

ISSUE BRIEFS PREPARED BY THE TECHNICAL WORKING GROUP FOR INFORMATION OF THE
SECRETARY-GENERAL'S HIGH-LEVEL ADVISORY GROUP ON SUSTAINABLE TRANSPORT

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Brief #1: Financing sustainable transport

1. The Issue¹

The need to increase and "better-target" funding invested in sustainable transport is urgent. Policy makers addressing transport issues face the dual challenge of ensuring better and safe access to markets and services while improving its economic, social and environmental sustainability as recognized, amongst others, in the proposed Sustainable Development Goals (SDGs) as well as national development policies. Improved accessibility to markets, jobs and community facilities, is an important driver of poverty reduction through economic growth in both rural and urban areas. To keep global warming below 2° Celsius above pre-industrial levels, the transport sector will need to play an important role in mitigating GHG emissions. Transport will also be forced to improve climate resilience of the sector. Driven by economic and population growth, expanding urbanization, and resultant motorization land transport energy-related greenhouse gas emissions (GHG) are set to more than double by 2050² (IPCC 2014; IEA 2012).

Investments in the range of trillions of US dollars (USD) are needed for the expansion of land passenger and freight transport infrastructure and related services, but also airports, ports and transborder facilities, that in turn have to be operated, financed and funded on an on-going basis. Economic and social development supports an increasing demand for transport solutions. The countries' response has often been to expand the supply (e.g., building roads). Sustainability requires both responding with a different type of supply (e.g., modal shift), and managing the demand (e.g., fossil fuel subsidies).

Striving to meet the necessary GHG reduction cut also offers the opportunity to reduce other negative impacts of transport with significant social, economic and financial benefits. In 2010, such negative impacts were: (i) 1.24 million people killed and an estimated 20-50 million people are injured in road crashes globally every year; (ii) 184,000 deaths attributable to exposure to pollution from vehicles; (iii) more than 20% of energy-related global GHG emissions; and (iv) losses in global GDP of up to 5% per annum (WHO 2013; World Bank 2014; International Energy Agency (2012); and SLoCaT 2014 respectively).

USD 1.4 to 2.1 trillion is estimated to be spent on capital investment in transport infrastructure annually (Lefevre et. al. 2014). Choices made today on transport infrastructure, technology and services in the emerging and developing economies can lock-in a country to a fossil fuel-dependent or low-carbon pathway and determine transports impacts in terms of air pollution, congestion and road accidents. Redirecting funding away

¹ This issues brief on financing of sustainable transport should be read in conjunction with the other issues briefs prepared on SDGs and Technology, as well as the two issues briefs on Urban related transport.

² In 2009, transport contributed more than 20% of global energy-related GHG emissions of which about 70% were generated by land transport (IEA 2012). GHG emissions (2009) are projected to rise by nearly 50% by 2030 and by more than 70% by 2050 (IEA 2012).

from the road-dominant development model to sustainable, low-carbon transport infrastructure and services will require significant transformational investments in coming decades in sustainable, low-carbon transport infrastructure and services. Most of the estimates available on transforming transport sector and investments are climate related. For the period 2015-2035, the Climate Policy Initiative estimates the cumulative transitional investment required to be just over USD 3 trillion of which over 70% relates to land transport. On road safety investments, IRAP estimates that investing more than 0.1% of GDP per year in targeted road infrastructure safety upgrades has the potential to prevent more than 40,000,000 deaths and serious injuries and unlock more than US\$5,000 billion of benefits (IRAP, no date).

The additional transitional investments focus on low-carbon modes such as railways, mass transit and active transport (walking and cycling) and will need to be fostered by the public sector with the bulk of funding provided by the public purse but also substantial private investment. Traditional investments in rural roads, national highways and transborder links will be needed where they are of high priority, but also in these cases additional investments may be required to make infrastructure more safe and resilient.

However, the initial investments can be recouped by very large cumulative monetary savings (reduced cost of investments in vehicles, fuel, transport infrastructure) estimated at over USD 70 trillion 2050 (IEA 2012; ITDP 2014) of a sustainable transport development scenario aligned with the estimated the 2° Celsius warming trajectory, compared to the 'business as usual' (BAU) transport development scenario aligned with the 4° Celsius warming trajectory.

Shifting the geographic pattern of investments to the fast growing developing nations and re-orienting investments to more sustainable transport modes are urgently required. Lefevre et al. (2014) estimated that currently, of total annual investments in transport infrastructure, 60% is represented by OECD countries and 40% by non OECD countries - quite a different investment pattern to that needed in future. Globally, private sector investment accounts for 61% of total investment in transport infrastructure in high income countries but 44% in low-middle income countries – again a pattern being quite different to that needed in future.

2. Critical Challenges or Road Blocks to Implementation in the Context of Sustainable Development

Demand from client countries for sustainable transport is not yet mature. Domestically public financed investment in transport, on average 50 times as significant as multi-lateral and bilateral ODA (Lefevre et. al. 2014), is still dominated by spending on roads. Obviously, not all roads are bad or not sustainable, e.g., rural roads in rural areas are key factor in poverty reduction and school enrolment. The issues are short-term decision-making + externalities not factored in the economic analysis. Nations while attempting to provide

access for communities to markets and jobs, and to support economic development, often neglect maintenance of existing transport facilities, and instead favour new facilities that may not always exhibit high economic and social priority, provide end to end connectivity, or be designed to be resource-efficient and climate resilient. Countries do not necessarily go for sustainable transport solutions (while the benefits—road fatalities, GHG emissions, local air pollution, congestion) seem to be so obvious. This is due to short-term costs are generally much higher than for traditional transport solutions. Prevailing regulatory regimes may not adequately foster the development of commercial, market-oriented and sustainable passenger and freight transport services. Under-pricing of external impacts, with fuel subsidies that are often present in low and middle income countries, may exaggerate the demand for transport, contributing to congestion and external impacts. Sustainable transport interventions are rapidly growing in number but are often still project-based and the absence of enabling financing arrangements hampers their scaling up. why

‘Sustainability’ is not consistently defined. Because there is no common understanding of what is sustainable (and why it is important), we tend to make the wrong investments. Different definitions of sustainability across all sectors (public – private – development organizations) investing in transport makes comparisons of trends in investment portfolios difficult. Financial institutions observing the Equator Principles, a project environmental and social risk management framework (www.equator-principles.com), may not be fully aware of the full dimensions of sustainable transport. Inadequate attention to agreed definitions of ‘sustainable’ may hinder institutional interest in investments in sustainable transport and the development of secondary markets for mature sustainable transport infrastructure.

Untapped capital and liquidity with widespread barriers limiting private sector

investment. There is ample capital and liquidity, yet the world is facing a growing mismatch between financing needs – particularly for long-term infrastructure – and available financing that is particularly acute in lower-income countries (Sachs et al., 2014). Incentives and risks between public, private and other entities are not well aligned to adequately foster sustainable transport. PPP is constrained for transport. Barriers common in many low and middle income countries include opaque legal frameworks in case of disputes, laws that prohibit foreign involvement in certain sectors or private operation of government-owned assets, deficient PPP contracts that may transfer excessive risk thus deterring a wide pool of bidders or greatly increase the cost of private capital, and a changeable policy environment. In many countries, the arrangements for tendering for PPP contracts are often unclear, the underlying quality of project preparation and prioritisation is inadequate, and relationship to policies and plans weak, thus deterring potentially willing investors. At the same time institutional investors, who could potentially increase investments in sustainable transport, have not always well defined sustainability criteria for their investments.

Incomplete Means of Implementation at sub-national level and lack of technical capacity are key constraints. National governments exert influence through national policies, plans,

standards, laws and regulations that guide national economic and social development and the spatial distribution of urban settlements and economic hubs such as industrial zones, ports and airports. However, national agencies are not necessarily always in a position to act effectively and quickly at a sub-national level to curb unsustainable development patterns with effective local action. In view of their favourable economic, social and environmental impacts, sustainable regional, urban and rural transport services may often require financial support that low income countries are ill-equipped to provide. Sub-national governments are needed to exert leadership, manage growth and coordinate financing but face many constraints that include: (i) they may not be sufficiently empowered by national governments to raise revenue and act independently; (ii) many competing demands including a backlog of other infrastructure and services; and (iii) lack of capacity and readiness to wisely use funding. MDBs and private lenders are often not able to lend directly to sub-national governments. Further, only 4% of the 500 largest cities in developing countries are currently rated as creditworthy in international financial markets (NCE 2014).

Inadequate breadth and depth of funding sources. Domestic public sector funding plays a vital role but is in developing countries currently insufficient to finance the needed transitional investments in sustainable transport investment and operations. Current sources of funding include general taxes, specific transport charges and user fees. The latter two may cover administration, and operations and maintenance, of current transport infrastructure and services (roads, railways, buses, walking and cycling provisions etc.) and possibly allow for renewal but not initial investment. Enhanced sources of funding are needed to finance initial investments, on-going operations and life-cycle maintenance.

3. Opportunities for Action/Recommendations³

Fostering local and national demand for sustainable transport through better definition of sustainability. It is necessary to encourage the demand for sustainable transport at the sub-national and national level as well as in MDBs and private investors. Agreement on what it means to be technically sustainable, covering economic, social and environmental impacts and the type of designs, is needed. Sustainable transport solutions based on common definitions will need to be context specific and developed by local stakeholders. This would assist local and national governments as well as MDBs and bilateral agencies and their management to re-orientate their portfolios, assist private financial institutions to appraise the sustainability of transport investments and support the development of new bond financing instruments appropriate for sustainable transport, as well as expand their application and incite the private sector to invest in sustainable transport infrastructure projects. Linked to improving the definition of sustainability of transport needs to be improvements in data collection and management.

³ The recommendations in this section are relevant as well for the Third International Conference on Financing for Development.

Improve regulatory and investment frameworks, remove perceived risks, and enhance government and private sector capacity.

Educate the private sector on available mechanisms and incentives designed to mitigate risks, to encourage them to take advantage of investment opportunities invest in transport infrastructure. Examples could include (a) government default guaranties where governments cover potential liabilities vis-a-vis its lenders to enhance the credit worthiness of public-private projects (i.e. the Indonesia Infrastructure Guarantee Fund created in 2010 or the Korean Infrastructure Credit Guarantee fund established in 1994); government guarantees that protect private operators against policy risk such as perverse regulatory measures, expropriation without compensation, force majeure or macroeconomic risk such as currency devaluation when revenues are in local currency, etc. These incentives should not serve to completely eliminate risks for the private sector. Hence, appropriate and balanced modalities for PPP should be determined out the outset to achieve a balanced allocation of risk while effectively inciting the constructive participation of the private sector in transport financing.

Given the limited supply of ODA compared to national budgets and the even lower quantities of international climate finance, even with increased international commitments, these funds should be prioritised to: (i) demonstrate new innovative approaches and reduce perceived risks of new technologies and sustainable transport; (ii) strengthen top-down national policy, strategy, program and project investment frameworks, and (iii) enhance national and sub-national government's capacity for sound implementation and measurement, reporting and verification (MRV). Climate funds should not be used for implementation but to encourage the adoption of transitional policies, capacity building and new technologies. Such a reorientation in the use of Climate funds can help to stimulate the use of Climate funds in the transport sector, which has been limited till now because of a combination of factors including project complexity.

Financial structures need to be put in place which would make appropriate sustainable transport projects 'bankable,' through access to a broader range of financing sources (with an appropriate mix of debt, grant and equity), and reduce risk through appropriate guarantees. The approach may also involve using pricing to influence patterns of demand and provide clear price signals for potential investors. Upfront demand for new technologies could be supported by appropriate financing, including viability gap financing through international climate finance, to encourage increased demand with a lowering of the unit costs of production.

Enhance governments' efforts to expand the pool of well prepared sustainable transport projects. A range of mechanisms exist which include: (i) appropriate project preparation facilities with more efficient and harmonised procedures; (ii) targeted support for national PPP Centres; (iii) new private investment facilities/ entities such as The Private Infrastructure Development Group (www.pidg.org); and Special Purpose Vehicles (SPVs) for

sustainable transport interventions (e.g. metro, bus rapid transit, bike-sharing, etc. All require clear objectives, appropriate governance and procedures that fully take into account the cross-cutting characteristics of sustainable transport. Funding is needed to facilitate these mechanisms that in turn can be used to strengthen national regulatory and investment frameworks. While ODA is likely to be used to provide initial support, a key issue is to build capacity so the new mechanisms can be sustained with domestic resources over the long-term. NAMAs (National Appropriate Mitigation Actions) for voluntary action on GHG, or Sustainable Urban Mobility Plans, could be used to assist the transition to local ownership and act as the launching pad for the next generation of sustainable transport projects and help structure investments strategies for sustainable transport.

Aggregate sustainable transport investment options that in their own right are too small to attract large scale financing. There are many examples available of the positive impact of bundling projects into multi-jurisdictional investment programs in the case of urban public transport such as those being supported by the Clean Technology Fund in Latin America or national financing programs like the Jawahri Nehru National Urban Renewal Mission in India. ODA assistance can assist governments in speeding up implementation of sustainable, low-carbon transport projects by developing instruments that support parallel, multi-jurisdiction programs and project development. The development of revenue models can be part of this international assistance. For existing mature sustainable transport investments, it is desirable to aggregate them to make them more attractive for investors, which can also be aided by appropriate certification of ‘sustainability’ and capacity building.

Use fiscal instruments and user charges to broaden and deepen revenue sources while reducing demand for unsustainable transport. Opportunities for broadening and deepening revenue sources exist in many countries such as: (i) increase direct road use charges, vehicle registration and ownership charges properly structured to reflect the emissions, road damage and congestion they cause; (ii) increase fuel taxes and shift fixed charges to those that vary with use; (iii) direct road use charges to better reflect the marginal social costs of travel (e.g. congestion charging); (iv) more efficient land value capture mechanisms to reflect the beneficial impacts of transport and other sectoral investments; and (v) social impact investment targeted at capturing the long-term financial benefits of reduced road trauma to fund the up-front capital improvement of road infrastructure star ratings for all road users and associated safer modes of transport or similar. Given the large scale growth in urban areas expected in future, city-wide mechanisms for enhancing the value capture are needed for funding of transport and other urban infrastructure. Sub-national governments are critical for developing these approaches but the effectiveness rests on their capacity and credit worthiness, which can be enhanced by ODA and international climate finance. Further, the wide scale implementation of fiscal instruments to promote sustainable transport would be expected to result in a reduced demand for conventional transport infrastructure with savings to government budgets.

Better alignment of prevailing fiscal rules and developing sustainable transport. Basel III rules and the EU Capital Requirements and Directives and Regulations for banks significantly restrict the ability of banks to engage in long-term, non-recourse project financing (financing in which loan repayments can only come from the profits of a project and not from the assets of the borrower). To promote sustainable transport or sustainable development more capital is needed to invest and permitted debt to equity ratios for sustainable transport will need to be revisited.

Promote innovative regional financing mechanisms that achieve scale by targeting benefits to multiple countries, rather than focusing on financing directed to individual countries. Development banks could establish criteria for financing of cross border transport infrastructure. Specifically such a model could be based on the creation of hybrid regional financing mechanisms to finance the creation of sustainable cross-border transport infrastructure, (road, rail or waterways) and (b) the establishment of regional infrastructure fund that pool resources to finance specific projects. The benefits are many – including improved road safety, reduced carbon emissions, increased economic activity and job creation, greater harmonization of trade procedures, and increased revenues for governments.

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Brief #2: Urbanisation, management and operation

1. The Issue

The world is rapidly urbanising and the global urban population has overtaken the world's population residing in rural areas – with 54% of the global population living in towns and cities in the year 2014. By 2050, the world's urban population is expected to reach 66% - growing from 30% in one century. This growth in the proportion of people living in urban areas should be seen in the context of overall population growth. For the last 50 years, world population multiplied more rapidly than ever before. In 1950, the world had 2.5 billion people; and in 2005, the world had 6.5 billion people. By 2050, this number could rise to more than 9 billion- the world is on its way to becoming a planet of cities.

The rapid urban growth is characterised by regional differentiations. An increasing share of this growth is projected to occur in Africa and Asia – both continents together making up nearly 90% of the increase until the year 2050.¹⁸

A few decades ago, most of the world's largest agglomerations were found in the more developed regions, today's largest cities are concentrated in developing countries and it will be these regions that will experience the greatest urban population increase in the next years.

Urbanisation is an engine of growth and development- it can generate tremendous economic and social benefits through agglomeration economies: economies of location (proximity to urban services and infrastructure), efficiency (specialization, connectivity) and urbanization (proximity of factors of production) and cities currently account for about 70% of the world's Gross Domestic Product (GDP). Sustainable urbanisation is inextricably linked with sustainable transport. Some key trends underlie this relationship. These are outlined below:

- Population growth, economic development and urbanization are driving motorization rates, particularly in cities. Worldwide, there are currently 1.2 billion cars, vans, trucks and buses. Rapid motorisation will continue, in particular in developing countries and, by 2035, the number of light duty motor vehicles will reach nearly 1.6 billion;
- The transport sector, in 2010, was responsible for approximately 23% of total energy-related CO₂ emissions. Greenhouse Gas Emissions from transport have more than doubled since 1970 - increasing at a faster rate than any other energy end-use sector;
- Annually, 1.24 million people are killed in road traffic accidents which occur predominantly (92%) in low and middle income countries; young adults and therefore income earners form the majority of victims;

¹⁸ <http://esa.un.org/unpd/wup/Highlights/WUP2014-Highlights.pdf>

- Outdoor air pollution, which is partly caused by transport, was estimated to cause 3.7 million premature deaths worldwide in 2012; predominantly (88%) in low and middle-income countries. Transport also contributes to soil, water and air pollution;
- Rising GDP has been linked to increasing motorization and vehicle –kilometers traveled per capita. But traffic congestion in cities resulting from motorisation and car dependency causes heavy economic losses due to time and fuel wastage and increased emissions. For example, in the United States, time lost in traffic amounted to 0.7% of GDP, in the UK to 1.2 % of GDP, 3.4 % in Dakar, Senegal; 4 % in Manila, Philippines, 3.3 % to 5.3 % in Beijing, China ; 1 % to 6 % in Bangkok, Thailand and up to 10 % in Lima, Peru where people on average spend around four hours in daily travel.

The growth of private motorised transport has influenced the development of cities across the world and developing countries are following the trends earlier seen in developed countries. In 2010, there were 825 million passenger cars in the world. Of these, 70% were in developed countries and 30% in developing countries, mainly in Asia. The number of light duty motor vehicles (cars, SUVs, light trucks and minivans) is expected to increase to 1.6 billion in 2035 and to more than 2.1 billion by 2050. The reasons for this growth include economic, demographic and urban spatial expansion, the rise of the consumption-oriented middle classes, and persistently inefficient, inconvenient and expensive public transport that is related to high informality of the sector. The consequences of this growth are reflected in the many externalities as outlined above.

Globally, the number of new cars sold annually increased from 39 million in the 1990s to 63 million in 2012. Asia has been a leader in new car sales, accounting for 40% of global sales in 2012 and the rapidly growing economies of Asia and South America are expected to continue driving massive future growth in car sales. However, it is worth noting that the bulk of newly registered cars are not new but second hand imports from developed countries and thus data on new car sales may not reveal the actual trend of motorization in developing countries. Some countries, notably in Asia and also in Africa, are seeing a huge increase of motorized two wheelers on their roads.

Many cities have taken initiatives towards sustainable urban mobility. Led by Latin American cities, Bus Rapid Transit (BRT) systems, integrated with Non-Motorized Transport (NMT), have emerged as a viable and affordable mass rapid transit option since the 1970s. Inspired by various successful BRT examples, modern bus systems have gained dedicated right of way in many parts of the world – safely and efficiently transporting millions of passengers.

Bogota, the capital of Colombia, is renowned for introducing many sustainable mobility measures. With 329 km of bike paths¹⁹ crossing the town, bicycles have become an integral part of the town's identity and have contributed to manifold socio-economic and environmental benefits. The NMT infrastructure in Bogota is well integrated with the various public transport hubs. Bogota illustrates an example where bike use has tremendously increased as investments were made into bike lanes and parking, safety features and supportive policies. Similar initiatives have also been taken up in Medellin,

¹⁹ <http://www.sustainablecitiesnet.com/uncategorized/sustainable-city-bogota-colombia/>

Colombia. Other countries, such as China and India, are strongly investing in the construction and expansion of metro systems to serve the ever increasing mobility demand. Many cities are developing integrated, multi-modal transport systems, linking city buses with BRT, Metro, NMT or Park & Ride facilities.

It is important to make sustainable urban mobility a policy priority. A new growth model has to be implemented that recognizes the importance of Public Transport and its integration with NMT. A more “positive” interpretation of NMT will also be timely. Rather than being defined in negative terms with motorized transport as the dominant mode, cycling and walking can be described as “active transport” considering particularly the public health benefits conferred by an increase in cycling and walking activities. Worldwide, experience has shown how successful sustainable mobility policy changes involve an integrated approach to mobility and institutional strengthening with clearly defined responsibilities, and broad public engagement to generate widespread support. A holistic governance approach, integrating policy, planning, technology, financing and infrastructure, is required for passenger transport, NMT and also freight.

In order to improve urban air quality, many cities have introduced incentives for improved vehicle technology and cleaner fuels. Other regulatory measures for the management of urban transport include traffic management (e.g. Intelligent Speed Assistance, intersection management etc.), parking controls, congestion charging, road pricing, area-wide traffic bans and green zones, toll way systems, or park and ride facilities around public transport stations. Electronic road pricing in Singapore and congestion or cordon pricing in London, UK and Stockholm, Sweden provide interesting examples.

National urban transport policy can be crucial in helping cities to develop effective institutions and financial capacity to deliver efficient and more sustainable transport. Some countries have adopted strong urban transport policies, with regulations linked to funding for urban projects and programs. However, some cities, particularly in the developing regions, have not been able to illustrate successful examples and manifold policy gaps exist. One major policy gap is the lack of adequate guidelines for planning processes as well as limited mechanisms for stakeholder engagement (citizens, academia, business etc.).

The integration of urban mobility with other developmental aspects, such as land-use or environmental planning, is lacking in many cities. In addition, addressing environmental concerns, such as emission reductions or social benefits such as affordability or equity, has often been overlooked in Transport Policies.

Urban transport is generally a local responsibility of the urban areas (cities, metropolitan areas). The role of the local authority has to be affirmed by a policy framework – an often neglected issue. Furthermore, strong institutional frameworks (based on multi-sector and multi-level coalitions) are required to ensure coordination among the institutions involved in urban transport.

2. Critical Challenges or Road Blocks to Implementation in the Context of Sustainable Development

A bias in favour of planning for cars rather than people has led to a vicious circle, where roads and infrastructure are built for the ever-increasing numbers of vehicles, further

propagating sprawl and increasing congestion, pollution and the frequency of road accidents. Growing disparities have also meant that large sections of the urban poor are compelled to walk long distances, in an increasingly unsafe environment in the absence of safe walking and cycling lanes and public transport. Goods transport is a fundamental component of the urban environment and cities face the challenge of balancing the need to ensure efficiency of goods transport, while minimizing the externalities of congestion, emissions, noise and accidents.

A lack of planning capacity at the local level as well as limited guidance from the national level are among the main challenges faced by cities in developing countries. Clear responsibility has to be set in regard of project evaluation, construction and implementation. Moreover, understanding of private-public partnerships is essential for successful implementation of urban transport projects. Urban transport is generally a local responsibility of the urban areas (cities, metropolitan areas). The role of the local authority has to be affirmed by a policy framework – an often neglected issue. Furthermore, strong institutional frameworks (based on multi-sector and multi-level coalitions) are required to ensure coordination among the institutions involved in urban transport. However, very often there is a lack of institutional capacity and overlapping, fragmented or unclear institutional responsibilities often impact on the management capacity of authorities involved in urban transport infrastructure and services and the enforcement of traffic rules and regulations. Successful implementation of urban transport policy can only be meaningful within the context of an effective, coherent and well-coordinated institutional framework.

In addition, jurisdictional and functional inconsistencies are among the main challenges of sound transportation planning across all levels of government and across jurisdictional boundaries. Legislative boundaries of cities are often not consistent with functional urban areas inhibiting investment, coordination, management and operation – which adversely affects the efficiency of mobility systems in urban agglomerations.

Many countries lack guiding policy frameworks for cities at the national level. Among other things this gives rise to conflicts arising between the different levels of governance over the role and level of revenue support for transport planning. In many countries, planning capacity and discretion of the local/regional authority are not clarified and regional coordination is not incentivized. Recommended reforms are taken up slowly. However, a few successful models of national government financial interventions at the local level exist (e.g in Mexico, Colombia, Brazil, India, South Africa).

Tax structures often underserve urban areas which generate a much higher share of tax revenue than is returned to them. In many countries this problem is compounded by urban regions not having adequate autonomy. This situation makes it difficult to finance for instance mass transport – which is capital intensive and rarely financially viable as stand-alone project (nor is it desirable that capital costs of public transport are borne by user base rather than tax base).

There is inadequate focus on the needs of trips and people. Too much attention is given towards the trips of vehicles. Simultaneously, underinvestment in mass public transport and NMT is slowing down buses in congestion situations while inducing unsafe conditions for cyclists and pedestrians. The lack of inter-modal public transport integration (service,

information and fare integration), and also the lack of integration between public transport, NMT (“last mile”) and parking policies are resulting in inefficient, inadequate and unsafe transportation networks in cities. Tariff policies are often a problem – when cities struggle between inclusive fare policies (low fares) and the need for subsidy versus cost-recovery fares which may price off the poor. In case of BRT, successful models exist for private/public risk-sharing and sustainable models exist for some cities. However, the city bus system in many cities in the developing world is still characterized by fragmented and informal low quality services. Attempts to formalize have often led to high levels of subsidy and social tension.

Urban goods transport covers a vast range of activities relating to an adequate level of service for a variety of urban supply chains. It is a crucial part of the urban environment and with increasing trade and commerce its importance is growing. However, goods transport or urban freight distribution has been largely ignored in urban transport planning. From a social perspective, interactions between people and goods transport in urban environments create many disturbances related to health, safety and the quality of life. Also despite its importance for urban productivity and job creation, goods transport has been neglected in policies around the world.

Transportation planning in various countries is done by technocrats and happens in isolation. However, stakeholders (such as citizens, transport operators, academia, business, associations) should play a key role in transportation decision-making and implementation since their engagement has the potential to improve the quality of urban mobility measures, enhance the sense of ownership, build local capacities as well as create a learning platform for information exchange.

3. Opportunities for Action/Recommendations

Overall, a reversal of the paradigm, where people rather than vehicles are at the centre of planning, is necessary. Such a paradigm considers accessibility as the ultimate objective of all transportation; i.e physical access to places and opportunities- to jobs and services and to goods and amenities. “Transport” or movement by itself is not the goal. Such a shift in the paradigm looks at how to bring people and places together and should also be accompanied by a move to safe, affordable and environmentally-friendly means of transport- i.e. decent public transport integrated with safe and attractive facilities for walking and cycling. The focus in the new paradigm shifts from managing the “supply” side of mobility to managing the “demand side”. It is through this shift in the paradigm and a focus on mobility that transport will become a better enabler of economic activity and social connectivity-supporting people in gaining their basic rights to education, healthcare and employment.

Transit-oriented development provides not only an opportunity to enhance mobility but also plays a key role in creating vibrant, liveable and walkable cities. It involves the creation of compact, mixed use, high density communities around and along major transportation hubs. This makes it possible to minimize trips, reduce car dependency and improve quality of life. Singapore has constructed public housing close to metro stations, which allows lower income people to access both, housing and transport.

Particular focus in transport planning should be given to vulnerable groups such as NMT users, women (demand for safety and security on public transport and NMT facilities), or

mobility challenged persons (need for universal design) who have additional issues that compound their mobility and safety problems. Their needs should be top priority and appropriate infrastructure design (e.g. sidewalks, ramps) as well as traffic rules (e.g. speed limits) should be in place. However, in the absence of clear policies, rules and regulations, their needs are often neglected in planning efforts.

The goal of all transport interventions should be to maximize accessibility while minimizing VKT (Vehicle Kilometres Travelled). The Avoid-Shift- Improve framework provides a basis for addressing accessibility issues and the externalities associated with transport in a comprehensive manner. Better land-use and mixed use zoning can reduce the numbers of trip and trip lengths for instance. Currently, many cities lack the integration between land-use and transport planning. Particularly against the background of the emergence of metropolitan regions, an integrated approach is required - containing recommendations for local action and regional integration - as well as alignment with national development objectives

A clear definition of functional urban areas is important. This can be done by using remote sensing data, with identified boundaries providing the basis for any planning interventions. In addition, roles and responsibilities have to be set out – being complemented by adequate financing and funding schemes in order to strengthen the local revenue base. The creation of an enabling environment for sustainable transport planning and its enforcement is crucial. The sub-national level has to be empowered and its capacity built through guidance, legislation and potentially, finance. Incentives for cooperation and improved communication can additionally enhance the empowerment of the local or regional level.

For large cities and metropolitan areas, conflicts and overlaps between the functional domains of different governmental bodies and institutions need to be resolved through the establishment of integrated “Metropolitan Transport Authorities”. Such authorities should be adequately empowered and have adequate capacity to deal with the full spectrum of issues relating to transport within their geographical domain- ranging from vehicle registration and licensing to, road construction and maintenance, safety, and public transport operations. Several good examples, such as from London, Singapore and Stockholm, have emerged in this regard and have the potential to be adapted in developing country cities.

National urban policies to address sustainable mobility - that focus on mixed land use, compact city forms and transit oriented development in order to reduce or avoid the need for travel – have to be developed. This is important in providing a framework for action at the level of the local government and will facilitate better integration between land-use and transport as well as encourage communication and interaction between transportation agencies and those involved with developing and implementing plans for growth, economic development, and similar issues and concerns impacting land use. Additionally, such policies will guide the coordinated preparation of local and regional land use/economic development strategies, policies, and plans based on pertinent studies and analyses.

Policies need to be promoted that make car travel less appealing while facilitating a modal shift towards public transport and NMT. Financial incentives and integrated tariff systems have to be provided to ensure convenience, affordability and uptake of these alternative modes. In addition, policies on parking, congestion charging or tolling are needed to reduce

private automobiles use and to promote the use of public transport and NMT. The additional revenues generated from road/congestion pricing measures can be used as a source for financing investments in public transport improvements. Innovations such as car-sharing can reduce car ownership, but still represent a win-win situation for the car industry and cities, serving to meet the un-met demand for mobility amongst city residents, while reducing demands on parking space. Employers can also contribute to reducing congestion by incentivising car-pooling amongst employees.

“Value Sharing” models to finance transport have great potential in bridging the financing gap for investments in public transport- even in developing countries. For example, loans taken by the Ethiopian Government for building a light rail transport system in Addis Ababa are expected to be paid from the incremental revenues from land alongside the LRT corridor leased out by the government to private builders and investors.

Reliable demand modelling and forecasting data should be the basis of any transport intervention. Opportunities presented by the diffusion of ICTs could be exploited. For example, data communicated over mobile phones can be used for creating origin-destination maps. Good examples are emerging in this area. For instance, the absence of origin-destination data in East African cities made it difficult to plan BRT operations. But by using information on informal transit routes captured on smart phones, it was possible to map the mobility patterns of people using informal public transport services. Since, potential BRT services are expected to reflect current informal transit patterns, this data in turn provided the basis for operational plans for the BRT systems in the cities. Such innovative use of technologies and instruments can be strengthened and facilitated to improve accessibility and reduce accidents, pollution and GHG emissions. The uptake of mobile phones and smart phones is rapidly increasing. For example, Ericsson, a technology company, estimates that the number of mobiles will rise to 930 million in Africa by 2019- almost one per person. The so-called “big data” held by mobile phone service providers could be harvested to provide information on travel patterns of people and thus expedite data collection and modelling, bypassing more time consuming and relatively more expensive methods. Developing countries in particular can be in a good position to benefit from such “leap-frogging” opportunities.

Furthermore, it is important to characterize the relationship between urban mobility systems and the efficiency and effectiveness of cities through suitable indicators that can quantify the pattern and develop evidence based action plans with clear targets. Possible indicators include measures for urban accessibility, percentage of urban space dedicated to streets, traffic fatalities rate, PM 2.5 exposure, mode share of private automobiles/VKT, GHG and local pollutant emissions from urban transport sector.

The Open Working Group (OWG) forwarded a proposal for sustainable development goals to the General Assembly which contains 17 goals with 169 targets covering a broad range of sustainable development issues. Sustainable mobility and transport has a relationship with most of the goals. Going forward, suitable indicators will have to be defined to allow future monitoring of the goals and targets. (See also issues brief on SDGs and post-2015 development agenda). Guided by the upcoming “Sustainable Transport Global Outlook Report” to be developed by the High Level Advisory Group, the global sustainable mobility

community has an opportunity to highlight and elaborate the links between mobility and the SDGs.

Sustainable transport planning needs to be linked to all relevant stakeholders such as academia, civil society, business or associations. Participation and partnerships at all levels shall be encouraged during all stages of the project cycle.

The close involvement of city networks, such as C40 or ICLEI, play a crucial role in facilitating knowledge transfer and peer-to-peer exchange, as well as providing direct support to cities developing local sustainable transport policies, programmes or projects. Learning platforms and partnerships can be created within the framework of these city networks.

The HLAG should be supported by the TWG on outreach efforts for sustainable mobility related to:

- Voluntary contribution of \$ 175 billion made by MDBs at Rio+20—also linked to capacity-building and advocacy;
- HLAG Sustainable Transport Global Outlook Report – compile compendium of good practice on mass transport development, promotion of cycling and improvement of pedestrian accessibility/safety/quality, parking management; dissemination and outreach to wider audiences; by building on existing initiatives such as the GIZ-SUTP Sourcebook on Sustainable Urban Transport;
- Support new initiatives (e.g. the “Transport Action Area Initiatives” launched at the UN Climate Summit in 2014);
- Position and promote sustainable urban mobility at COP21 and Habitat III;
- Promote sustainable urban mobility at the Third Financing for Development Conference to be held in Addis Ababa Addis Ababa (July 2015).

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- Global Report on Human Settlements 2013: *Planning and Design for Sustainable Urban Mobility*;
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Brief #3: Inter/intra-city and multi-modal interfacing

1. The Issue

The World is rapidly urbanizing. In 1950, 30% of the world's population was urban. Currently, 54 % of the global population lives in urban areas. By 2050, 66% of the world's population is projected to be urban. However considerable regional differences are observed in urbanization patterns across the globe. Currently, Northern America and the Latin America and the Caribbean region are most urbanized with 82% and 80% of their populations respectively living in urban areas. 73% of the population of Europe lives in urban areas. Africa and Asia are the least urbanized with 40% and 48% of their populations living in urban areas, but these are the regions where urbanization is growing at the fastest rate and by 2050, the percentage of people living in urban areas is expected to become 56% and 64% respectively.

Urbanization has been linked to the growth of GDP and is indeed an engine rather than an outcome of development. However, the rise of motorization, various macroeconomic and social factors and the growth of transport infrastructure in the 20th century has led to the wide dispersal of populations giving rise to sprawl which contributes to high energy consumption and greenhouse gas (GHG) emissions- currently over 75% of total global energy generated is consumed in cities which account for over 70% of global GHG emissions.

There is growing recognition of the need for seamless, affordable, economically viable, socially acceptable and environmentally sound transport systems and connections within and between cities and urban-sub-urban- national-regional and international networks and services. An important issue is the inter-modal integration between different modes of public transport systems [e.g. metro/ light rail transit (LRT) and surface transport (bus, tram etc.)], as well as between public transport and non-motorized transport (cycling and walking). Non-motorized transport should be given much more priority and re-defined more positively as "Active Transport" and always considered as a part of an integrated transport system. There is a growing need for connecting airports and passenger port terminals with city centres not only by road, but also by rail and public transport.

As cities expand into hinterlands, urban areas often cross multiple administrative boundaries – coordination across these boundaries on transport and spatial development issues is hard but critical for improving mobility/accessibility outcomes; the boundary between intercity/intracity infrastructure and the city and hinterland is becoming increasingly blurred – creating in particular road safety hazards.

The expansion of international trade in goods and services has resulted in an unprecedented demand for transport infrastructure and services to support the increased movement of goods and people, both within and across national boundaries. Pressure on land transport modes is likely to increase as inter-regional trade and investment flows, coupled with rising land and labour costs in coastal areas, directs more productive activities inland. The diversification and growth of the economies of landlocked developing countries will also raise demand for cross-border land transport.

The twenty-first century city is a city of intense flow of people, material and information. Goods transport accounts for 10 to 15% of vehicle equivalent kilometres travelled in urban areas and have been linked to the externalities of congestion and air and noise pollution. Evidence indicates that a high-income city in Europe generates about 300 to 400 truck trips per 1000 people per day and 30 to 50 tons of goods per person per year. Freight movement is largely driven by diesel powered cargo vessels, trucks, and trains and while diesel engines are more energy efficient than petrol, they contribute significantly to GHG emissions and other short-lived climate pollutants, particularly black carbon, thus impacting public health.

With growing urban congestion crippling many cities and draining the economy, the concept of “green freight” has emerged in recent years. It involves policy makers, business leaders and civil society working voluntarily together to improve the energy and environmental efficiency of freight movement. This approach reduces costs and can make businesses more competitive, while also reducing emissions and benefiting public health. Transport strategies in the increasingly contested urban landscape have not received adequate attention and it is essential that the close interactions between urban land-use and goods transport is considered in framing policies and strategies that can ensure the economic benefits of efficient goods transport while reducing its environmental, health and social impacts.

2. Critical Challenges or Road Blocks to Implementation in the Context of Sustainable Development

The tendency to equate transport with the means of travel, particularly with travel by private motorised means, has led to increasing motorisation and a propensity to build and expand urban roads. In 2010, there were 1 billion motor vehicles worldwide (excluding two wheelers). Data from 2005 indicates that almost half of all trips in cities were made by private motorised modes. This proportion continues to increase. By 2035, the number of light duty motor vehicles (cars, sports utility vehicles, light trucks and minivans) are expected to reach 1.6 billion and by 2050 this number will exceed 2.1 billion. Most of the increase will be found in Asian Countries, especially China and India.

From a regional and also international perspective of adjoining countries, the main challenge is to strengthen regional transport connectivity in the most economically, environmentally and socially sustainable way. Given that at present the vast majority of freight movements by land are moved by road, priority needs to be accorded to enhancing the role of railways and inland waterways for long-distance freight, as well as international trade. However, due to both technical and institutional factors, the regional railway networks remain underutilized. Different gauges of the regional network and “missing links” mean that goods must be transhipped en route, thereby reducing the time and cost advantages held by railways. Furthermore, lack of maintenance and investment in rail tracks, locomotives and rolling stocks in some countries have contributed to the deterioration of their railways.

More significantly, however, institutional obstacles make the railways and inland waterways less attractive to freight companies. For railways, some major common challenges include delays at border stations, partly due to inspections on both borders, and lack of harmonization in processes and documents; different technical standards for rolling stock,

power supply, braking systems and signalling systems; different operating rules and tariff structures; and a lack of qualified manpower to operate cross-border trains. As the cost-advantages of railways are derived from volume, the lack of consolidation centres also prevents them from operating regular and/or profitably services.

Road transport still plays a critical role in countries where alternative modes do not exist, as well as in linking remote and rural areas to cities. Roads connect production and consumption centres within countries, and for some landlocked developing countries provide the most efficient transport option for transit to maritime ports. In low-income countries, road transport is often the only competitive mode for both agricultural and industrial producers to link to domestic and international markets. But regional road transport services in some regions (e.g. Africa and Asia) are less efficient, both economically and environmentally, than in other regions. Poor maintenance of roads, weak enforcement of traffic rules and regulations concerning axle-loads, weights and speed, and numerous non-physical barriers to cross-border movement of vehicles and drivers add to the time and energy used for transport, while aging vehicles and the lack of professional standards for drivers add to the environmental and safety toll, particularly of trucks.

Economic growth and expanding trade also means that road and transport infrastructure, including intra-city and intercity roads, are subject to increased loading. Poor design, construction and maintenance often result in the rapid deterioration of such infrastructure. This in turn leads to vehicular damage in addition to causing congestion and safety hazards.

“Transportation Corridors” which are made up of one or more primary transportation facilities that constitute a single pathway for the movement of goods and people within and between activity centres should also link with land-use patterns and street networks in adjoining areas. But often, “corridor development” emphasises inter-city connectivity and the movement of goods and people without adequate consideration of land-use patterns and urbanization pressures generated alongside the nascent corridors. This presents a missed opportunity in the sense that the increasing value of land is not tapped in systematic ways for developing public infrastructure and services such as better roads, connectivity, water supply and sewage in the newly urbanizing areas. For example, appropriate tax regimes can be considered for housing developments close to such corridors, with the additional revenues being directed to improvements in basic services. Supply-side corridor management and the lack of integrated and inter-jurisdictional planning also constrain accessibility to the corridors, cause safety hazards and disrupt community linkages (e.g. links between settlements on two sides of an intercity super highway).

A number of issues are associated with expanding city boundaries, for example: (1) While a regional perspective may prioritize compact structure of urban growth based on public transport, outlying municipalities in the periphery may have financial incentives (tax base) to encourage sprawl; (2) Smaller municipalities may have limited capacity and legal authority to actively guide spatial development causing sprawl; and (3) National/provincial agencies manage/build intercity infrastructure and local government manages municipal level infrastructure and the lack of coordination between these spheres of governance leads to bad planning (e.g. big intercity highways but ineffective connection to inadequate local road network); (4) Public transport integration is a problem impacting investments, operations, service integration and user side integration (fares and tariff policy). The poor

often live in the periphery and are particularly affected by this lack of integration since they may need to change multiple modes.

As intercity roads traverse through small urban areas and approach larger urban areas they create some of the most hazardous conditions. Residents of these peri-urban areas treat the space as streets – with a strong pedestrian/cyclist user population crossing frequently. Drivers treat the space as fast roads. Good solutions have been difficult to design.

Freight logistics and intermodal integration in a framework of co-modality are often underestimated, but of very high relevance for the liveability of cities and metropolitan areas. This is particularly true for megacity agglomerations. The potential of complementarity of public/passenger and freight transport should be further analyzed (e.g. conjunctive use of rail/tram infrastructure). Efficient logistics dictate the use of large trucks on intercity routes while urban considerations often require restrictions on size and timing. In port cities restrictions on truck traffic can have a deleterious effect on the entire logistics supply chain. Planning of transfer terminals is another problem – these are expensive investments and as cities expand a terminal located in what used to be the urban periphery becomes a terminal inside the city affected by restrictions and thus of much less functional value. Taking a broader regional perspective, the main challenge emerges as the need to strengthen regional transport connectivity in the most economically, environmentally and socially sustainable way.

3. Opportunities for Action/Recommendations

Generally, a focus on the means of transport – vehicles and roads, bridges and flyovers has dominated policy making and planning. There needs to be a fundamental shift in this paradigm. The goal of all transportation is access – access to opportunities, services, goods and amenities. Accessibility and sustainable mobility is to do with the quality and efficiency of reaching destinations whose distances are reduced rather than the hardware associated with transport. Accordingly, sustainable urban mobility is determined by the degree to which the city as a whole is accessible to all its residents, including the poor, the elderly, the young, people with disabilities, women, children and women with children. This move from a “transport” bias to a focus on accessibility opens up the possibilities of better linking land-use planning, urban design and transport planning and laying the foundation for compact, walkable and more “connected” cities.

The coordination between land-use and transport planning needs to be promoted at the highest level through national urban policies which are developed as statutory instruments that provide a vision for sustainable urban development while also defining the roles, responsibilities and relationships amongst different sectors, agencies and stakeholders. Such policies can also support a regional vision for coordinated land-use and transport (e.g. service integration of public transport in a metropolitan region). Some good examples indicate the way forward. For instance, in Auckland, New Zealand, “Auckland Transport” was created in 2010 to function under the city council. The new organisation amalgamates the functions and expertise of eight local and regional councils and the Auckland Regional Transport Authority and all transport functions now fall under the domain of the new organisation. The underlying assumption behind this transformation is that the Auckland Council with its multiple roles and responsibilities is not able to provide the required level of specialisation and focus on transport related matters. Auckland Transport now is

responsible for planning and delivering local “roads and footpaths, parking and train, bus and services”. It is also responsible for preparing the Auckland regional land transport programme, which sets out the transport projects.

In Stockholm, Sweden, to deal with urban growth, the *Storstockholms Lokaltrafik* was created as a single regional transport body to take over the responsibilities that had been earlier shared amongst different municipalities. In another example, encouraged by potential investments in transport infrastructure, the five “county governments” that make up the Greater Nairobi Metropolitan Area have agreed on a collaborative framework for transport planning and operations by signing a “Memorandum of Understanding” as a precursor to the establishment of the proposed “Nairobi Metropolitan Transport Authority” to oversee transport development in the Greater Nairobi Metropolitan Area.

With reference to transport corridors, instead of supply-side corridor development responses (e.g. building frontage roads; curb-cut restrictions), corridor –level growth management plans that link land-use to new improvements can be developed. Coordinated, strategic and long-range planning keeping in view a dual vision of infrastructure development for transport and land-use development can maximise the gains from new investments.

A good example of public-transport oriented corridor development is provided by the city of Stockholm, Sweden, where strategic regional planning has created regional settlement and mobility patterns that have reduced car-dependency. The city planners deliberately created a balance between jobs, housing and retail activities along rail-based axial corridors producing a so-called “necklace of pearls” form of development, where a number of mixed-used neighbourhoods are interspersed by lower density development and open spaces. This has reduced trip lengths and a high share of trips take place within self-contained sub-regional corridors. Traffic congestion has reduced and there is more even distribution of traffic between peak and non-peak hours. Curitiba, Brazil provides another land-mark example, where a lower cost option bus rapid transport system was introduced in conjunction with a land-use policy that promoted increasing intensity of land-use progressively with proximity to the BRT corridor demonstrating a planning for people approach rather than the planning for car paradigm.

It is important to consider the complementary roles of freeways and railway systems. For example in the suburbs of Munich, Germany, motorways and suburban trains are physically integrated to allow for motorists to switch to trains. Similarly, better pedestrian and cycling paths feeding into suburban railway stations, bike sharing and rental schemes where such stations function as a node can improve accessibility in the wider metropolitan regions and should be prioritised in large urban agglomerations.

Good examples of modal integration have emerged in Asian and Latin American Cities. In Guangzhou, China, the BRT system which serves 800,000 passengers daily is integrated with the city’s bicycle lanes and bike share systems, thereby ensuring access to public transport and extending the reach of public transport. Sao Paulo and Curitiba in Brazil, Bogota in Colombia and Santiago in Chile have also taken measures towards such integration.

Governments also need to take a comprehensive approach and develop integrated national transport plans and policies, in coordination with national urban policies, which encourage

the most efficient use of different modes of transport. For example, for long distance freight, national policies may help the railways and inland water transport service providers to compete with road. The development of high quality intermodal facilities such as dry ports would also encourage the use of railways, as it would allow for safer consolidation and smoother transfer between modes. Additionally, regional cooperation in road and railway facilitation could help address the various institutional issues which affect cross-border movements of goods and people. In this regard, the application of information and communications technology (ICT) can help improve the efficiency of border-crossing procedures and logistics. For movement of people, the railway has many environmental and, within certain distances, economical advantage over aviation. High level political commitment and private sector interest are required to overcome the deadlock of government bureaucratic procedures.

Some good practices have emerged on freight distribution in urban areas. These include rationalisation of delivery and consideration of “reverse logistics” (i.e. removal of waste and modal adaptation), but much more focussed research is required on integrating freight distribution as an integral part of sustainable urban mobility. Challenges of (transfer) terminals and logistics centres might be reduced, if they move away from road dependency and towards intermodal terminals with rail access. Freight logistics and intermodal options require more attention from policy and decision makers, especially, as mentioned above, regarding decision making for terminal location and integration (e.g. long distance railway network often goes beyond administrative city boundaries

The “Sustainable Transport Global Outlook Report” to be developed by the HLAG provides a unique opportunity to instigate more action towards sustainable mobility. It should provide a repertoire of emerging good practices, and guidance in terms of the key steps governments can take. It should also seek to inform the private sector on how the goal of sustainable mobility can be a multiple “win” for people, for businesses and for the planet. An advocacy programme to disseminate the “Global Transport Outlook” should be implemented for accelerating the policy dialogue on sustainable mobility and Inter/intra-city and multi-modal interfacing.

4. References and Further Reading

- Global Report on Human Settlements 2013 : *Planning and Design for Sustainable Urban Mobility*;
- Open Working Group Proposal on SDGs;

Brief #4: Sustainable transport technology and innovation

1. The Issue

Transport is a key enabler of societies to achieve wealth, economic development, quality of life, and the personal aspirations of its members. The goal of sustainable transport is to allow transport to play that role, while helping to reduce the total amount of motorized vehicle movement needed to attain those goals and make motorized vehicle movements that do occur less damaging on human and natural environments.

Today's transport sector is a main contributor to major societal problems. Including air pollution – the WHO is estimating that air pollution causes 3.7 million pre mature deaths per year – with transportation the biggest source in most cities, and climate change - the transport sector is set to increase its contribution to global CO2 emissions from one quarter to one third - increasing more rapidly than any other sector. And 1.3 million people get killed on our roads every year – more than malaria and TB combined. Other issues include noise pollution, loss of biodiversity, inefficient use of energy, and congestion.

Transport technology has reduced impacts in the past. Cars and trucks emit substantially less pollutants than they did 30 years ago, and are substantially more fuel efficient. These improvements are largely the results of improvements in vehicle technologies, but are not equally shared between high and low income countries. Technology also plays an important role in improving the safety performance of transport systems, helping to reduce the rate at which accidents occur, and reducing their severity when they do.

Further introduction of technological advances to support sustainable transport can have massive benefits. Technology can contribute to many transport interventions – following the ASI approach; **A**voiding transportation, for example through better city planning; **S**hift to more sustainable transport modes like public transport, and **I**mprove transport through cleaner transport. Examples are the logistical arrangements for pricing mechanisms such as dynamic parking pricing, road pricing or congestion charges. On the supply side, information systems such as Intelligent Transportation Systems applications to manage road traffic and public transport services provide for better route planning. On the vehicles side introducing cleaner fuels and vehicles can at least halve the number of people exposed to air pollution levels exceeding WHO standards, and vehicles technology policies can result in a doubling of the average global fuel economy, thus constituting an important element in a global response to climate mitigation. Finally, on the demand side, technological advances support the information systems that are used for shared vehicle systems such as car sharing, bike sharing, and ride sharing services.

But there are limits to what technology can do. Collective behavioral decisions can bound the effectiveness of technologies. For example, over the past decades, many countries around the world introduced emissions control technology into their vehicle fleets, which resulted in major air quality improvements, especially in cities. However due to ever increasing fleets their air quality has now started deteriorating again. Therefore technology must be combined with better transport infrastructure, planning, financing, regulation,

incentives for behavioral changes and other sustainability measures. As another example, the experience of trying to improve fleet fuel economy in the USA shows that efforts to improve fleet economy are not only affected by the technologies applied to improve efficiency, but also, and in the big picture more substantially, by what kinds of cars and trucks people choose to buy and use. Technology must not be thought of in isolation of the institutional processes and behavioral choices that will determine their use. Behavioral and institutional processes define what kinds of technologies are needed, which are likely to be successful, and which are not within the realm of the possible. Operating environments need to be suitable for the transfer, adoption, replication, and up-scaling of technologies. Clean transport technologies also can have adverse effect, often called “rebound effects”, for example more efficient vehicles will reduce transportation costs and thus could increase the use of motor vehicles. Another example in developed countries is ICT improvements resulting in the use of Just-in-Time delivery systems, resulting in an increased use of smaller vehicles.

Technology can also drive organizational and institutional changes. Not only do behavioral and institutional processes define what kinds of technologies are feasible, but technology can also help enable behavioral or institutional process changes. For example, use of electronic fare collection for mass transport systems, can enable use of more differentiated pricing and subsidies for targeted groups, and a better demand forecasting and analysis. A second example - introducing cleaner vehicles technologies can result in increased inspection and enforcement capacities.

The IEA Energy Technology Perspectives (ETP) scenarios indicate that only a combination of Avoid, Shift and Improve measures can achieve the necessary emissions cuts from the transport sector – with the majority of cuts to come from fuels and vehicle technologies in the Improve group of interventions. The ETP further concludes that deep cuts in carbon emissions from the global transport sector can only occur through a global transition away from oil as the dominant fuel to no- and low-carbon fuels, including biofuels and electricity, in addition to the A, S, and I measures needed to stabilize emissions. However, such a transition must avoid mistakes such as misuse of biofuels or charging electric vehicles with high carbon intensity grids.

Major benefits can be achieved by a wide application of existing, proven technologies in countries around the world. To be sure, new technologies, such as electric mobility and synthetic biofuels are important, especially for the long term, but to move to sustainable transportation in the immediate term, there already is a set of proven technologies that can result in major and immediate benefits if they were to be adopted world-wide. These technologies differ between OECD and non-OECD countries and several conditions will need to be met to ensure these technologies can be applied, especially in low and middle come countries.

2. Critical Challenges or Road Blocks to Implementation in the Context of Sustainable Development

Knowledge, capacity and incentives are needed to introduce technologies. Clean and efficient technology does not automatically trickle down to low and middle-income

countries. For example, while the developed world switched to unleaded fuels in the 80s and 90s, with compelling health and economic impact evidence, developing countries kept using it for several more decades. Cost-effective technologies to improve vehicle fuel economy in widespread use in developed countries are not penetrating developing country fleets. One reason for this gap is that there can be a lack of knowledge and incentives in developing countries, including lack of information about technology options and benefits, lack of expertise, lack of incentives for implementation of better systems, and limited capacity to develop appropriate policies. Examples of this include bike/car sharing, advanced transit system management, and electric 2-wheelers. Another reason for the gap is that technology improvements often need to be accompanied by an array of policy and behavioral changes to develop an operating environment in which these technologies can work, changes which have proven challenging to implement in many developing countries. For example, emissions-reducing technologies that have been tried and tested in some cases for decades in developed countries need to have in place processes and procedures for monitoring compliance with their use.

Cost remains another major obstacle for adopting technology to support sustainable transport. Major investments are needed to develop better mass transit systems and towards deep CO₂ reduction measures such as alternative fuel refilling infrastructure. While initial development costs of related technologies may be absorbed by developed countries and high-end consumers, there is still a need for financing models to ensure state of the art technologies will be applied. What will eventually drive the cost down in each country is the learning path associated with technology uptake, innovation to improve efficiencies and improve suitability to local conditions, new financing models (including public–private financing), and development of local capabilities. Redirection of resources (from example fossil fuel subsidies) and appropriate incentives policies (for example proper parking charges or clean vehicle purchase incentives) can help overcome this. However, the introduction of cleaner transport technologies does not necessarily have to result in major costs. For example, so called “fee bate” systems, whereby higher-emitting cars need to pay higher taxes, while less emitting and more efficient cars will get a tax break, are an example of a cost-neutral technology intervention. The slow rate of transport technology trickle-down to developing countries (e.g. second hand cars, lower quality fuel) provides opportunities for cost-effective leapfrogging (e.g. car/bike-sharing programs). The role of pricing as a key enabler – or limit – on what technology can accomplish cannot be overstated, because prices affect behavior.

Technical guidance, tools and harmonized standards are needed to overcome technical barriers, both for technology users and policy makers. For example, electric vehicles face a number of barriers even in the richest of countries: high cost of batteries, low driving range, long recharge times, lacking recharging infrastructure. Many of these will likely improve over time but some barriers might never be fully overcome (e.g. substitution of lower density electricity or hydrogen fuel in place of dense liquid fuels for aircraft). And the lack of skill and equipment for measurements needed for monitoring, reporting and verification are also challenges.

Poor incentives for sustainable transport technology are resulting in low market penetration of technology to support sustainable transport. One challenge is to overcome entrenched interests which drive the market for low-quality vehicles and fuels (few

developing countries have put in place used vehicles age restrictions to prevent dumping of old, highly polluting technology). In other cases, the structure of the market itself is a challenge to the use of sustainable transport technology. An example of this is the nature of the urban freight business in many developing countries, with many small enterprises, which makes it difficult to coordinate innovation. This challenge is compounded by the fact that many countries lack any mandate by, and legal support for, local authorities to take a leading role in driving change in behavior and organization of urban freight. In many countries, subsidies for dirty or high carbon fuels is a major challenge to the widespread adoption of sustainable transport technologies (such as electric vehicles) and might lead to an overemphasis on new technological solutions to the detriment of existing technical alternatives, or encourage over-reliance on cars to the detriment of “avoid/shift” solutions. Similarly, a clean but expensive technology for an urban bus system imposed on a public transport operator without regard to affordability could result in higher costs and lower ridership, with perverse and potentially counterproductive effects. A final weakness in many developing countries’ policy frameworks is that vehicle import policies are driven more by fiscal and revenue considerations (e.g. tariffs and duties for new cars and vehicle parts) than concerns like road worthiness / safety, pollutant emissions, or fuel economy.

3. Opportunities for Action/Recommendations

Technology opportunities exist for all three A-S-I areas. Technology can contribute to “**Avoiding**” motorized travel (and cutting demand growth) through for example: better decentralization and localization of certain services, thereby necessitating shorter trips; better tools for planning, operations and management, resulting in better plans for compactness with more buy-in; and use of ICT for tele-work and tele-shopping and video conferencing for some long range travel.

To achieve travel “**Shifts**”, emphasis must be on providing technology that will promote a shift between modes of transport – from individual car use to transit systems and “active transport” (walking and cycling) and technology solutions that will promote increasing the load factor of transport modes (more people or goods in vehicles), for example carpooling. This will need integrated approaches that combine investments in new technologies with better infrastructure (e.g. bike sharing systems with creation of dedicated bike lanes).

In the “**Improve**” group, technology plays the driving role, and would include: fast tracking cleaner fuels, for example low sulfur fuels that will allow introduction of cleaner engine and exhaust after-treatment (filter) technologies; promoting cleaner vehicles standards and technologies, for example following a harmonized approach by using EURO vehicle emissions standards; promoting increased fuel efficiency for existing engines and vehicles (existing technology can double the fuel economy of the global fleet with massive fuels savings and CO₂ reductions); promoting the use of alternative fuels, including biofuels and electricity; and introducing new no- and low-emissions vehicles technologies, including electric mobility.

However, use of the above technologies to make transport sustainable only works if the policies and prices are right. Therefore promoting clean transport technologies is often not only a matter of introducing technology in the market, but also of introducing policies and financial frameworks that provide an incentive for the technologies and ensure a sustainable application of these technologies.

ICT provides new opportunities. Much of the traditional planning and management methods used in the developed world rely on significant data collection/analysis capacity, which is often not available in developing countries. However, the advent of “big data” systems is lowering data costs, and new solutions can be used to create simpler, cheaper, and easier-to-use proxies. Smartphones and purpose-developed apps to assess road network conditions, map transit routes and compile transit service indicators, calculate and disseminate information through multimodal journey planners, and track performance management of public transport systems using open-source software and ICT-enabled citizen engagement and grievance management apps, have all been made possible through new big-data systems which both developed and developing countries can exploit.

New technology opportunities need to be supplemented with investment in research and development. Research can help analyze the barriers to the uptake of existing and new technologies and provide insight in the costs and benefits of more sustainable transport technologies. Research should focus on speeding tech transfer rates, optimizing policies to encourage uptake and the most effective use of new technologies, and how ICT, connectivity, communication and innovation can be applied to improve transport system efficiency and reduce negative impacts, with not only environment but also social and road safety benefits (for example autonomous vehicles or vehicles that communicate to one another and traffic management systems). Impacts of some of these new technologies on energy use, emissions and road safety are yet unclear.

There are a number of near-term technologies that seem promising for widespread adoption to improve the sustainability of transport:

- **Technology to reduce urban congestion**, including traffic management systems such as Singapore/London/Stockholm style electronic road pricing and parking pricing systems;
- **Vehicle safety systems** - new ones include smart guidance systems to avoid accidents that are appearing on premium market cars;
- Increased uptake of **fuel economy** technologies via stronger policies. Existing cost-effective technologies widely in use today could double the efficiency of new cars in many countries yielding large reductions in fuel consumption and GHG emissions;
- Ensure wide availability of **improved fuels to enable lower emission transport**, including low sulfur diesel fuels. This will require refinery improvements needed to produce cleaner, lower-sulfur fuels. Cleaner fuels will have direct positive impacts on vehicle emissions and enable cleaner engine technology and after treatment equipment, including particulate filters, that will in turn yield deep reductions in particulates and other pollutant emissions;
- Stronger deployment of **pollutant emission control technologies** (enabled by related fuel quality improvements) are already in use in developed countries and mainly need strong policies including enforcement to speed deployment and effectiveness in the developing world;
- Data and ICT for better **planning and operation of public transport** systems as well as business vehicle fleets (cars and trucks);
- **Roadmap for advanced no- and low-carbon vehicle and energy technologies.** Electric, plug-in hybrid electric and fuel cell vehicles all produce low or zero tail pipe emissions

and potential very low GHG emissions if clean feedstocks are used. Although full market penetration of these vehicles will take many years, efforts must begin now, concurrent with efforts to decarbonize electricity grids and develop clean hydrogen production systems;

- **Electric 2 and 3 wheelers** represent a leapfrog opportunity with excellent marketability prospects in many countries. Internal combustion engine scooters are often high emitters so this is a priority area;
- **Bike sharing and car sharing** and/or ridesharing systems, including innovative operating systems to facilitate them;
- Deployment of **advanced (cellulosic) biofuels** with strong safeguards to ensure minimum adverse secondary environmental or social impacts.

These ten short term priorities are not in order of priority and each requires a comprehensive approach with policy, fiscal, institutional, and operational considerations to ensure that transfer and application of these technologies will work and will continue to work at the longer term.

There are programs in place to support a move to sustainable transport technology. Many of these programs work globally - in all regions. These often need political, financial and networking support to allow for an increase in their operations and roll out their programs at a global scale. This is a short and incomplete listing of major initiatives at global and (sub) regional level that support clean transport technologies:

- The **Climate Technology Center and Network (CTCN)** support clean technology projects around the world, including in transportation, the CTCN is the operational arm of the UNFCCC Technology Mechanism, it is hosted and managed by UNEP in collaboration with UNIDO, and with the support of 11 Centers of Excellence located in developing and developed countries;
- The **Partnership for Clean Fuels and Vehicles (PCFV)** is the leading global initiative to support countries adopting cleaner fuels and vehicles. The PCFV is a public-private partnership, active in over 100 countries, with 75 partners. The Secretariat is based in UNEP;
- **Private Financing Advisory Network (PFAN)** supports clean energy projects and includes a transport programme;
- The **Global Fuel Economy Initiative (GFEI)** is an initiative of six leading organizations, with a Secretariat based at the FIA Foundation, which promotes a doubling of the average fuel economy and supports currently 40 countries in developing national fuel economy programs;
- The **Climate and Clean Air Coalition (CCAC)** is a large coalition of governments and non-government organizations to address short lived climate pollutants. Its priority focus includes work to reduce emissions from diesel vehicles and engines – vehicles fleets, maritime, and freight;
- The **Global Environment Facility (GEF) Sustainable Low Carbon Transport Programme** supports transport technology projects in developing countries.

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- ICCT roadmap on Global transportation energy and climate
- IEA roadmaps on Transport (including Fuel Economy of Road Vehicles, Electric and Plug-In Hybrid Electric Vehicles, Biofuels for Transport, Hydrogen

Brief #5: SDGs and the post-2015 development framework

1. The Issue

Transport was not part of the Millennium Development Goals (MDGs), which guided global, regional and national development policy since the start of the new millennium. The transport community considers this as a missed opportunity considering the strong linkage between the MDGs and transport. A more explicit acknowledgement of the contribution of transport towards realizing the MDGs could have accelerated the development of sustainable transport. It is important therefore that the transport community makes full use of the opportunities presented by the on-going efforts to formulate Sustainable Development Goals (SDGs) to advance the position of sustainable transport. While the primary emphasis in this issues paper is on the SDG process it is important to consider as well other key global processes taking place in 2015 and 2016 and the opportunities they provide to advance the case of sustainable transport. These include but are not limited to: the Third International Conference on Financing for Development; the second global High-level conference on Road safety; the 21st Conference of Parties (COP) under the UNFCCC; and Habitat III.²⁰

There is an emerging consensus that a post-2015 development agenda effective for the transport sector needs to include specific language on improving rural, urban and regional access (including connectivity) and should address key negative externalities such as air pollution, climate change, congestion and lack of road safety. Enabling Means of Implementation (MoI) need to address policy, financing, institutions and capacity, as well monitoring. They should address passenger and freight transport and should include all modes of transport including active transport (walking and cycling), which is often overlooked.

The final July 2014 report of the Open Working Group on SDGs acknowledges the contribution made by transport. In the SDSG framework sustainable transport is not represented by a standalone SDG, instead it is mainstreamed into many of the proposed SDGs, especially those related to food security, health, energy, infrastructure and cities and human settlements. Some of the proposed targets explicitly call for improving access (rural, urban, and regional connectivity) and overcoming negative externalities of motorized transport (road safety accidents and air pollution). Transport services are essential to achieving most, if not all, SDGs.²¹ For example, absence of transport infrastructure, high transport costs and externalities are a clear obstacle to economic development and accessibility in countries, adversely affecting policies on fighting poverty and achieving higher education rates just to quote a few examples. Also, effective action on Climate Change will need to include action on transport. It was decided that the proposal of the

²⁰ It is important to note as well as the second UN Conference on Land-Locked Developing Countries in November 2014, and the third International Conference on Small Island Developing States in September 2014 which both resulted a number of transport related recommendations.

²¹ For assessment of transport targets in the proposed SDGs see http://www.slocat.net/sites/default/files/slocatfiles/000slocat_assessment_of_final_owg-sdg_document-july_19-_final.pdf

Open Working Group shall be the main basis for integrating sustainable development goals into the post-2015 development agenda, while it is recognized that other inputs will also be considered. The intergovernmental discussions on the SDGs have reached a stage that it is not likely that major changes or additions will be made prior to the adoption of the SDGs and associated targets in a global Summit in September 2015. Efforts to influence the SDGs and targets will need to focus on the indicators being developed to measure progress.

The zero draft Addis Ababa Accord on Financing for Development was released in March 2015. The current version contains the Member States' intention to follow-up on commitments made in Monterrey and Doha and to further strengthen the framework to finance sustainable development and the MoI for the universal post-2015 development agenda. Transport is referenced *directly* in passages related to sustainable and resilient infrastructure, trade related regional infrastructure, and Public Private Partnerships targeting sustainable urban development, and *indirectly* in passages to fossil fuel subsidies, carbon pricing, and ensuring enabling environments necessary for infrastructure investment. At midpoint of the Decade of Action on Road Safety, the 2nd Global High Level Conference on Road Safety to be held in Brasilia, Brazil will take stock of implementation of targets and agree on future action. The Draft Brasilia Declaration effectively links improvements in road safety to the wider agenda of urban planning and sustainable transport. COP 21, in December 2015, is expected to result in a new, more ambitious, global agreement on climate change. Countries that so far have communicated Intended National Determined Contributions have all included the transport sector as one of the sectors in which action will be taken domestically to address climate change. Habitat III, in October 2016, is expected to result in a new global agenda on urban development. Urban transport is one of many topics that are being discussed in the Preparatory Committee meetings for the Habitat III Conference.

All in all it appears that the post-2015 development agenda, while still to be further defined and negotiated, will further "legitimize" sustainable transport and provide significant opportunities to advance the scaling up of sustainable transport. The implementation of a sustainable transport friendly post-2015 development agenda can benefit from a number of regional and global intergovernmental partnerships and organisations that have been established in Africa, Asia, Europe and the United States. These partnerships and organisations bring together transport and environment ministries of well over 100 countries. They include the Africa Sustainable Transport Forum (ASTF); the Regional Environmentally Sustainable (EST) Forum in Asia; The Transport, Health and Environment Pan-European Programme (THE PEP) and The International Transport Forum at the OECD. All four have adopted declarations or action plans in some form that reflect to some extent the substance of the proposed transport targets.

2. Critical Challenges or Road Blocks to Implementation in the Context of Sustainable Development

The mainstreaming of transport across many SDGs underscores the importance of transport as a critical sector to achieve sustainable development. This being said, it is also clear that this approach does not offer an easy way to apprehend what is “sustainable transport” in the context of the SDGs.

There remain several critical gaps related to transport in the current SDG framework. As a consequence the developmental impact of sustainable transport might not be fully realized:

- The need for improved rural transport and enhanced rural access is not featured prominently in the proposed SDGs. Geographic isolation is a strong contributor to poverty and the marginalisation of rural communities. The extent of poverty is not just dependent on family income, but also on the availability of infrastructure and services, such as education, safe drinking water, basic sanitation, clean and affordable modern energy services and medical care. According to the World Bank, 1 billion people in developing countries do not have access to an all-weather road.
- There is no guarantee that new/improved passenger/freight transport infrastructure will be accompanied by new/improved transport services. Intermodal transport, with the options of integrating multiple modes is becoming increasingly important in satisfying the demand for sustainable door-to-door mobility. Intermodal transport also provides a flexible response to changing supply chain management requirements in global markets and distribution systems. The creation of intermodal systems can have significant cost savings as well as environmental gains.
- The absence of specific statements about the need for improved logistics services and sustainable supply chains for regional, urban, national and rural goods transport puts the SDG at risk. Thriving sustainable supply chains can drive sustainable economic growth, national competitiveness and facilitate market access to ensure countries’ integration in the global system, and contribute to poverty alleviation, notably in least-developed and landlocked countries. Statistics indicate that truck drivers spend up to 57% of their travel time in customs queues at borders. The resulting congestion at borders generates increased pollution levels, which negatively impacts on human health; incites criminal activity; creates an environment conducive to prostitution and the spread of disease, and more. At the economic level, congestion at border crossings represents a huge impediment to trade and constrains the development and expansion of global supply chains, which results in high costs for operators and lost business opportunities.
- The absence of a specific reference to access through cycling and walking (active modes of transport) and enabling safe infrastructure for these sustainable but vulnerable modes of transport often used by the poor weakens the relevance of the SDG framework for the poor and other disadvantaged groups.
- Climate change and air pollution are part of the SDGs but because of the mainstreaming of transport not described in a transport sector specific manner.

The tracking and measurement of progress toward SDGs and targets will require additional strategies, resources, and coordination. The United Nations Statistical

Commission indicator report²² presents an initial set of provisional indicators to measure progress toward SDGs and targets proposed by the OWG:

- Sustainable transport contributions are developed more fully in indicators than in targets, but indicators remain provisional.²³ Measurability remains an issue for a number of proposed transport-related indicators.
- There are differences in the manner that transport is defined under various indicators – this is however not a transport specific problem but equally applies to other sectors.
- Indicator formulation does not appear to be driven by an assessment of capacity among statistical commissions and other relevant stakeholders in developing countries and available resources for data collection. Transport passenger and goods flows pose a number of current measurement challenges (for example, data on land-based passenger and freight passenger movements are not usually collected on a systematic basis).

Implementation of sustainable, low carbon transport (rural, urban, regional) needs to be scaled up:

- While there is agreement on the need to scale up sustainable transport in a comprehensive manner there is less agreement on whether this can be achieved through incremental change of what we have, as against the radical change argument calling for a comprehensive paradigm shift in transport policies.
- Enabling policies at local and national level are required that incentivize sustainable transport, discourage continuation of traditional harmful transport policies (e.g. fuel subsidies) and promote active transport (walking and cycling). There is a disconnect between good practices on sustainable transport that have been implemented in some places and on the ground reality across many countries so policy is extremely important and getting transport policy right needs to be a key priority.
- Scaling up of sustainable transport is also being held back by a lack of institutional mandate and legal support for local authorities to take the leading role in driving change in behavior and organization of urban passenger and freight transport. Examples from Brazil, India and Mexico indicate that it is feasible to put in place institutional structures that incentivize action on sustainable transport by local authorities.
- Financing for sustainable transport must increase dramatically to meet the future goals of the post-2015 agenda.²⁴ Transport related targets agreed upon in the OWG are ambitious and will require a broad set of funding strategies. Private sector financing avenues, including through Public Private Partnerships, will have to be better integrated in the post-2015 agenda implementation process. Climate finance, although disappointing in scale so far, is important and needs to work hand in hand with other financing sources. A concern in terms of financing is that the zero draft of

²²[https://sustainabledevelopment.un.org/content/documents/6754Technical%20report%20of%20the%20UNSC%20Bureau%20\(final\).pdf](https://sustainabledevelopment.un.org/content/documents/6754Technical%20report%20of%20the%20UNSC%20Bureau%20(final).pdf)

²³ For example access to all weather road is included under indicators for Infrastructure related targets but is not included at target level.

²⁴ See also the Issues Brief on Financing of Sustainable Transport

the Finance for Development Conference does not capture the critical point that sustainable transport/infrastructure investments are more cost-effective than traditional motorized transport investments, when considering co-benefits (e.g. air quality, time/fuel savings, road safety and active transport health benefits).

3. Opportunities for Action/Recommendations

The SDG framework, as it stands, is a useful, yet imperfect means to achieving the full potential contribution of sustainable transport towards sustainable development. To strengthen its effectiveness in connecting marginalised communities through affordable transport infrastructure and services and in reducing private transport through modal shift, as well as making transport cleaner and safer, all stakeholders in the public, private and development sector will have to increase their level of engagement. The negotiations on the SDGs and the post-2015 development framework are country-driven, but its implementation will need to also be supported and driven by national and local stakeholders. The regional and global intergovernmental partnerships and organisations described earlier in this issues paper have a key role to play in taking the sustainable transport dimension of the SDGs to the national and local level. It will be important as well to successfully tackle those key challenges, listed in section two, that can hamper the scaling up of sustainable transport. An effective indicator framework for sustainable transport is key in that respect and full use needs to be made of the opportunities offered by the on-going process of indicator development to ensure that efforts will result in workable indicators. The same goes for financing for sustainable transport, which is dealt with in more detail in a separate issues paper.

At the same time it is important to build on the strength of the sustainable transport community, which has identified a range of opportunities to significantly scale up opportunities for sustainable transport. These include, for example:

- Achieving and/or maintaining sustainable modal split in transport of goods and passengers. In the particular case of urban transport, for instance scaling up of modal shift in urban transport, could, based on modelling by UC-Davis and ITDP (2015) result in more than \$100 trillion savings in cumulative public and private transport related spending, and 1,700 megatons of annual carbon dioxide (CO₂)—a 40 % reduction of urban passenger transport emissions—could be eliminated by 2050 if the world expands public transportation, walking and cycling in cities.
- Invest more into a sustainable transport infrastructure: for example, investing more than 0.1% of GDP per year in targeted road infrastructure safety upgrades that improve the safety rating of roads for pedestrians, cyclists, motorcyclists and vehicle occupants worldwide has the potential to prevent more than 40,000,000 deaths and serious injuries and unlock more than US\$5,000 billion of benefits (IRAP, 2014).

- A higher fuel efficiency of all modes of transport should be sought, encouraging and financing the use of new more sustainable technologies. Experts suggest that just by using the existing cost effective technologies in all light duty vehicles we could halve CO₂ emissions from the global car fleet by 2050 and reduce 1GT/CO₂e by 2030 and 2GT CO₂e by 2050). (Sustainable Energy for All, 2014).
- Improving the share of walking and cycling in all trips. Many countries have used the World Health Organisations HEAT tool to provide authorities with an evidence based decision making tool that estimates the value of reduced mortality that results from regular walking or cycling. Austria worked out that their current level of cycling saved 142 lives with €405 million value. The Boston Metropolitan Area Planning Council showed that cuts to public transport services would result in 9 to 14 additional deaths per year due to decreased physical activity, which could be valued between \$74.9 and \$116.5 million (WHO, no date).

It is important to highlight the potential of the sustainable transport agenda to promote economic transformation and growth by creating new business opportunities at the local and national levels. For example, new information technologies and intelligent transportation systems, new low-fuel consumption vehicles, alternative fuels and other innovations create strong dynamics in markets that lead to opportunities for value-addition, job creation and economic growth, and should therefore be emphasised in the context of achieving the SDGs.

Over the last years, on the occasion of the Rio+20 Conference in 2012 and the Secretary General's Climate Summit in 2014, the transport community has made a wide range of transport related commitments.²⁵ These commitments, which cover all major modes of both passenger and freight transport, are ambitious in scale and reflect sustainable transport interventions that have been tested at scale both in the developed and developing world. It will be in the interest of the sustainable transport community to place these commitments in the context of the SDG and post-2015 development agenda. These commitments, including the \$175 billion commitment for more sustainable transport by the world's 8 largest Multilateral Development Banks, are a powerful argument that the transport community stands ready to help provide the Means of Implementation for an ambitious post-2015 development agenda on sustainable transport.

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