energy revolution. It is also important to put the advances in electrification in context, considering the scale of uptake in comparison to the overall growth of a country's fleet.

#### Vehicles

Innovation in vehicle technology can improve safety and efficiency, including through access to the greater ICT system across transport modes, in personal and freight transport. Examples of vehicle technology innovations include:

- ▶ **Aviation (passenger and cargo):** Aviation has reduced fuel use and CO<sub>2</sub> per tonne kilometre by 50% since 1990 through significant advances in efficiency. Manufacturers of aircraft and engines spend US\$15 billion a year on research to produce more efficient aircraft, and each new generation of aircraft brings around 15-20% savings in fuel and CO<sub>2</sub> compared with the aircraft it replaces. The recent use of composite materials, such as carbon-fibre reinforced plastic for the construction of large parts of aircraft fuselages and wing structures is delivering weight reductions and cutting down on the number of rivets that need to be used, making the aircraft even more aerodynamic. Most



newer aircraft and many retro-fitted aircraft now utilise winglet technology, devices fitted to the tips of aircraft wings that reduce drag and fuel consumption and related emissions.<sup>74</sup>

- ▶ **Maritime:** In large freight and cruise ships, sky-sails and more energy efficient propulsion systems are showing promise, and shipping companies are using slow steaming to save both money and fuel. Ferry transport is becoming more efficient and “smart” with internet-connected surveillance cameras and radios; Global Positioning Systems; display monitors for passengers updated with real time information; and sensors that collect data on ridership, weather, speed and direction, and fuel use and maintenance needs.<sup>75</sup>
- ▶ **Rail:** Railway energy efficiency has doubled since 1975. Electrification has expanded to cover one-third of the global network and powers almost 45% of all rail activity. Rail companies are choosing to invest directly in renewable energy, which now powers more than 20% of electric powered trains.<sup>76</sup> Recuperative braking, returning energy to the grid when trains slow down, is now state of the art. Rail companies also have a well-developed research program to develop further efficiencies, such as smart grids<sup>77</sup> and other technologies.
- ▶ **Road:** Connectivity and integration of ICT into vehicles reduces congestion, reduces time delays, allows for real time adjustments for routing, enables tailor-made mobility solutions based on individual needs, connects the driver to work and families, and improves overall experience of the user. Collision avoidance and other driver assistance innovations are enhancing safety. Energy efficiency is improving through newer engine and aerodynamic design, and refinements in hybrid bus technology are enabling savings in fuel consumption of 30-40%. New renewable fuels as well as electricity are being introduced and autonomous driving such as “truck platoons” (a line of freight trucks traveling as a connected convoy that can separate and travel to their respective destinations) are developing.

### Systems

Designing urban transport systems based on population density, usage data and other factors allows for more efficient investments in transport infrastructure built around high quality mass public transport. Investments in efficiently designed roads, airports, rail, and marine ports can reduce carbon emissions while providing greater mobility and access. International collaboration is particularly crucial in

### Sustainable Bio-Jet Fuel



With an aim of reducing greenhouse gas emissions and realizing sustainable development benefits worldwide, the United States Federal Aviation Administration (FAA) and aviation industry are leading the effort to develop and deploy sustainable alternative jet fuel. The Commercial Aviation Alternative Fuels Initiative (CAAFI) serves as the driving force to make these fuels a reality. Among its accomplishments to date, CAAFI established a process to include alternative jet fuel in the industry’s fuel specifications, helped secure approvals under the specification for five such fuels with more currently undergoing review, developed an array of feedstock readiness and sustainability evaluative tools and guidance, and fostered agreements between airlines and fuel producers. Since CAAFI’s inception in 2006, the aviation industry has gone from test flights to commercial flights and now is working to scale up production of sustainable bio-jet fuel around the world, with sustainable feedstocks as diverse as non-edible plant oils, used cooking oil, agricultural waste, high-energy tobacco and municipal solid waste. The U.S. FAA and CAAFI have worked in partnership with initiatives around the world, such as Indonesia’s public-private Aviation Biofuels and Renewable Energy Task Force, which has completed feasibility studies and is preparing to generate commercial supply. The Indonesian government is working towards implementing a requirement that 2% of aviation fuel be certified, sustainable biofuel by 2018 (3% by 2020). The International Civil Aviation Organization is also helping with capacity building under its Global Framework for Aviation Alternative Fuels.

Connected to Recommendations: 1, 2, 3, 8, 10



## Global Fuel Economy Initiative

GFEI is a partnership of the International Energy Agency, the United Nations Environment Programme, the International Transport Forum, the International Council on Clean Transportation, the Institute for Transportation Studies at University of California - Davis, and the FIA Foundation, working on improvements in vehicles' fuel economy and to maximize deployment of existing fuel economy technologies in vehicles across the world.



The GFEI team assists governments and transport stakeholders to promote greater fuel economy. It establishes a baseline in participating countries; presents policy options and case studies; and enables all stakeholders to engage in the policy process. Countries such as **Kenya, Chile, Costa Rica, Cote d'Ivoire** and **Indonesia** are already taking part in this policy development process. Kenya, for example, adopted an age-based taxation scheme for imported second-hand vehicles in September 2015 that will raise the tax for imported second-hand vehicles older than 3 years by 150% and reduce tax to 30% for vehicles younger than 3 years.

Connected to Recommendations: 1 and 2

this context. In the case of global goods movements, examples of good practice include:

- ▶ Optimized networks and supply chains maximize efficiency in global trade routes and reduce the number of vehicles and trips necessary, balancing demands for price, speed of delivery, and environmental impact.
- ▶ Urban logistics management with deliveries coordinated out of a small number of warehouses reduces the overall number of trucks and deliveries.
- ▶ E-Commerce solutions as part of a larger retail sector provide greater access to goods from around the world and can reduce the number of individual trips,

thereby reducing overall congestion and emissions while improving road safety. Data collected by the U.S. Departments of Commerce and Transportation showed that from 2007 - 2013 e-commerce doubled with no net increase on urban truck traffic.<sup>78</sup> This not only benefits consumers, but facilitates entrepreneurship in developing countries, where the barrier to markets and capital are often higher for small businesses.

- ▶ ICT for consumer-directed deliveries, using real time shipment status information and a portal for recipients to manage the day, time window, and location for delivery to reduce likelihood for missed deliveries.
- ▶ Pursuit of a circular economy –recapturing raw materials, refurbishing technology, preserving and reusing energy used in manufacturing and transport—to minimize waste.

For people movements (local and long distance), good practices include:

- ▶ Integrated ticketing, shared passenger information and interchanges within and between modes allowing fast, easy and seamless multimodal journeys.
- ▶ Air Traffic Control (ATC) modernization: the move to satellite-based navigation allows for safer point-to-point flights and more efficient air navigation procedures, such as continuous descent approaches, which reduce flight time, carbon emissions, and fuel costs.
- ▶ 'Active Safety' technology such as Intelligent Speed Adaptation (ISA) of motorized vehicles can eliminate speeding and avert millions of fatal collisions of cars and pedestrians or cyclists in the coming decades.
- ▶ Ride share and vehicle share, innovative business models capitalizing on ICT including big data and the explosion of connectivity among consumers, as well as social trends and changing attitudes toward ownership. ICT creates the opportunity also for connected public transport systems including "Mobility on Demand".

In the 2030 Agenda for Sustainable Development, countries pledged to leave no one behind, and in the area of technology, this means that governments, private companies, academia and other stakeholders will work to advance knowledge sharing, open data sources and technical assistance to developing countries. Capacity building and knowledge sharing can be advanced including through test and demonstration platforms.



## Improving Aviation Sustainability Through Performance Based Navigation

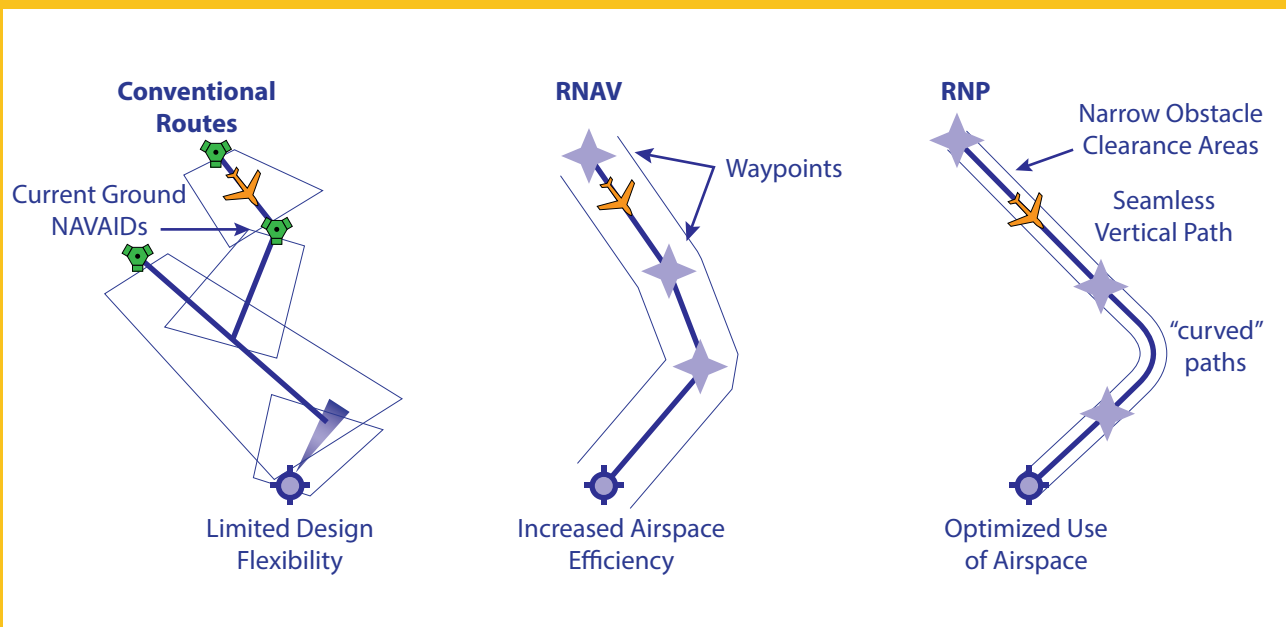
Air traffic is expected to increase worldwide. The International Civil Aviation Organization (ICAO) projects that departures on scheduled air services worldwide will increase from 33 million per year today to over 60 million by 2030.<sup>79</sup>

Reliance on ground-based air navigation systems poses a barrier to safely increasing air transport capacity, efficiency and environmental integrity. Enabled by satellite-based systems, Performance Based Navigation (PBN) capabilities can help overcome that barrier. PBN frees aircraft from the less efficient ground-based navigation routings and allows for more direct routings that increase capacity while reducing emissions. Ground-based radar effectively restricts aircraft to designated 'lanes' in the airspace, zig-zagging in relation to where the radar towers and controllers are and with conservative separation distances. Satellite-based PBN allows for more point-to-point and precise routes -- reducing flight time and resulting fuel burn and emissions.

For example, Brazil implemented PBN in specified air corridors via its SIRIUS programme. Due to PBN, 930 nautical miles could be cut out of various routes within these corridors. As stated by ICAO in the 2014 Air Navigation Report, this would result in annual savings of 203,000 metric tons of jet fuel and a reduction of 640,000 tons of CO<sub>2</sub> per year.<sup>80</sup> The United States is pursuing PBN through its "NextGen" program, which is estimated to result in a cumulative reduction of 16 million metric tons of CO<sub>2</sub> by 2020.<sup>81</sup> Europe is pursuing it under its Single European Sky Air Traffic Management Research program, targeting a 10% reduction in CO<sub>2</sub> per flight.

While full PBN implementation is hampered by country-specific challenges, including bureaucratic inefficiencies, finance and the ability to work across sovereign boundaries, ICAO keeps building capacities to facilitate the uptake of PBN worldwide.

### Evolution to Performance-Based Navigation



Connected to Recommendations: 1, 2, 3, 10







2

### 3. CONCLUSIONS

Sustainable transport is a driver of sustainable development and a means by which people can access what they need to live full and fulfilled lives. All actors—governments, business, civil society, and individuals—must make a genuine commitment to transforming the transport system in terms of individual travel and freight into one that is safe, affordable, accessible, efficient, and resilient, while minimizing carbon and other emissions and environmental impacts.

This report explores needed actions that can effectively bring about this transformation. It is clear that these actions will look different depending on where one is in the world and at what level of development, but with the 2030 Agenda for Sustainable Development and the Paris Climate Agreement, the global family has declared unequivocally that the only viable model for development is a sustainable model.

Sustainable development offers challenges and opportunities for all countries. However, the needs in the developing world and emerging economies merit special attention and support to ensure that their pathway to development follows a well-planned route that fulfils the social, economic and environmental needs and

aspirations of current and future generations. This course will be shaped by the people and their governments, but there is also an important role for developed country partners, international organizations and multilateral development banks.

In many cases, opportunities arising from sustainable transport are well known. Integrated policy making is critical to decision making on transport systems and infrastructure. Financing decisions must be based on a holistic understanding of the complex nature of transport investments and their consequences and of the full range of innovative funding options. Technology advancing clean fuels and clean energy is a high priority, and when considering the scale of the health and climate challenges, it is an imperative. The 'Avoid-Shift-Improve' approach is a useful framework for assessing transport measures and for taking action in support of sustainable transport.

The Advisory Group concludes its report with the following ten recommendations, and offers reflections on the possible future role of the United Nations in carrying forward impetus for their implementation. The Advisory Group will actively pursue communication of and advocacy for these recommendations.



## 4. RECOMMENDATIONS

The below recommendations by the High-Level Advisory Group are intended to advance sustainable transport, defined as the provision of services and infrastructure for the mobility of people and goods—advancing economic and social development to benefit today’s and future generations—in a manner that is safe, affordable, accessible, efficient, and resilient, while minimizing carbon and other emissions and environmental impacts.

### POLICY DEVELOPMENT AND IMPLEMENTATION

1. **Make transport planning, policy and investment decisions based on the three sustainable development dimensions—social development, environmental (including climate) impacts and economic growth—and a full life cycle analysis.**
  - a. Give paramount attention to safety for all transport users, and ensure that quality of life improvements and advances against negative environmental impacts are fundamental to policy and investment decisions.
  - b. Advance equitable access (to jobs, markets, services) as a key guiding principle for transport planning and policy and for investments in infrastructure (maintenance, renewal, or building, as applicable).
  - c. Ensure that resilience to climate impacts and other natural and economic shocks and chronic stresses is central to planning transport infrastructure and developing transport networks and that opportunities to “leapfrog” to more sustainable infrastructure and transport systems are maximized.
  - d. Make the maintenance of existing infrastructure and the improvement of its efficiency an integral part of transport policy and investment decision making.
  - e. Improve internalizing external costs and benefits of transport as a tool to achieve sustainable and low-carbon transport whilst maintaining equitable access for all.
  - f. Prioritize the use of full value chain analysis in transport policy making, with the aim of enhancing the cost efficiency of trade.
2. **Integrate all sustainable transport planning efforts with an appropriately-balanced development of transport modes: integration vertically among levels of government and horizontally across modes, territories and sectors.**
  - a. Develop, adopt and implement integrated national sustainable transport frameworks and strategies for the movement of people and goods. Integrated planning for transport systems and land use should advance sustainable transport
  - b. Foster regional integration and institutional cooperation among national governments to enable the safe, secure and efficient movement of people and goods across borders and along major transport corridors, while reducing economic, social and environmental costs across the total value chain.
  - c. Develop sustainable urban mobility plans that support intermodal and interconnected transport networks for seamless and “door-to-door” mobility and connectivity of people and goods, aligned with national policies and supported by national governments through guidance, financial support and technical capacity building.
  - d. Align, within the national and local government levels tasks and responsibilities of transport and land use authorities with an eye toward a single joint authority at each level with oversight of all policy and planning aspects.
  - e. Promote regional and international dialogue on sustainable development and the logistics underpinning the movement of people and goods, recognizing that efficient logistics drives economic growth and social development.
3. **Create supportive institutional, legal and regulatory government frameworks to promote effective sustainable transport.**
  - a. Devolve authority to the appropriate levels of government, ensuring that national, subnational and local authorities have adequate funding, resources and capacity to carry out their responsibilities, including for the procurement of public transport services.



- b. Enhance transparency and accountability of all relevant national and local ministries and authorities.
  - c. Set clear parameters, in a process led by governments and public authorities, for the involvement of the private sector in transport service provision.
- 4. Build technical capacity of transport planners and implementers, especially in developing countries, through partnerships with international organizations, multilateral development banks, and governments at all levels, to ensure equitable access to markets, jobs, education and other necessities.**
- a. Ensure that capacity building efforts are a core requirement for bankable sustainable transport projects especially in developing countries.
  - b. Promote the collection, analysis and sharing of relevant data especially in developing countries for well-informed transport policy and investment decision making, and for the development of indicators on transport safety and equity and quality of life and resilience.
  - c. Give priority to low emission, efficient and equitable transport solutions, shifting to the modes that are most appropriate to local and national circumstances and that best advance sustainable development.
- 5. Reinforce efforts toward preventing road traffic deaths and injuries.**
- a. Prioritize the prevention of deaths and injuries of road users, using the Sustainable Development Goal target of reducing global road traffic deaths and injuries by 50% by 2020 as a guide, and follow a systemic approach to improving road safety.
  - b. Promote road and transport system design that gives priority and emphasis to protecting people from death and injury, taking into account human fallibility and vulnerability.
  - c. Disseminate to local stakeholders best practices on road safety legislation and public policy.
  - d. Ensure that minimum safety standards for vehicles and vessels are set and enforced, with particular attention to the secondary market in developing countries. National governments lead these efforts.
- e. Reduce behavioural risk factors that lead to road traffic deaths and injuries through legislation, awareness raising, signage and rules and regulations. Governments and civil society organizations work hand in hand in these efforts.
- 6. Foster an informed, engaged public as a crucial partner in advancing sustainable transport solutions.**
- a. Develop and promote public awareness campaigns and education programs to inform and engage people of all ages about the imperative of providing equitable access to social and economic opportunities as well as about the importance and benefits of sustainable mobility. Themes to be addressed by governments and international and civil society organizations include road safety; the benefits of public transport, walking and cycling; and opportunities for reducing carbon emissions.
  - b. Pursue effective ways to seek inputs, buy-in and, when possible, co-creation, from a wide range of stakeholder groups when making transport planning, policy, infrastructure and system decisions.
- 7. Establish monitoring and evaluation frameworks for sustainable transport, and build capacity for gathering and analyzing sound and reliable data and statistics.**
- a. Establish comprehensive monitoring and evaluation methodologies for sustainable transport by national and local governments, linking tracking frameworks, targets and indicators, where appropriate, to the Sustainable Development Goals.
  - b. Take regular (in some cases annual) stock of progress toward transport goals within national and local governments, and adjust policies and practices in response to the lessons learned with the objective to drive continuous improvement, focused on society's needs.
  - c. Help build monitoring and evaluation capacity in governments at all levels, including through sharing of lessons learned, best practices, training and guidance of international and civil society organizations and business.



## FINANCING

### 8. Promote diversified funding sources and coherent fiscal frameworks to advance sustainable transport systems, initiatives and projects.

- a. Employ regulatory and market-based measures appropriate to national and local needs and circumstances to diversify sources of funding towards sustainable transport, while at the same time encouraging changes in behaviour.
- b. Use beneficiary and polluter pays measures including carbon pricing, congestion pricing, and other charges as part of the diverse tool box from which funding for transport can be drawn.
- c. Keep fairness and equity as guiding principles in the application and implementation of these measures, avoiding excessive impact of these mechanisms on those with fewer resources and on the funding base needed for transport systems to be able to make sustainable infrastructure investments.
- d. Introduce innovative approaches, such as land value capture programs, green bond investments, and transit-oriented development grants as applicable and appropriate.
- e. Make strategic, equity-based decisions regarding the use of revenue, including from market-based and other sustainable transport measures.
- f. Scale down and eliminate inefficient fossil fuel subsidies by national and sub-national governments.
- g. Ensure that the principles of sustainability are respected when national and local governments and private sector organizations are planning for the participation of private capital through public-private partnerships and other approaches.
- h. Cooperate within national and local governments on enhancing the credit-worthiness of cities.

### 9. Increase international development funding and climate funding for sustainable transport.

- a. Establish clear criteria, including equitable access, for international development funding of sustainable transport.
- b. Ensure that climate funding mechanisms finance sustainable transport initiatives, acknowledging their inherent complexity, great mitigation potential and multiple co-benefits.

## TECHNOLOGICAL INNOVATION

### 10. Promote sustainable transport technologies through outcome-oriented government investment and policies that encourage private sector investment and action through various incentive structures.

- a. Provide financial resources and support technical capacity building to advance research and development and scaling up of clean fuels and propulsions, sustainable transport services and renewable energy.
- b. Enact and enforce performance standards that drive industry toward developing clean and more efficient systems and technologies.
- c. Maintain policy neutrality to allow consumers and market forces to drive development toward the most effective sustainable technology.
- d. Lead by example through government procurement of sustainable technologies and products, and policies encouraging employees to travel and act sustainably.
- e. Advance knowledge sharing, open data sources and technical assistance to developing countries, including through capacity building and knowledge, test and demonstration platforms by national governments, international organizations and the business sector.



## The role of the United Nations

Carrying forward an effective and timely implementation of these recommendations to mobilize sustainable transport for development will require leadership and concerted, coordinated action from public authorities at all levels: the private sector, the research community, civil society, multi- and bi-lateral development banks and international organizations.

With its global reach and universal membership, the United Nations has an essential role to play in the realization of sustainable transport, using its unique position and internationally-recognized leadership to bring together the wide range of stakeholders who can make these recommendations a reality. As the international community now increasingly recognizes the importance of sustainable transport in all credible efforts for sustainable development and in achieving the climate change goals, the United Nations needs to step forward and focus on sustainable transport.

The United Nations could support a coalition or partnership network to strengthen coherence and accelerate action in support of transformative change by mobilizing cooperative action among relevant United Nations organizations and actors outside the United Nations system that are key to scaling up sustainable transport. Other initiatives available to Secretary-General Ban Ki-moon, his successor and the United Nations include the nomination of a Special Envoy on Sustainable Transport and the declaration of an annual United Nations Day or a United Nations Year of Sustainable Transport.

Whatever tools the United Nations chooses to employ, the High-Level Advisory Group urges the organization to pledge the highest level of commitment to sustainable transport, with adequate resources, strategic thinking and a bold and innovative spirit.



# THE SECRETARY GENERAL'S HIGH-LEVEL ADVISORY GROUP ON SUSTAINABLE TRANSPORT

**Martin Lundstedt** (co-chair)

Chief Executive Officer, Volvo Group, Göteborg, Sweden

**Carolina Tohá** (co-chair)

Mayor of Santiago, Chile

**Frank Appel**

Chief Executive Officer, Deutsche Post DHL Group, Bonn, Germany

**Milica Bajić-Brković**

Former President, International Society of City and Regional Planners, The Hague, The Netherlands

**Morten Engelstoft**

Chief Executive Officer, APM Shipping Services Maersk Group, Copenhagen, Denmark

**Alain Flausch**

Secretary General, International Association of Public Transport, Brussels, Belgium

**Tanya Müller García**

Secretary of Environment, Ministry of Environment of Mexico City, Mexico

**Maty Mint Hamady**

Mayor of Nouakchott, Mauritania

**Patrick Ho**

Deputy Chairman and Secretary-General, China Energy Fund Committee, Hong Kong, China

**Victor Kiryanov**

Former Deputy Minister of Interior of the Russian Federation, Moscow, Russian Federation

**Jean-Pierre Loubinoux**

Director General, International Union of Railways, Paris, France

**Len Roueche**

Former Chief Executive Officer, Interferry, Victoria BC, Canada

**Elattuvalapil Sreedharan**

Former Managing Director, Delhi Metro Rail Corporation, Delhi, India

**Tewolde Gebre Mariam**

Chief Executive Officer, Ethiopian Airlines, Addis Ababa, Ethiopia

**Jose Viegas**

Secretary-General, International Transport Forum, OECD, Paris, France

**Nancy Young**

Vice President, Environmental Affairs, Airlines for America, Washington DC, USA





**Martin Lundstedt**  
Co-Chair of the High-  
Level Advisory Group on  
Sustainable Transport

President  
AB Volvo  
and Chief Executive Officer  
Volvo Group  
Göteborg, Sweden

Martin Lundstedt joined Volvo in 2015 as President of AB Volvo and Chief Executive Officer of the Volvo Group. He began his business career in 1992 when he joined Scania and has since then held various managerial positions within Scania and was the President and CEO from 2012 to 2015. He holds a Master of Science in Industrial Management and Technology from Chalmers University of Technology.

## VOLVO

Legal name	AB Volvo
Sector	Automotive
Headquarter location	Göteborg, Sweden
Founding year	1927
Number of employees	Approximately 100,000
Website	www.volvogroup.com

The Volvo Group is one of the world's leading manufacturers of trucks, buses, construction equipment, and marine and industrial engines. Volvo Group also provides complete solutions for financing and service. It operates under multiple product brands.

The Volvo Group, which employs about 100,000 people, has production facilities in 18 countries and sells its products in more than 190 markets. It is the company's mission to drive prosperity through transport solutions. In 2015, the Volvo Group's sales amounted to about €33.4 billion.

### SUSTAINABLE TRANSPORT SHOWCASE:

In 2010, the Volvo Group became the world's first automotive industry manufacturer approved by the World Wide Fund for Nature (WWF) to participate in its Climate Savers program. Between 2009 and 2014, the Volvo Group successfully managed to reduce the total lifetime CO<sub>2</sub> emissions from products sold during this period by more than 50 million tons as well as CO<sub>2</sub> emissions from its production plants by 0.5 million tons (23%), compared with 2008.

In 2014, the Volvo Group renewed its commitment to Climate Savers and is still the only automotive manufacturer that is a member of the program. The Volvo Group aims to accelerate progress during the 2015-2020 program period. In addition to reducing emissions from its own products and production, the Volvo Group is committed to push the reduction of carbon emissions across the automotive industry. The commitment includes hosting the Construction Climate Challenge (CCC) that aims to create a dialogue between construction industry representatives, academia and politicians and address mutual projects for improvement.







**Carolina Tohá**  
Co-Chair of the High-Level Advisory Group on Sustainable Transport

Mayor  
Santiago, Chile

Carolina Tohá was elected Mayor of Santiago in October 2012. Previously, she served as Congresswoman of Chile between 2002 and 2009 and as Minister General Secretary of the Government of Chile during 2009.

As a Mayor of Santiago, her focus has been on strengthening community participation and democracy, developing intersectoral health policies, improving enabling environments to active and sustainable transport, and restoring and protecting the city's architectural, urbanistic and cultural heritage.



**SANTIAGO**  
Ilustre Municipalidad

Legal name	Municipalidad de Santiago
Sector	Municipality
Founding year	1541
Number of citizens	5.278 million
Website	<a href="http://www.municipalidaddesantiago.cl">www.municipalidaddesantiago.cl</a>

The Municipal Administration of Santiago has taken a special interest in promoting sustainable transport in a city overwhelmingly dominated by private vehicles and affected with chronic traffic congestion. For this reason, the Municipality of Santiago has been strongly committed to "inverting the transport pyramid" by giving priority to pedestrians, public transport and the promotion of sustainable means of transport such as bicycles and electric vehicles. In 2016, it was awarded with the prestigious Sustainable Transport Award.

## SUSTAINABLE TRANSPORT SHOWCASE:

### *Integral Transport Policy*

The Municipal Administration of Santiago implemented the Integral Transport Policy which sets concrete goals for the different dimensions of sustainable transport:

- Downtown Plan: Expanding up to 50% the sidewalk space in key roads of downtown Santiago, as well as the establishment of exclusive roads for public transport.
- Interconnected bike network: New bike lanes that allow for safe and speedy mobility across Santiago.
- Electric mobility: Pilot projects, such as an electric bus and three electric taxis, which operate around in the city.
- 'Gardens in your sidewalk' program: Creating safer and more pleasant environments for communities and pedestrians.
- Education programs in schools and pre-schools.
- 'Pedestrian First' plan: Sidewalk improvement in every neighbourhood in Santiago.
- Turning traffic roads into exclusive walking spaces.





## Frank Appel

Chief Executive Officer  
Deutsche Post DHL Group  
Bonn, Germany

### Deutsche Post DHL Group

Legal name	Deutsche Post AG
Sector	Transport/ Logistics
Headquarter location	Bonn, Germany
Founding year	1995
Number of employees	Approximately 500,000
Website	www.dpdhl.com

Deutsche Post DHL Group is the world's leading mail and logistics company. It makes a positive contribution to the world by connecting people and enabling global trade, while being committed to responsible business practices, corporate citizenship and the environment.

Deutsche Post DHL Group operates under two brands: Deutsche Post is Europe's leading postal service provider. DHL is uniquely positioned in the world's growth markets, with a comprehensive range of international express, freight transport, e-commerce and supply chain management services.

Deutsche Post DHL Group employs approximately 500,000 employees in over 220 countries and territories worldwide. The Group generated revenues of more than €59 billion in 2015.

Dr. Frank Appel joined Deutsche Post DHL Group in 2000. Since 2002, he has been a member of the Group's Board of Management. In 2008 he assumed the role of Chief Executive Officer and Chairman of the Board of Management. Prior to joining the Group, Dr. Frank Appel was a managing partner at McKinsey & Co. He holds a MSc in chemistry and a PhD in neurobiology.

### SUSTAINABLE TRANSPORT SHOWCASE:

#### *GoGreen – protecting the environment with Deutsche Post DHL Group*

With its GoGreen program Deutsche Post DHL Group is committed to minimizing the impact of its business on the environment and contributing to environmental protection worldwide. The GoGreen program is an integral part of the Group strategy: Back in 2008, Deutsche Post DHL Group introduced a measurable climate protection target – and was the first global logistics provider to do so. By 2020 the Group wants to improve the carbon efficiency of its own transport services and those of its subcontractors by 30% compared with the base year 2007. In 2015, the Group achieved an overall carbon efficiency improvement of 25%.

Deutsche Post DHL Group views environmentally-friendly and efficient logistics as an opportunity to create value – for the environment, for the company and for its customers. With its global presence and its expertise, Deutsche Post DHL Group can support customers in achieving their environmental goals. The Group's portfolio ranges from individual climate neutral shipments for private customers to the optimization of multinational corporations' entire supply chains.





### Milica Bajić-Brković

Former President  
ISOCARP – International  
Society of City and Regional  
Planners  
The Hague, The Netherlands

Milica Bajić-Brković was the President of ISOCARP from 2012 until 2015. She is a Professor at the University of Belgrade, Serbia and has over thirty years of international experience in urban planning and development education, research and professional practice. Milica Bajić-Brković is a member of the Advisory Council for Energy for Sustainable Transport (a joint venture of the UN Department of Economic and Social Affairs and the China Energy Fund Committee) as well as the European Research Council Committee for EU-funded research in Environment, Space and Population.

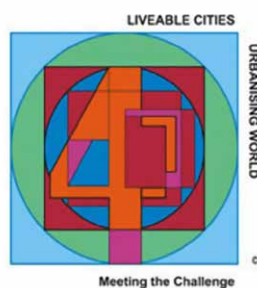


Legal name	ISOCARP - International Society of City and Regional Planners
Sector	Urban and Spatial Planning, Urban Development and Management
Headquarter location	The Hague, The Netherlands
Founding year	1965
Number of members	800
Website	<a href="http://www.isocarp.org">www.isocarp.org</a>

ISOCARP is a global association of experienced professional planners. It was founded in 1965 in a bid to bring together recognized and highly-qualified planners in an international network. The ISOCARP network brings together individual and institutional members from more than 80 countries worldwide. Members are planners and other stakeholders involved in the development and maintenance of the built environment. ISOCARP is formally recognised by the United Nations, the United Nations Human Settlements Program (UNHCS/UN-HABITAT), and the Council of Europe. The Society also has a formal consultative status with the United Nations Education, Scientific and Cultural Organization (UNESCO).

## SUSTAINABLE TRANSPORT SHOWCASE:

### *Transport Networks: Making Sustainable Transport a Reality*



In 2011, ISOCARP organized a worldwide planning congress 'Liveable Cities: Urbanising World, Meeting the Challenge' in Wuhan, China. A dedicated session on sustainable transport systems investigated sustainable transport methods and procedures to link transport to the requirements of a low carbon environment and quality urban liveability.

The congress concluded that making transport sustainable by far exceeds a traditional engineering approach, or matching physical provisions to budgetary constraints. A major paradigm shift in understanding the relationship between land-use planning and transport is needed for making a barrier free environment, where accessibility and mobility options positively impact on social justice and community well-being, land use, heritage preservation, land recycling and planning new developments. Urban form can contribute to a more carbon neutral settlement by treating transport as an integrated part of the cities, and by employing the means and ways to create an environment conducive to pedestrian, bicycle and public transport.





## Morten Engelstoft

Chief Executive Officer  
APM Shipping Services  
Maersk Group  
Copenhagen, Denmark

Morten H. Engelstoft is CEO of APM Shipping Services which is one of the five business divisions in the Maersk Group. APMSS consists of Maersk Tankers, Maersk Supply Service, Svitzer and Damco. Prior to assuming his current role, he was COO in Maersk Line. Morten joined Maersk in 1986 and has thirty years of extensive experience in the shipping industry.



## MAERSK

Legal name	A.P. Møller - Mærsk A/S
Sector	Shipping, Oil & Gas
Headquarter location	Copenhagen, Denmark
Founding year	1904
Number of employees	88,300
Website	www.maersk.com

The Maersk Group is a global conglomerate consisting of a number of companies operating in two main industries - shipping and oil & gas. Through Maersk Line, Maersk Oil, APM Terminals, Maersk Drilling, APM Shipping Services and other companies, the Group employs roughly 88,300 people in more than 130 countries, and generated US\$ 40.3 billion in revenue in 2015.

The Maersk Group was founded in 1904, when Arnold Peter Møller partnered with his father to purchase a second-hand steamship. Arnold Peter Møller set a course of carefully managed expansion that would eventually see the family business grow into a major global player in shipping and energy. The current Group CEO is Søren Skou.

## SUSTAINABLE TRANSPORT SHOWCASE:

Maersk introduced 22 new container ships (WAFMAX) in West Africa in response to growing trade relations between Far East Asia and West Africa. Specially designed to the conditions in Ghana and Nigeria, and in combination with innovations in the port, such as fixed berthing windows, the vessels are helping to improve port productivity and thereby support trade growth as well as reducing transport emissions. A study by Copenhagen Economics concluded that trade flows in the terminals of Tema in Ghana and Apapa in Nigeria increased by more than US\$ 1 billion due to the enhanced port productivity. Furthermore, the logistic costs were reduced by more than US\$ 1 billion. Finally, CO<sub>2</sub> and SO<sub>x</sub> emissions were reduced by 30% and between 13 and 20%, respectively. A key factor behind those numbers is the reduced waiting time stemming from the increased port productivity. In fact, the cost of holding up one 2,200 TEU vessel one extra day is estimated to be more than US\$ 35,000.





## Alain Flausch

Secretary-General  
International Association of  
Public Transport  
Brussels, Belgium

Alain Flausch was selected Secretary General of UITP in 2011. He was the Association's President from 2009 to 2011 and member of different UITP Committees and Commission from 2004 to 2009. From 2000 to 2011, he was CEO of STIB, Brussels' public transport operator, transforming the culture of the organization. He was recently awarded Professor Honoris causa of the National Research University in Moscow.



Legal name	International Association of Public Transport
Sector	Public Transport
Headquarter location	Brussels, Belgium
Founding year	1885
Number of members	1,400
Website	<a href="http://www.uitp.org">www.uitp.org</a>

As a passionate champion of sustainable urban mobility, the International Association of Public Transport (UITP) is internationally recognised for its work in advancing the development of this critical policy agenda. UITP has a long history to its name, and is the only worldwide network to bring together all public transport stakeholders and all sustainable transport modes.

UITP has 1,400 member companies giving access to over 16,000 contacts from 96 countries. UITP's members are public transport authorities and operators, policy decision makers, research institutes and the public transport supply and service industry.

## SUSTAINABLE TRANSPORT SHOWCASE:

### *Declaration on Climate Leadership*

UITP's Declaration on Climate Leadership demonstrates the public transport sector's commitment to tackling climate change and advancing the global sustainable development agenda. Launched at the UN Climate Summit in September 2014 and as part of the Action Agenda at COP21 (2015), the Declaration affirms the sector's goal to double the market share of public transport by 2025. In doing so, it allows to cater for ever-increasing demand for urban mobility and ensure that the sector moves in the direction of the Paris Agreement.

The Declaration is supported by over 350 pledges to climate action from over 110 members of the international public transport community in 80 global cities. Actions are aimed at giving a greater role to public transport in mobility helping to decrease regional, municipal and corporate carbon footprints. The Declaration is also a commitment to provide technical support and capacity building to governments at all levels through lessons learned from delivering action on the ground in support of implementing national climate and sustainable development strategies and evidence that public transport interventions produce impact.





**Tanya Müller García**

Secretary of Environment  
Ministry of Environment of  
Mexico City  
Mexico

Tanya Müller García was designated as the Minister of Environment of Mexico City on 1 December 2012 by Mayor Miguel Ángel Mancera. She has developed groundbreaking initiatives and policies to make Mexico City (one of the largest cities in the world) more sustainable and resilient, while contributing to fighting climate change and improving people’s living conditions.



Legal name	Secretaría del Medio Ambiente de la Ciudad de México
Sector	Government/public sector
Headquarter location	Mexico City, Mexico
Number of employees	Over 4,000
Number of citizens	8.9 million (2015)
Website	www.sedema.cdmx.gob.mx

The Government of Mexico City has developed and implemented public policies to improve the city’s mobility through an integral, safe and sustainable system.

Mobility is a strategic line of action in Mexico City’s Climate Action Plan, Resilience Strategy and Air Quality Program. It is considered a key factor not only for a sustainable urban development but also for smart growth, which includes equitable and social development.

**SUSTAINABLE TRANSPORT SHOWCASE:**

*Mexico City Cycling Strategy*

In Mexico City, 50% of the daily trips are eight kilometres or less. These short distances can be easily done by bicycle. The Government of Mexico City has placed a particular policy emphasis on getting more people to cycle through three focus areas:

1. Cycling infrastructure such as bike lanes, massive bike parking and the public bike system (Ecobici) has been created to connect with other means of transport. Ecobici stations are located close to important transport hubs and the system is integrated with the city’s transport card (which includes subway, BRT, light rail and tram) to encourage intermodality, as 30% of Ecobici users combine their trips with other transport modes. Ecobici has allowed an important shift, reaching 35,000 daily trips. The number of female cyclists has doubled in the last two years, an indicator of gender balance and safety.
2. New transit regulation: cyclists (and pedestrians) have priority over any other mode of transport, fostering a cycling culture and improving their safety.
3. Create a cycling culture: through the closure to traffic of 55 kilometres of the city’s main streets every Sunday for the enjoyment of more than 54,000 cyclists, pedestrians and skaters. Seven bike schools were created, which trained over 90,000 urban cyclists in the last three years.





### Maty Mint Hamady

Mayor  
Nouakchott, Mauritania

Maty Mint Hamady was elected as Mayor of Nouakchott, Mauritania's capital city, in February 2014. Maty Mint Hamady is the first woman to take the reins of an Arab or Islamic capital. She is heading the governing board of the urban community of Nouakchott consisting of 37 delegates from nine municipalities. Prior to becoming the Mayor of Nouakchott, Maty Mint Hamady served as Minister of Public Services between 2011 and 2014.



Legal name	Communauté Urbaine de Nouakchott
Sector	Municipality
Headquarter location	Nouakchott, Mauritania
Founding year	Capital of Mauritania since 1960
Number of citizens	1,000,000
Website	<a href="http://www.cun.mr">www.cun.mr</a>

The Urban Community of Nouakchott has initiated a series of actions to establish a strategic framework for sustainable development at city level. In this context, on June 18, 2015, the Urban Council of Nouakchott adopted resolution 12/2015 containing general policies to direct the city of Nouakchott towards the path of sustainable development.

### SUSTAINABLE TRANSPORT SHOWCASE:

The Urban Community of Nouakchott has put in place a solar lighting project in public places. It was the first institution in Mauritania to implement such a project. Based on this initiative, the Mauritanian government has launched a solar lighting project for urban roads in the entire capital city of Nouakchott, which makes up a third of the country's population.





### Patrick Ho

Deputy Chairman and  
Secretary-General  
China Energy Fund  
Committee  
Hong Kong, China

Dr. Patrick Ho Chi Ping, Deputy Chairman and Secretary General of the China Energy Fund Committee since its inception in 2010, was formerly Secretary for Home Affairs with the Hong Kong SAR government, Vice-Chairman of the Hong Kong Policy Research Institute, and member of the Chinese People's Political Consultative Committee. Dr. Ho is an ophthalmic surgeon by training.



### China Energy Fund Committee

With Special Consultative Status, UN Economic and Social Council

Legal name	China Energy Fund Committee
Sector	NGO
Headquarter location	Hong, Kong, China
Founding year	2010
Number of employees	20
Website	<a href="http://www.cefc.org.hk">www.cefc.org.hk</a>

China Energy Fund Committee (CEFC) is a non-governmental, non-profit, tax-exempt, civil society organization registered in Hong Kong and the USA, holding Special Consultative Status with the United Nations Economic and Social Council. A strategic think tank engaged in research, public diplomacy, energy cooperation and cultural exchange, CEFC is dedicated to fostering dialogue, regional cooperation, energy security, and issues relating to China's emerging place in the world.

CEFC promotes sustainable transport as a culture and way of life, resting on three pillars: conservation, efficiency, and environmental protection. It also aims to advance and safeguard the special needs of developing countries for transport.

## SUSTAINABLE TRANSPORT SHOWCASE:

### *Powering the Future We Want – Recognizing leadership and innovative practices in energy for sustainable development*

Powering the Future We Want is a programme established in collaboration with the United Nations Department of Economic and Social Affairs. It offers a grant in the amount of one million US dollars annually to fund capacity development activities in energy for sustainable development. The grant is awarded to an individual, institution or partnership, based on past and current achievements, with the objective of promoting leadership and innovative practices in meeting the global energy challenge. Through capacity development seminars, finalists are invited to share their experiences and knowledge in the implementation of their projects, and to openly discuss the many challenges that they face. In 2016, the thematic focus of the grant is 'Energy for Sustainable Transport.'







### **Victor Kiryanov**

Deputy Minister of Interior of the Russian Federation  
Moscow, Russian Federation

In 2011, General Victor Kiryanov was appointed by the President of the Russian Federation, Dmitry Medvedev, as Deputy Minister of the Interior, responsible for safety and security in the national transport system. General Kiryanov is the highest-ranking Russian official responsible for road safety, and over the years, has been a champion in promoting international cooperation in this area.

## **SUSTAINABLE TRANSPORT SHOWCASE:**

General Kiryanov was the initiator and the architect of the 1st Ministerial Conference on Road Safety in Moscow in 2009. On numerous occasions, he addressed the UN General Assembly and other multilateral fora promoting road safety. He also officially presented all Russian drafts of UN General Assembly resolutions on the subject.

With active involvement by General Kiryanov, the UN General Assembly has a road safety item on a biennial basis. In May 2010, Russia tabled a draft resolution that was adopted the UN General Assembly proclaiming the Decade of Action for Road Safety from 2011-2020.

On behalf of the Russian Federation, General Kiryanov promoted the integration of road safety topics in the latest major UN Program document, the '2030 Agenda for Sustainable Development,' and ensured its inclusion in Sustainable Development Goal 9 – "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation."





## Jean-Pierre Loubinoux

Director General  
International Union  
of Railways  
Paris, France

Jean-Pierre Loubinoux was appointed Director-General of UIC, the worldwide association representing the rail sector, in 2009. He joined the rail sector in 1978 and held various positions including Director of the SNCF General Delegation in North America and then President and CEO of SNCF International. Jean-Pierre Loubinoux holds a wide range of responsibilities at international and professional levels.



INTERNATIONAL UNION  
OF RAILWAYS

Legal name	Union Internationale des Chemins de fer - International Union of Railways (UIC)
Sector	International Railway Sektor
Headquarter location	Paris, France
Founding year	1922
Number of employees	130
Number of members	240
Website	<a href="http://www.uic.org">www.uic.org</a>

UIC, the worldwide railway association, groups 240 members from 100 countries, including railway companies, rail infrastructure managers, transport operators, rail-related service providers and research bodies. UIC is the voice of the railway sector and has consultative status to the United Nations Economic and Social Council. It liaises with over 100 international organizations or transport associations with competence in transport issues.

The UIC mission is to promote rail transport at the global level, organize international cooperation among railways and help railways to meet current and future challenges of mobility and sustainable development.

## SUSTAINABLE TRANSPORT SHOWCASE:

### *Rail as the backbone of sustainable transport and a part of the solution to climate change*

The UIC low carbon rail transport challenge (<http://www.uic.org/low-carbon-rail-challenge>) sets out a vision for rail as a part of the solution to climate change, saving one gigaton of CO<sub>2</sub> emissions. Through this initiative, UIC's global membership is committed to halving energy consumption and carbon emissions (per passenger/ton-kilometres relative to a 1990 baseline) by 2030, and then by 2050 further reduce these to 60% and 75% for energy and carbon, respectively. The final target aims to leverage these improvements by achieving a more sustainable balance between transport modes, increasing the rail passenger market share by 50% by 2030, and 100% by 2050 relative to a 2010 baseline. For freight transport the target is to equal road market share by 2030 and then increase to 50% greater than the road market share by 2050.





### Len Roueche

Former Chief Executive Officer  
Interferry  
Victoria BC, Canada

Len Roueche served as CEO of Interferry from 2002 until his retirement in April 2016. Prior to coming to Interferry, Mr. Roueche spent 25 years with BC Ferries, the largest ferry operator in Canada. In total, his career in the ferry industry has spanned 41 years. He holds a BA and an MA degree in economics.



Legal name	Interferry, Inc.
Sector	Maritime transport
Headquarter location	Victoria, BC, Canada
Founding year	1976
Number of members	600
Website	www.interferry.com

Interferry was formed in 1976 and is the only maritime trade association exclusively representing the world-wide ferry industry. It has over 600 individual members in 37 countries. Interferry has three primary functions: to facilitate the exchange of ideas and experience amongst members of the industry; to represent the industry on regulatory matters; and to promote the benefits of ferry transport.

## SUSTAINABLE TRANSPORT SHOWCASE

### *Ferry safety in developing countries*

For the past 15 years Interferry has been very concerned about the safety of ferries in the developing countries where over 95% of ferry fatalities occur. The International Maritime Organization (IMO) is the body of the United Nations responsible for international shipping regulations. Unfortunately its mandate does not extend to ships operating with the territorial waters of a single nation. Despite this restriction, IMO has also shown great concern for ferry safety in developing nations where the vast majority of ferry operations are domestic. In 2006, IMO and Interferry joined together in an effort to improve this situation by engaging with the developing regions that have suffered the most from unsafe ferries, including Bangladesh, Indonesia, Philippines and the South Pacific Islands. Although this effort has been a slow process there have been some significant signs of change. The Philippines in particular has been a strong supporter of this project. In 2016, Manila is the host the 42nd Annual Interferry Conference with domestic ferry safety being one of the focus topics.





## Elattuvalapil Sreedharan

Former Managing Director  
Delhi Metro Rail Corporation  
Delhi, India

Dr. Elattuvalapil Sreedharan, known as 'Metro Man' of India, was the first Managing Director of Delhi Metro Rail Corporation (DMRC) from November 1997 to December 2011. He continues to be the Principal Advisor to DMRC assisting most of the metros coming up in the country. Born in 1932, he served Indian Railways for 36 years before retiring as Member Engineering, Railway Board in 1990. Thereafter he was in charge of the 760 kilometres long Konkan Railway Project from Mumbai to Mangalore, which is an engineering marvel in itself.



Legal name	Delhi Metro Rail Corporation Limited
Sector	Railway & Urban Transport
Headquarter location	New Delhi, India
Founding year	1995
Number of employees	8,690
Website	<a href="http://www.delhimetrorail.com">www.delhimetrorail.com</a>

DMRC, a joint venture of Government of India and Delhi Government, is responsible for implementing the Delhi Metro project and for its operations & maintenance as well. The first phase, covering 65 kilometres, was commissioned in April 2006. The second phase, covering 125 kilometres, was completed in December 2010. The third phase, covering 160 kilometres, is expected to be completed in 2017. Currently, 210 kilometres of Delhi Metro, which carries about 2.8 million passengers a day, are under commercial operations. Success of Delhi Metro has spearheaded a virtual metro revolution in the country and eleven other cities are now implementing metro projects.

## SUSTAINABLE TRANSPORT SHOWCASE:

### *Delhi Metro - A Role Model of Sustainable Urban Transport*

Delhi, the capital city of India, today has a population over sixteen million. After several studies, it was finally decided in 1996 to provide a rail-based metro system as the best option for the city.

The 1st Phase of Delhi Metro covering 65 kilometres was started in 1998 with Dr. E. Sreedharan as its first Managing Director. The 1st Phase was fully completed by December 2004 and the 2nd Phase covering 124 kilometres was also completed by December 2010. Now, the 3rd Phase covering 160 kilometres is in progress.

Having constructed a large network in record time, Delhi Metro stands out as a shining example of how a complex infrastructure project can be completed in time and within the budgeted cost by a government entity. The Delhi Metro has been instrumental in ushering in a new era in urban transport. Delhi Metro system offers comfortable, punctual and eco-friendly services, and it has completely revolutionized the mass transport scenario not only in Delhi but the entire country.

Dr. E. Sreedharan stepped down as Managing Director of Delhi Metro in December 2011.





## Tewolde Gebre Mariam

Chief Executive Officer  
Ethiopian Airlines  
Addis Ababa, Ethiopia

Mr. TEWOLDE Gebre Mariam is the Group CEO of Ethiopian Airlines and serving at the helm of this global-standard flag carrier of Ethiopia since January 2011. He is a holder of a BA degree in Economics and an MBA from the Open University in the UK. He serves in various Boards, including the International Air Transport Association, the African Airlines Association, and the Africa Travel Association.



A STAR ALLIANCE MEMBER 

Legal name	Ethiopian Airlines Company
Sector	Aviation
Headquarter location	Addis Ababa , Ethiopia
Founding year	December 1945
Number of employees	12,593
Website	<a href="http://www.ethiopianairlines.com">www.ethiopianairlines.com</a>

Ethiopian Airlines is the fastest growing and most profitable airline in Africa. It has been driven by its Pan-African vision and unswerving commitment to bring Africa together by developing comprehensive air links throughout the continent.

Over the past seven decades, Ethiopian Airlines has been a pioneer of African aviation as an aircraft technology leader. Ethiopian Airlines provided the first jet service in the continent in 1962, the first African B787 Dreamliner in 2012 and is leading the way again by providing the first African A350 XWB.

Ethiopian Airlines joined Star Alliance, the world's largest Airline network, in December 2011. It is currently implementing a 15-year strategic plan called Vision 2025 that will see it become the leading airline group in Africa with seven strategic business units. Ethiopian Airlines is a multi-award winning airline, including SKYTRAX World Airline Award for Best Airline Staff in Africa, for the second time, in July 2016.

## SUSTAINABLE TRANSPORT SHOWCASE:

### *Contribution to the Socio-Economic Development of Africa*

Ethiopian Airlines contributed to the socio-economic development of Africa. It has been serving the African continent since its establishment as an airline in 1946 by 'bringing Africa together.' Ethiopian Airlines spearheaded Africa's socio-economic and cultural integration, connecting people, moving goods and services for the last 70 years on the continent when, for a long time, the only way to fly from one part of Africa to another was either via Paris or London.

The Ethiopian Cargo freighter service has been playing an important role in the transport of horticulture produces from Kenya and later from Ethiopia. Through its vast passenger flights network coupled with freighter services, Ethiopian Airlines significantly contributed to the growth and development of trade relationship of the African nations within the continent and with the rest of the world.

Ethiopian Airlines plays instrumental role in promoting tourism, investment and cultural exchange and serves as a vast global cargo network with state of the art cargo facilities to promote import and export. It is registering an average annual growth of 25% in the past seven years. As 'a good corporate citizen,' Ethiopian Airlines supports many community initiatives and, via its 'Fly Greener Campaign,' strives to minimize carbon emission to make the world a better place to live.





### Jose Viegas

Secretary-General  
International Transport  
Forum, OECD  
Paris, France



Legal name	International Transport Forum
Sector	Transport
Headquarter location	Paris, France
Founding year	2006 (previously European Conference of Ministers of Transport founded in 1953)
Number of employees	57
Number of members	57
Website	<a href="http://www.itf-oecd.org">http://www.itf-oecd.org</a>

The International Transport Forum at the OECD is an intergovernmental organization with 57 member countries. It acts as a think tank for transport policy and organises the Annual Summit of transport ministers. ITF's mission is to foster a deeper understanding of the role of transport in economic growth, environmental sustainability and social inclusion and to raise the public profile of transport policy. It acts as a platform for discussion and pre-negotiation of policy issues across all transport modes. ITF analyses trends, shares knowledge and promotes exchange among transport decision makers and civil society.

José Viegas has been Secretary-General of the International Transport Forum at the OECD since August 2012. He has implemented new initiatives to increase value for member countries. He has created a work stream for rapid-delivery policy analysis for countries, strengthened ITF's links with the private sector through the ITF Corporate Partnership Board and advanced the harmonisation of pan-European road freight transport by helping to secure approval for the Quality Charter developed by ITF's European Road Transport Group.

### SUSTAINABLE TRANSPORT SHOWCASE:

#### *Zero Road Deaths and Serious Injuries: Leading a Paradigm Shift to a Safe System.*

In 2008, ITF published *Towards Zero: ambitious road safety targets and the safe system approach*. This was the first international effort in defining a Safe System and promoting its adoption. A Safe System is at the core of the Plan of Action of the UN Decade of Action for Road Safety, it is based on the ethical imperative that no human being should be killed or seriously injured in a road crash. A Safe System moves beyond reactive approaches based on analysis of past crashes, and takes a proactive approach to guide safe behaviour and prevent serious trauma when crashes occur. In 2016, ITF published a follow up report, *Zero Deaths and Serious Injuries: Leading a Paradigm Shift to A Safe System*. The report focuses on implementation challenges and opportunities.

It recommends in particular to:

- Think safe roads, not safer roads
- Provide strong, sustained leadership for the paradigm shift to a Safe System
- Foster a sense of urgency to drive change
- Underpin aspirational targets with concrete operational targets
- Establish shared responsibility for road safety





## Nancy Young

Vice President  
Environmental Affairs  
Airlines for America  
Washington DC, USA



Legal name	Airlines for America
Sector	Aviation
Headquarter location	Washington, DC, USA
Founding year	1936
Number of employees	80
Number of members	9 airline members, one airline associate member
Website	<a href="http://www.airlines.org">www.airlines.org</a>

Airlines for America (A4A), the principal trade and service organization of the U.S. airline industry, vigorously advocates on behalf of the industry as a model of safety, customer service and environmental responsibility and as the indispensable network driving the U.S. economy and global competitiveness.

A4A is partnering to advance critical technology, operations and infrastructure improvements and a global market-based measure for international aviation to achieve carbon neutral growth from 2020. Further, A4A works within the Air Transport Action Group to support sustainable aviation worldwide and the Commercial Aviation Alternative Fuels Initiative and other initiatives to advance sustainable alternative aviation fuels.

Nancy N. Young was named Vice President, Environmental Affairs for Airlines for America (A4A) in July 2007. An environmental attorney with over 25 years of experience, Ms. Young directs A4A's environmental sustainability programs. She serves on the Air Transport Action Group Board and on the Steering Group and as environmental co-lead of the Commercial Aviation Alternative Fuels Initiative.

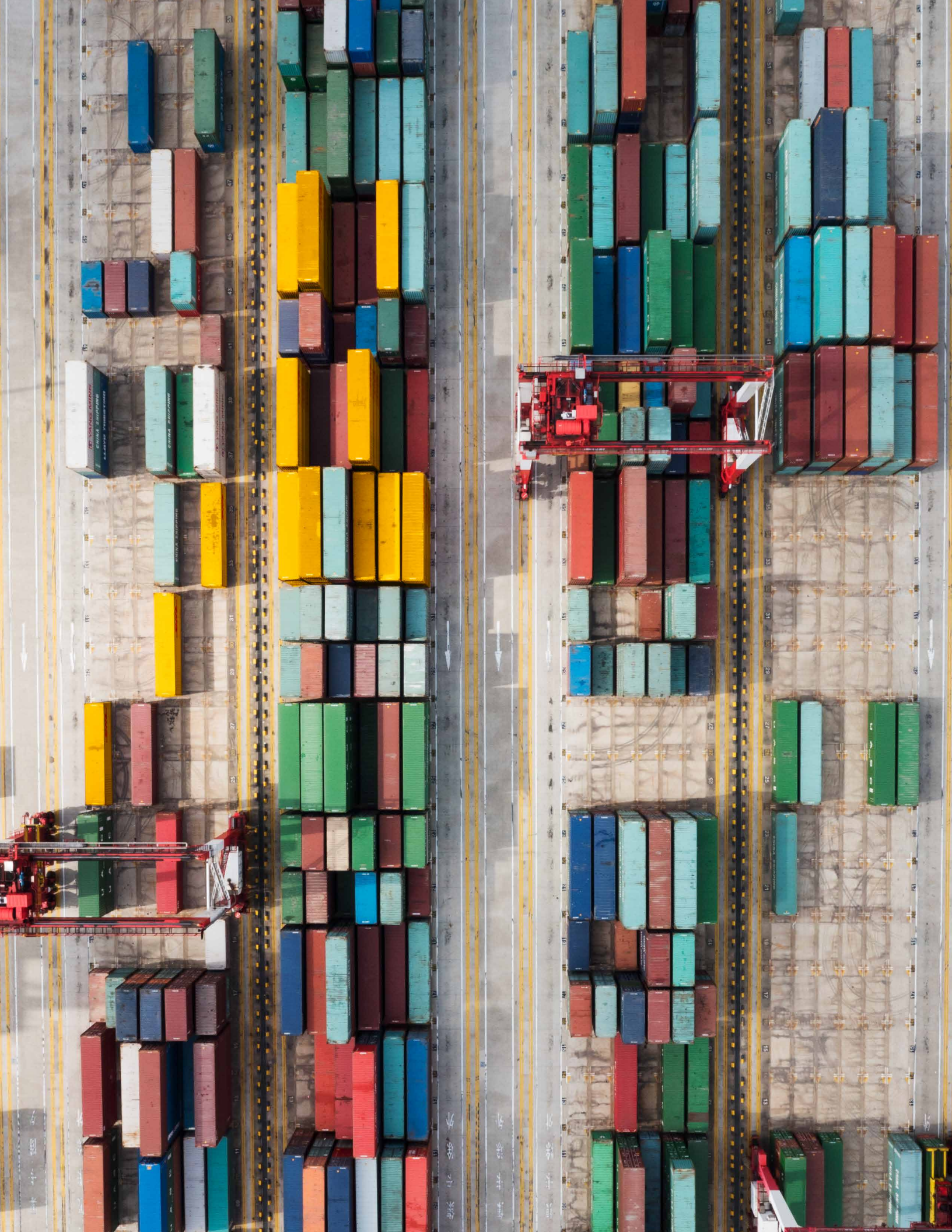
## SUSTAINABLE TRANSPORT SHOWCASE:

### *Integrated Aviation Industry Action for Climate & Sustainable Development Solutions*

A4A is part of the Air Transport Action Group's (ATAG) coalition of airlines, airports, aircraft manufacturers and air navigation service providers that is working together to reduce aviation greenhouse gas emissions and advance sustainable development. Through ATAG, in 2008, the aviation industry announced near-, medium- and long-term carbon dioxide reduction goals, underpinned by technology/alternative fuels, operations and infrastructure measures and support for the development of a global market-based mechanism. By coordinating on aircraft design, operations, airspace efficiency, fuels and infrastructure, the integrated industry is optimizing emissions reduction opportunities. As a result, the industry is meeting its near-term carbon efficiency goal and is preparing to meet its mid-term goal of carbon neutral growth from 2020, working closely with the International Civil Aviation Organization (ICAO) and governments around the world. This is part of the A4A and ATAG commitment to sustainable development.

More information under [www.aviationbenefits.org](http://www.aviationbenefits.org)







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Ms. Zhang Ya, Principal Representative to the UN, China Energy Fund Committee

Mr. David Zhu, China Energy Fund Committee

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