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INTERGOVERNMENTAL ELEVENTH REGIONAL ENVIRONMENTALLY SUSTAINABLE TRANSPORT (EST) FORUM IN ASIA

2-5 OCTOBER 2018, ULAANBAATAR, MONGOLIA

Sustainable Urban Design for Green Growth –Role of EST

(Background Paper for EST Plenary Session-1)

Final Draft

This background paper has been prepared by Mr. Holger Dalkmann, for the Eleventh Regional EST Forum in Asia. The views expressed herein are those of the author only and do not necessarily reflect the views of the United Nations.

Promoting green growth in Asia: Role of urban planning and design to encourage environmentally sustainable transport

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Executive Summary

Today, 55 per cent of people live in towns and cities, which is expected to grow to more than 70 per cent by 2050, with the majority of the growth anticipated in Asia. Cities are focal points for economic activities and engines of economic growth with around 75 per cent of Asia's GDP being derived from urban areas. More compact, connected, and coordinated cities can create up to US $17 trillion in economic savings by 2050 and reduce infrastructure capital investments by over US$ 3 trillion between 2015 and 2030. The coming decade will be a critical opportunity for Asia to pursue policies, plans and governance frameworks to determine its path towards green growth, underpinned by environmentally sustainable transport and improve the quality of life for its residents.

Recognizing this urgency, the Bangkok Declaration was approved at the Fifth Regional EST Forum in 2010, which emphasized the need for an integrated AVOID-SHIFT-IMPROVE approach. It focuses on avoiding motorized travel by reducing the number of trips or their distance, shifting towards environmentally friendly modes like walking cycling, public transport and shared modes, and improving fuel and vehicle efficiency. These can be enabled by coordinated governance, institutional capacity, financing for sustainable infrastructure and technology.

Countries and cities across Asia have taken numerous measures to move towards integrating land-use, urban form and transport, challenges remain in ensuring policy coherence across cities, sub-national/ provincial and national levels, as well as across sectors. The lack of horizontal and vertical coordination and institutional capacity is the biggest challenge, along with limited devolution of powers to enable transparent, accountable governance at metropolitan and city scales. This is compounded by the lack of relevant and up-to-date data, limited capacity of metropolitan and local governments to raise their own revenues and lack of participation by civil society organizations.

Cities in Asia have denser urban fabrics compared to their counterparts in Western Europe and the United States, creating a unique opportunity to prioritize non-motorized transport and regulate the use of personal motor vehicles at an early stage. Asian countries/ regions such as Japan, Hong Kong Special Administrative Region, China, Republic of Korea and Singapore have successfully decoupled economic growth from carbon emissions and provide relevant case studies for the Asian region, for structuring urban growth around rail-based transport systems. However, with a majority of growth anticipated in cities with a population of 500, 000 and above, the role of bus-based public transport will feature prominently. Simultaneously, countries like India and China have undertaken nation-wide centrally assisted reforms, whereas Laos, Mongolia, Viet Nam, Philippines have focused on their larger urban centres.

Going forward, the Asian EST Forum can serve as a powerful platform to push for the implementation of the Sustainable Development Goals and the Paris Agreement on climate change by becoming enabling reporting, monitoring progress and sharing learnings. National governments have a crucial role to play by creating national urban policies as well as other policies which can indirectly affect urban development – such as transport, housing, energy and environment, focus on rapidly growing cities, create spatial planning guidelines, indicators and benchmarks to evaluate provincial, metropolitan and city-level plans, undertake reform-based central assistance, clearly define roles and responsibilities, enable regions and cities towards raising their own revenues, build capacity and move towards more accountable governance with civil society participation. The prospects for the New Urban Agenda will largely rest on the way in which the Asia-Pacific region urbanizes over the next 20 years.

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1. Background

Today, 55 per cent of people live in towns and cities, which is expected to grow to more than 70 per cent by 2050, with the majority of the growth anticipated in Asia. Cities are focal points for economic activities and engines of economic growth with around 75 per cent of Asia's GDP being derived from urban areas (Asian Development Bank 2011). With this growth, it is assumed that 60 per cent of the infrastructure is still to be built (Meltzer 2018). Cities and nations have a unique opportunity and the urgent task to shape the future of their urban areas and improve the life of their residents.

Transportation consumed around two-thirds of global liquid fossil fuels in 2015 (IEA 2017), emits nearly a quarter of the world's energy-related CO_2, and generates more than 80 per cent of the air pollution. Transport is responsible for millions of road crashes and fatalities and produces chronic traffic congestion in major Asian cities. It is estimated that these costs add up to more than 10 per cent of a country's GDP. Therefore, the rapid rate of urbanization needs to be effectively managed to ensure that the potential economic and social development arising from urbanization is optimized and increase the economy, improve the quality of life and protect the environment.

The Bangkok Declaration which was approved at the end of the Fifth Regional EST Forum 2010 in Bangkok emphasized the need for an integrated strategy on transport (UNCRD 2010) and referred to the **AVOID-SHIFT-IMPROVE** paradigm (Dalkmann and Brannigan 2007). To enable a paradigm shift towards environmentally sustainable transport (EST), all stakeholders are required to reduce the number or shorten the length of trips, to shift towards environmentally friendly modes like walking cycling, public transport and shared modes, improve fuel and vehicle efficiency and use technology to enable the above. More compact, connected, and coordinated cities can create up to US$17 trillion in economic savings by 2050 and reduce infrastructure capital investments by over US$ 3 trillion between 2015 and 2030 (New Climate Economy 2018).

However, while there is a lot of attention to the shift and improve strategies, the potential to reduce trips and length of trips is often not considered in national strategies as the latest analysis of country voluntary reports on the sustainable development goals (SDGs) show (Yiu, et al. 2018). This was also observed in the goal by goal and country comparison of Avoid, Shift and Improve strategies of member countries of the EST Fora (Litman and Earley 2017).

Therefore, the main objective of this paper on "***Promoting green growth in Asia: Role of urban planning and design to encourage environmentally sustainable transport****"* is to guide and support EST member countries in Asia by focusing on the potential of the AVOID strategy. The paper will be used to provide background information for the Forum participants to share the state of the art knowledge on the nexus between urban planning, design and environmentally sustainable transport for green growth development. After reflecting on the implementation of the UN agenda and describing latest trends, individual chapters will look at enabling implementation through policies, planning, institutions, governance, technology and capacity building.

This paper will be presented, distributed and lead policy consultations at the 11th Regional EST Forum in Asia in Ulaanbaatar, Mongolia as well as subsequent fora.

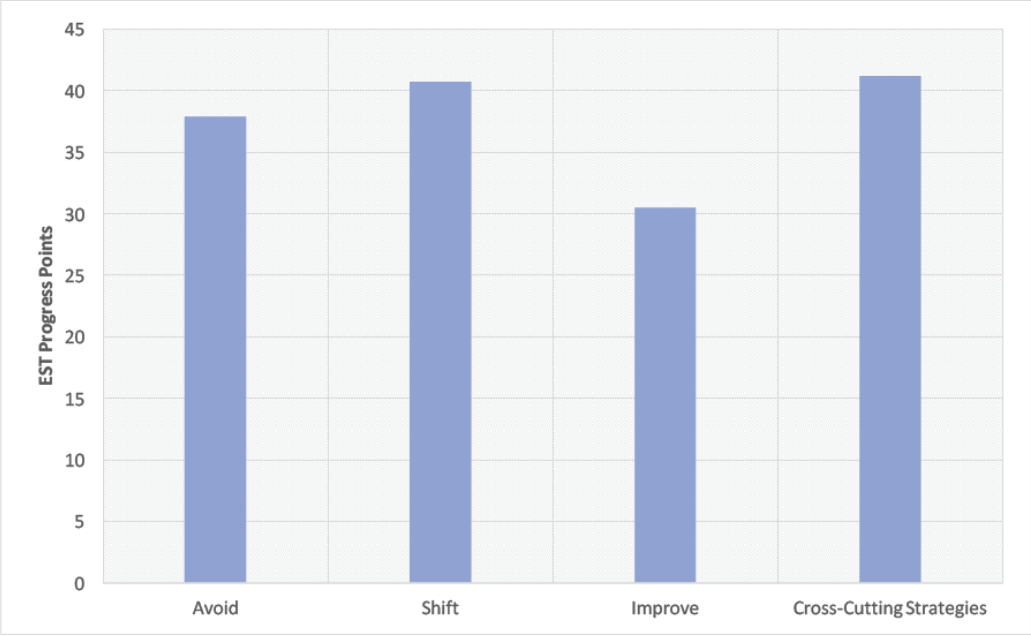

Figure 1: Average progress of EST members within each strategy group
Source: Litman and Earley 2017

1.1. International agreements as a driving force for integrating environmentally sustainable transport and urban planning

The adoption of the 2030 Agenda for Sustainable Development in New York in 2015, the Paris Agreement on Climate Change in 2016 and the New Urban Agenda in Quito in 2016 set the global framework of actions towards acting on sustainable development and climate change. As the following paragraphs will show, transport and its linkage with urban development was mostly an implicit rather than an explicit part of the agreement and the follow-up actions by the countries. It is therefore, even more important that fora like the EST build on the global agreements and pay attention to sectoral levels as well as the link for transport with other sectors like urban development and energy.

1.1.1. Sustainable Development Goals (SDGs)

In September 2015, countries adopted the 2030 Agenda for Sustainable Development and the SDGs. 191 countries agreed on 17 goals and a reporting mechanism. Every year, the annual High Level Political Forum (HLPF) focuses on specific goals and selected countries submit their progress and action report known as the Voluntary National Report (VNR). While transport was not an explicit goal, there are five direct and seven indirect links to transport in 12 out of the 17 goals (SLoCAT 2016).

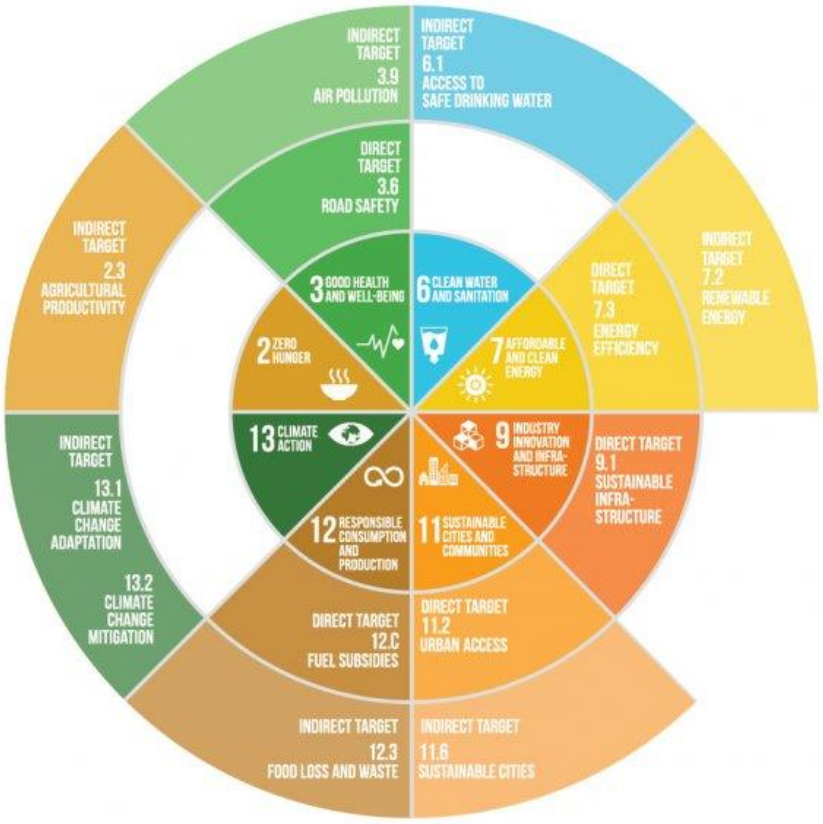

Figure 2: Direct and indirect transport SDG targets
Source: SLoCaT 2016

The most explicit reference is in Goal 11, which focuses on sustainable cities and communities to make them inclusive, safer, cleaner, resilient and more sustainable. In goal 11.2, the countries commit "to provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons". Further, goal 11.3 focuses on "inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries". These two goals highlight the nexus between urban development and transport and call for action.

However, the latest analysis of the Voluntary National Reports (VNRs) shows that while almost all countries provide some reference to transport, there is a lack of clear goals and explicit policy action reported. So far 112 countries provided their VNRs, of which 19 are EST members. In 2019, an additional 42 countries are expected to report, of which 9 are EST member countries. As SDG 11 was one of the SDGs under review at HLPF 2018, urban transport is covered by 33 out of 47 VNRs (70 per cent), covering a wide range of solutions including public transport (bus and metro), walking and cycling, Sustainable Urban Mobility Plans (SUMPs), mobility and traffic management and parking policy. The percentage of the EST members is slightly lower, but still more than a half focus on public transport (Figure 3). Major urban mobility options including heavy rail, walking and cycling are mentioned in 28 per cent and 23 per cent of VNRs respectively, which is similar to the EST member countries. The contribution of transport to enhancing urban access (SDG indicator 11.1.2) is

only addressed in 7 out of 47 VNRs (15 per cent). The EST members focus on social inclusion and poverty reduction while urban access is only recognized by two members (Yiu, et al. 2018).

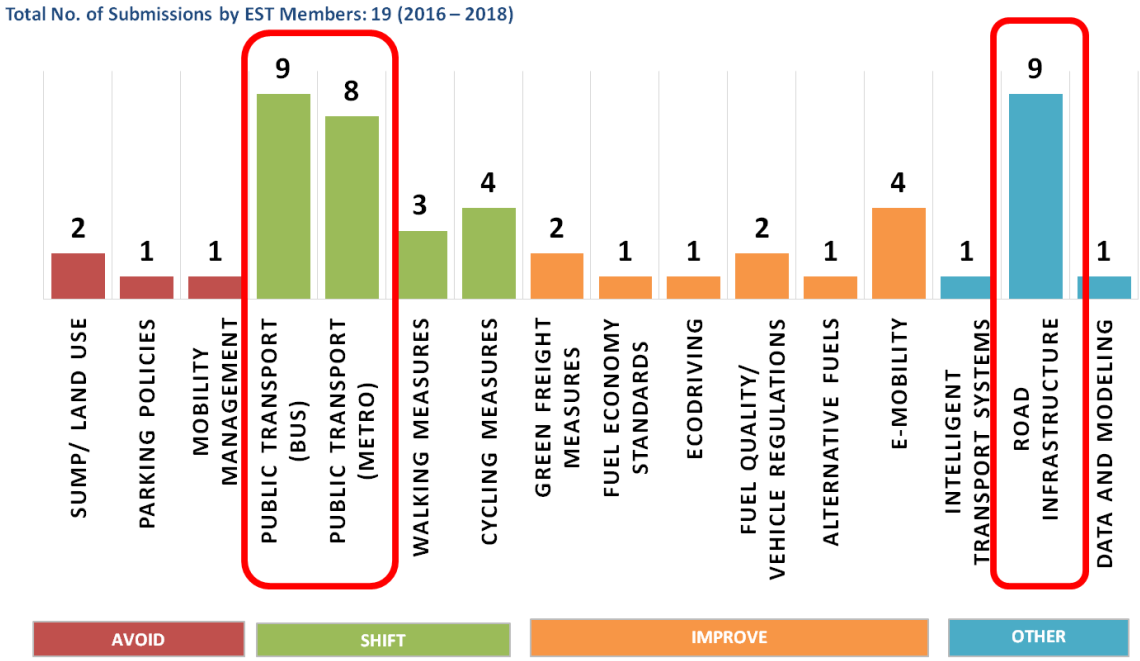

Figure 3: Total number of submissions by EST members
Source: Yiu, et al. 2018

1.1.2. New Urban Agenda

A year later the United Nations Conference on Housing and Sustainable Urban Development took place in Quito, Ecuador and was the first UN global summit on urbanization which adopted the New Urban Agenda – setting new global standards towards sustainable urban development. There is a wide range of reference to transport. In total more than 15 paragraphs reference transport. Given the nature of the agreement with its focus on cities there were a wide range of references to the link between urban development and transport (SLoCAT 2016).

Contrary to the SDG and the Paris Agreement, the New Urban Agenda stays rather vague in terms of its reporting and follow-up processes. In February 2018 in Kuala Lumpur, the 9th World Urban Forum was held as first of its kind global forum to follow-up on the Habitat 3 process. It focused in particular on the implementation of the NUA through the SDG. As there is no explicit reporting mechanism, at this stage it seems vital to ensure the consideration of the NUA outcome within the country report for the SDG.

1.1.3. The Paris Agreement

The Paris Agreement, adopted in April 2016 in New York, was a milestone to address the issue of climate change. Unlike the former failed approach in 2009 in Copenhagen, countries agreed, amongst other issues, to a bottom-up country led approach to achieve a “well below 2 degree” ambition. In other words, it was asking for countries to set up their own targets and action plans through Nationally Determined Contribution (NDCs). While international aviation and shipping is handled separately, transport and transport related energy consumption is seen as an integral part of the national action. The agreement included the direct involvement of cities and regions, civil society and the private sector, for the first time. In the Action Agenda, cities as well as the transport sector is recognized

separately in the Marrakesh Climate Action Plan, an outcome of the follow-up conference, COP 22 in Marrakesh.

According to latest research, the current cumulative mitigation action is not seen as sufficient to meet the global target. In particular, the transport sector seems to lack in contribution. While over 70 percent refer to transport, only a few set sectoral targets or provide a holistic approach, including passenger and freight transport, to clearly articulate AVOID-SHIFT and IMPROVE strategies (Gota, Huizenga, et al. 2018, ITF/OECD 2018, Gota, Peet, et al. 2016).

The current agenda prioritizes SHIFT and IMPROVE strategies. The link between urban development and transport is referenced by less than 10 per cent of the national strategies and only one out of 22 initiatives explicitly addresses integrated planning. One of the exceptions is the Mobilize Your City Initiative (MYC), which aims to support countries in creating national urban mobility policies and 100 Sustainable Urban Mobility Plans (Mobilise Your City 2018).

1.1.4. Potential role of transport and urban development in international agreements

With the Paris Agreement, SDG and the New Urban Agenda in place, countries have the unique opportunity to initiate a paradigm shift towards enabling compact, coordinated and connected cities with environmentally sustainable transport as its back bone. Even though the current implementation mechanisms of international agreements are too weak (NUA), bottom-up approaches do not sufficiently leverage action on the ground to meet future global targets and the potential of the AVOID strategy is almost entirely neglected, the international agreements provide a substantial to drive action towards integrated planning and environmentally sustainable transport at the national level. The Asian EST Forum aims to build on the UN agendas and help governments to lead their future by focusing on the potential of urban design and development.

1.2. The economic impact of green growth

Transport is enabling local and global markets by providing access to goods and services. The transport industry is one of the most important economic drivers for a national economy. To enable a paradigm shift towards environmentally sustainable transport, it is important to include the economic aspect when managing the transition. Recently, the term of a “circular economy” has gained traction in academia and national policy.

For a region like Asia with strong economic growth, it is vital to understand these concepts and reflect on how to apply them with a sectoral focus. As this paper focuses in particular on the nexus between urban development and transport, we aim to make the link to green growth and circular economy.

1.2.1. Green economy, transport and urban development

The need for an economic transition was highlighted in the Rio +20 Conference in 2012. UNEP (2011) defines it as the transition to economies that are low carbon, resource efficient and socially inclusive. In their flagship report in 2011, the transport chapter made the link to the AVOID SHIFT and IMPROVE paradigm. It argues that a full transition from a brown to a green economy needs to pay attention to a holistic approach including urban planning, strengthening walking, cycling, public transport and shared modes as well as improving fuel and vehicle efficient technologies (UNEP 2011).

However, often the economic argument focuses on the transition of the car industry towards electric vehicles. The report by UNEP and the German Development Institute in 2017 on industrial policy

provides good examples of the value of transition caused by national policies on fuel efficient standards and subsidies for electric vehicles (Altenburg and Assmann 2017) referencing, that "in 2016, the global stock of electric cars exceeded two million, up from a few hundred ten years earlier (OECD and IEA 2017) Furthermore, they argue, that with rapidly falling battery prices and increasing battery performance, electric cars will soon be fully competitive with fuel-driven cars (Altenburg, Feng and Shen 2017).

This transition towards cleaner and more energy efficient cars and two-wheelers is a key element and national governments need to take action, particularly in Asia, where air pollution is a key driver and cause for cleaning the fleet.

But to truly enable the transition, there is a need for wider attention to AVOID and SHIFT. "The work of the new climate economy (NCE) demonstrates that countries and cities can follow a different growth pathway to unlock a new wave of urban productivity and transport connectivity based on Compact urban growth, Connected infrastructure and Coordinated governance (the "3C" model)" (New Climate Economy 2014). The authors provide examples like the economic productiveness of BRT and estimate that investments in public transport and non-motorized forms of travel could unlock an economic opportunity of around US$11 trillion by 2050, based on energy savings alone. Furthermore, savings of more than US$3 trillion in infrastructure investment could be achieved by encouraging more compact, connected urban development over the next 15 years (New Climate Economy 2014).

1.3. Scope and Structure

The introduction has shown that there is a lack of attention on the nexus of urban development and transport in the global agenda and its current implementation. While the economic dimension of transport in the context of the green economy is recognized, the attention to the importance of urban development and urban planning is lacking. This paper aims to fill this key gap.
Further, while the literature on green growth development focuses on environmentally sustainable transport, urban planning, urban waste management and building efficiency, this paper primarily focuses on the role of transport and urban development.

The paper is structured as follows:

- Chapter 1 describes urbanization trends, key issues and challenges in Asia;
- Chapter 2 highlights the key elements of integrated urban planning and environmentally sustainable transport;
- Chapter 3 outlines the key challenges and barriers faced by cities and national governments;
- Chapter 4 explores the role of new mobility solutions;
- Chapter 5 describes good practices examples in the Asian region and key learnings
- Chapter 6 collates the learnings into key recommendations for national governments; and
- Chapter 7 describes the way forward in the context of the Bangkok Declaration.

2. Trends and emerging challenges for green growth in Asia

Asia is a large, diverse and complex region with varying levels of economic growth and development trajectories. It consists of 37 countries in South and South West Asia, South East Asia, North and Central Asia, and East and North East Asia. Its urban growth, trends and key issues are summarized below to set the context for the potential for the integration between urban development and environmentally sustainable transport to support green growth in the region

2.1. Urbanization trends in Asia

Asia has had a significant impact on the global population and those residing in urban areas. Its urbanization and transportation has been characterized by the following key elements.

2.1.1. Share of urban population

According to the United Nations (2015), from 1950 to 2005, the world population increased from 2.5 billion to 6.5 billion. Of the incremental increase of 4 billion, Asia contributed to 2.5 billion or 64 per cent of the increase. Similarly, from 1950 to 2005, the global urban population increased from 0.7 billion to 3.2 billion of which Asia contributed to 55 per cent (1.3 billion) of the increase. Currently, approximately 54 per cent of the world's population currently lives in urban areas. It is estimated that continuing urbanization will add 2.5 billion people to the world's urban population by 2050, of which 90 per cent of the increase will be concentrated in Asia and Africa. While 48 per cent of the population in Asia resides in urban areas, this is expected to increase to 64 per cent by 2050, which will pose a number of challenges to planners and policy makers (UN-Habitat and ESCAP 2015).

2.1.2. Level of urbanization and concentration

Asia includes countries with different levels of economic growth – the developed economies of Japan, Taiwan, South Korea, Hong Kong SAR of China and Singapore to the erstwhile centrally planned economies of the People's Republic of China, India, Viet Nam, Laos, Myanmar and others before 1980s. Urbanisation levels range from 100 percent in Singapore to 80-90 per cent in Japan and South Korea, 60 per cent in Philippines, 40 per cent in the People's Republic of China and Malaysia and 31, 18.2 and 18.3 percent in India, Nepal and Sri Lanka respectively (UN-Habitat and ESCAP 2015).

The South-east Asia sub-region is distinguished by the primacy of their capital cities (Yiuen 2009, Cervero 2013); Indonesia (Jakarta), the Philippines (Metro Manila), Thailand (Bangkok), Malaysia (Kuala Lumpur), Myanmar (Rangoon) and Vietnam (Hanoi and Ho Chi Minh City). In the 20 years following Habitat II, a number of cities in Asia such as Beijing, Seoul, Shanghai, Singapore and Tokyo to name a few, became global centres of innovation and prosperity.

2.1.3. Mega-urban regions and smaller cities

Megacities (cities exceeding 10 million inhabitants), once exceptional, are now increasingly commonplace in the Asia-Pacific region. They increased from 7 in 1995 to 17, currently, including three of the world's largest - Tokyo, Delhi and Shanghai. It is projected that, by 2030, the region will have no less than 22 megacities. Moreover, megacities are now giving way to the emergence of mega-urban regions that encompass cities, towns, villages and rural areas, some of which even cross national boundaries in the form of planned or unplanned urban corridors (ESCAP 2017).
However, contrary to common perception, only a little over 10 percent of the Asia and Pacific region's urban population lives in megacities. The region's urban population is predominantly found in medium sized and small cities, and the region's urban transition is largely unfolding in these cities.

Over half of the urban residents (54 per cent) live in smaller cities with a population of less than 500,000 inhabitants. These smaller cities and towns do not have the resource base of many larger cities and the population often has less access to basic service provisions, adequate livelihoods and transportation options (ESCAP 2017). An early decision to prioritize environmentally sustainable modes of transport and integration with urban development can pave the way for green growth in these cities.

2.1.4. Urban density

Asian cities, historically, are also characterized by higher urban density than those in the USA, Canada and Western Europe. In 1990, densities above 100 persons per hectare were typical of large cities in developing countries, especially in Asia. For example, Bombay, Bengaluru, Madras, Cairo, Dhaka, Shanghai, Hanoi, and Pusan all had urban densities of over 200 persons per hectare (Barter, 1999). This was sustained over a period from 2000-2010 where a comparison of the five densest cities[1] with (a population of 500,000 or more) in six regions[2] revealed that those in Asia were between 25 per cent to 2100 percent as dense as others (Cervero 2013).

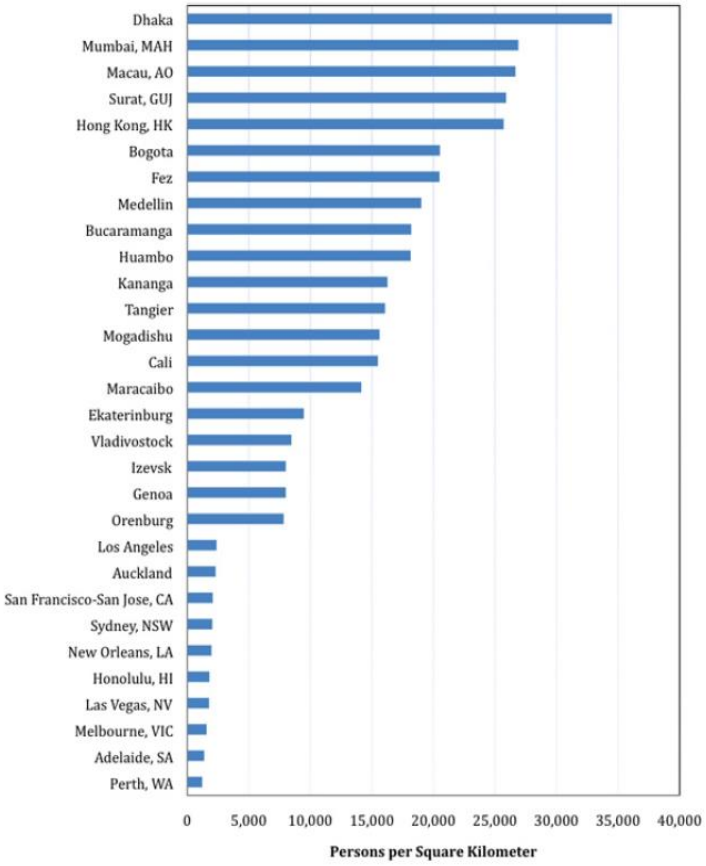

Figure 4**:** Urban population densities of the five densest cities of 500,000 inhabitants or more in six global regions, 2000 to 2010 period. Source: Data from UN Habitat, analyzed by Robert Cervero.

2.1.5. Urbanization and transport

Rapid urbanization in Asia has been accompanied with motorization. In the last 15 years or so, car ownership has doubled or trebled in cities like Mumbai, Shanghai, Beijing, Teheran and Jakarta (Table 1). Motorization levels in Asia range from less than 50 to 700 vehicles per 1000 persons (Barter 2015), and the projected growth in Asian cities is huge. In Delhi, for example, projections

[1] Population of 500,000 and more
[2] Asia, Africa, Latin America and the Caribbean, Europe, Oceania and North America

indicate a 500 per cent increase in vehicles by 2030, compared to 1990 levels (Hickman and Banister 2011).

Table 1: Car ownership in selected Asian cities

City	Car ownership per 1000 persons	
	1995	Most recent data
Mumbai	21	44
Shanghai	15	42
Beijing	43	142
Tehran	95	170
Jakarta	91	203
Kuala Lumpur	209	314
Hong Kong	46	55
Singapore	116	112
Seoul	160	227
Taipei	175	253

Source: Barter 2015

Note: Motorcycle ownership is also very significant in Asia. Data for this table is derived from multiple sources and years. Source: Based on analysis conducted by the above author using multiple sources from 1995 to 2014.

However, there is a wide variety of non-motorized and public transport in Asian cities. In South East Asia, the non-motorized modes include walking, bicycles, calesas, pedicabs, cycle-rickshaws, tricycles, cyclos and becaks. Non-motorized modes constituted 20 per cent of mode share in Vientane (Laos) in 2007 (UNCRD 2008) to at least 40 per cent in cities in India (MoUD 2008). In South Asia, non-motorized modes vary from 17 to 60 per cent (Jain 2011). In East Asia, bicycle mode shares in cities like Shanghai (29 per cent) and Beijing (18 per cent)[3] in mainland China were larger than those of Taipei (3.2 per cent) and cities in the Republic of Korea (1.2 per cent) in 2005. In Hong Kong SAR of China, 97 per cent of the daily cycle trips take place in the New Territories and Outlying Islands while only 3 per cent take place on Hong Kong Island and in the urban areas of Kowloon (Pan, Liu and Hau Yan 2011).

Public transport in Asian cities is characterized by high reliance on road-based public transport. Most Asian cities, except Tokyo, show a much higher share of bus and metro services in the total demand for public transport services than other cities. Through their early high level of investment in the 1960s, they set an example for addressing congestion through high quality public transport provision. Additionally, intermediate public transport (IPT) or para-transit plays an important role in response to organic, dense urban structures and insufficient public transport infrastructures. There are diverse modes of transport in Asian cities including trucks that have been converted into songthaews and jeeps that have been converted into jeepneys. In Bangkok, tuktuks, songtaews, and motorcycle taxis

[3] However, in cities in China, there is a new bicycle revolution due to bicycle sharing options.

account for 14 per cent of public transport. In Manila, jeepneys and tricycles account also for a significant share in public transport (Morita, et al. 2004).

2.2. Negative impacts of urbanization and motorization

The described trends pose a significant challenge not only for Asia but for the world in achieving sustainable urban development.

2.2.1. Congestion

Congestion in many urban areas has been increasing in duration and intensity. Traffic speeds have been reducing each year in many cities, with the severity of congestion tending to increase with city size. In Thailand, with the longest commuting times in the world, a total of 37 million hours are spent traveling to work every day. The average working person living in Thailand spends about 2 hours every day traveling to and from work. Currently, the average travel speed in central Bangkok during peak hours is just around 11 kilometres per hour (Hickman, et al. 2011). It is estimated that congestion in Metro Manila costs 4.6 per cent of its GDP (Chin 2011).

2.2.2. Road Safety

With only 16 per cent vehicle share, Asia accounts for almost 60 per cent of the world's traffic fatalities per year (WHO 2013, Wismans, et al. 2014). Studies show that Asian countries especially emerging economies like People's Republic of China, India, Indonesia and Thailand have the highest number of traffic fatalities. More than 200,000 people are killed in the People's Republic of China every year as a result of traffic accidents (WHO 2015). India, in 2015 alone, youth aged between 15 and 34 constituted 54 per cent of total road crash fatalities (Government of India 2016).

Within cities, pedestrians, cyclists and motorized two-wheelers are the most vulnerable road users, which is due to issues ranging from space allocation to pedestrians and cyclists, road design, education and enforcement. Research shows that a city focusing on environmentally sustainable transport modes with safe access and design are able to substantially reduce the fatalities (Duduta, Adriazola and Hidalgo 2013). In addition, two-wheelers are frequently used without helmets, including when carrying large packages in Hanoi. In India, the two-wheeler is often used to carry the family, but only the driver wears a helmet (Hickman, et al. 2011).

2.2.3. Greenhouse gas emissions, air pollution and noise

In 2009, transport was responsible for 23 per cent of global green house gas (GHG) emissions and in a business as usual scenario, it is expected to become the single largest GHG emitter accounting for 46 per cent of global emissions by 2035, and 80 per cent by 2050. Transport emissions are the fastest growing source of carbon dioxide (CO_2) emissions, with the vast majority of projected increases expected to come from developing Asia. In 2006, Asia accounted for 19 per cent of total worldwide transport sector–related CO_2 emissions, which was estimated to increase to 31 per cent by 2030 (ADB n.d.).

Meanwhile air pollution has become a major cause of illness and premature death with dangerous air quality levels frequently reached in several of the region's cities, especially in Beijing, New Delhi, Dhaka, Kathmandu and Ulaanbaatar (UN-Habitat and ESCAP 2015). According to the World Health Organization (WHO), 9 out of 10 people are exposed to air quality levels that exceed WHO limits with 4.2 million deaths in 2016 due to exposure to ambient (outdoor) air pollution. Transport emissions, in particular PM 10, 2.5 and NOx are major (WHO 2018).

2.2.4. Urban sprawl

A comparison of average densities (Figure 1) across different regions has revealed a decrease in urban densities over 2000-02 and 2013-15 (New Climate Economy 2018) and a tendency towards urban sprawl and low-density growth. This is increasingly having consequences for agricultural lands and ecosystems which are converted into urban and peri-urban areas. Given this expansion, understanding of urban-rural linkages and complexities is crucial to ensure that growth is managed effectively for all people engaged in urban and peri-urban areas, regardless of their area of residence (ESCAP 2017).

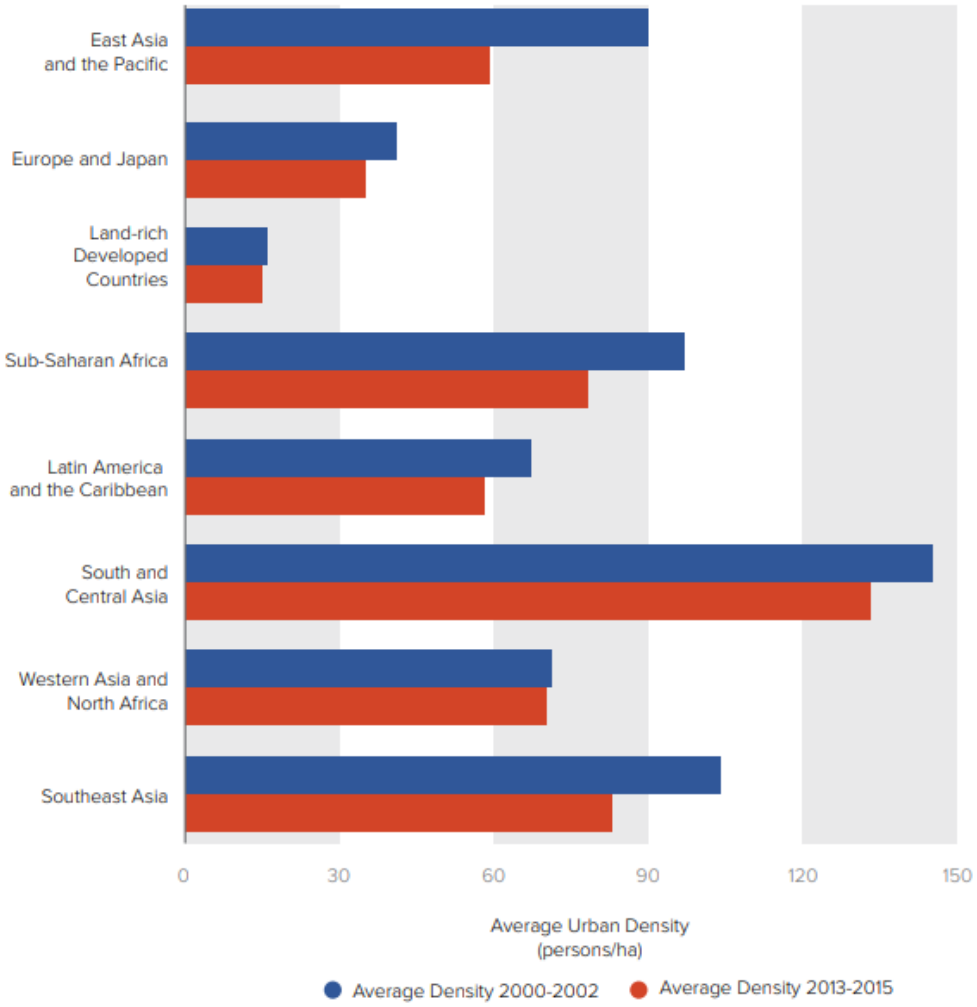

Figure 5: Average density of cities by region in 2000-02 and 2013-15
Source: Coalition for Urban Transitions. Data source: Lincoln Institute of Land Policy

2.3. **Vulnerability to climate change**

The Asian and Pacific region's urban façades often mask vulnerabilities to natural disasters and the projected impacts of climate change. Almost three-quarters of the worldwide fatalities of disasters between 1970 and 2011 occurred in the Asia and Pacific region (UN-Habitat and ESCAP 2015). Coastal cities in the region are extremely vulnerable in particular to sea-level rise and stronger storms and storm surges, which can adversely affect fast-growing and globally-connected cities. Inland cities and land-locked developing countries across parts of Central and South Asia are facing increased heat and drought periods, along with regional experiences of earthquakes and tsunamis. The table below identifies the different levels of risk to mega cities in the region.

Table 2: Mega-cities and natural hazards

Table 4.9 Mega-cities and natural hazards

Rank	City	Population (millions)	Risk Level			
			Cyclone	Drought	Earthquake	Flood
1.	Tokyo	37.2	A	•	B	A
2.	Delhi	22.7	•	B	•	A
3.	Shanghai	20.2	A	•	•	A
4.	Dhaka	15.4	C	C	•	A
5.	Kolkata	14.4	B	A	•	A
6.	Karachi	13.9	C	A	•	C
7.	Manila	11.9	A	C	A	A
8.	Osaka-Kobe	11.5	A	•	B	B
9.	Istanbul	11.3	•	C	A	C
10.	Guangzhou	10.8	A	•	•	A

A: high risk (8-10th decile); B: medium risk (5-7th decile); C: low risk (1-4th decile); • = no hazard

Table from UN-Habitat and ESCAP 2015
Source: UNPD 2012

2.4. **Urban poverty**

The Asian Development Bank notes that “almost 25 per cent of Asia's urban population is poor, and the rate is increasing, as there is a continuous influx of poor people into cities” (Asian Development Bank 2014). In Cambodia, Bangladesh, the Philippines and Mongolia, some 40 per cent of the population subsist below the poverty line (Thynell 2016). The access to affordable housing, transport and basic services will be a key challenge for these groups, as urban population growth has not been matched by growth in housing units or equitable access to land, resulting in housing shortages and the persistence and growth of informal settlements (ESCAP 2017). Further, spatial mismatch affects the urban poor disproportionately, as places of formal jobs may not be accessible from their places of residence, resulting in increased transportation costs as a proportion of their daily wages (Cervero 2013).

The prospects for the New Urban Agenda will largely rest on the way in which the Asia-Pacific region urbanizes over the next 20 years (ESCAP 2017). As the Asian region’s urban areas grow, it is evident that the current path towards personal motor vehicles needs to be reversed towards compact, coordinated and connected cities.

3. Scales and elements of environmentally sustainable transportation and urban planning

The former chapter described the trends and challenges to improve the situation in the region and achieve the objectives of the global agreements. It is noticed, that a business as usual scenario would lead to higher impacts and at the same time have a negative economic impact.

As part of the solution, compact, mixed use urban forms with enhanced accessibility and environmentally sustainable transport options can yield significant green house gas (GHG) reductions and improve energy security, local air quality, public health and economic growth. Well-integrated transit and land development while a complex, multi-scalar process, can provide a strong foundation for sustainable national and urban growth (Broekhoff, Piggot and Erickson 2018). Empirical evidence shows a strong negative correlation between the share of environmentally sustainable transport and per capita carbon emissions. For instance, in Hong Kong SAR, China the share of low carbon transport accounts for 89 percent of urban trips and CO_2 emissions per capita are about 378 kg per year, while in Houston, Texas green transport only accounts for 5 percent of urban trips and CO_2 emissions per capita are as high as 5,690 kg per year (Bongardt, et al. 2013). Cities with good access to public transit and walking and cycling conducive public spaces can encourage the use of low carbon transport modes and reduce/ avoid the shift to personal motor vehicles (Suzuki, Cervero and Iuchi 2013).

The integration of land-use and urban form with environmentally sustainable transport is not new in Asia. City regions such as Singapore, Tokyo and Hong Kong SAR of China had cogent regional visions that shaped regional transit investments more than vice versa. Transit was one of several important tools, along with supportive zoning and creative financing, transportation demand management measures and street design improvements to make urban visions a reality (Suzuki, Cervero and Iuchi 2013). However, these are developed economies with urban development largely structured around rail systems, whose models cannot be replicated in developing countries with bus rapid transit systems[4], limited resources and technical capacity and different institutional contexts. As other cities move forward along this path, it is important to identify the key instruments to enable the integration of urban form and transit (or transit-oriented development), at different scales. Seoul is another good example, which during economic growth, made substantial investments towards an integrated urban development and transport infrastructure for public transport and walking. The restoration of the Cheonggyecheon stream, creation of 5.8 km long and 16m wide linear park over 2003-05, after demolishing an elevated expressway in its place (ITDP and EMBARQ 2012), became an iconic symbol to mark this transformation.

3.1. Scales of planning

Land-use, urban form with transit integration requires coordinated efforts at multiple scales. National urban policies and visions along with spatial planning frameworks and guidelines can create an enabling framework for sub-national and regional/ city governments. The regional/metropolitan vision needs to guide transit planning and investments, and identifying a hierarchy of nodes based on transport function, land-uses and urban typologies. Such nodes can be characterized as regional or city-level, district centres, neighbourhood centres or suburban (Shah, Goswami, et al. 2015). While accessibility improvements and last mile connectivity is imperative for the entire public transit

[4] According to Globalbrt.org, there are 43 cities in Asia with bus rapid transit systems.

system, a classification of nodes can guide the selective and judicious development or redevelopment of a few rail and BRT stations. This will allow resources to be concentrated effectively and benefit both public and private interests from the new transit investments (Suzuki, Cervero and Iuchi 2013).

3.2. **Key elements of integrated planning**

In addition to the scales of planning, key elements of land-use, urban form and transport integration need to be identified. In the 1990s, a 3D approach focusing on density, diversity and design evaluated the impact of urban density, diversity of land uses and non-motorized transport oriented design on vehicle kilometres travelled. Taking the case of the San Francisco Bay Area, the research found a statistically significant relationship between the above and non-automobile travel and reduction in trip rates (Cervero and Kockelman 1997). An international comparison of 46 cities revealed that the urban density (persons per hectare) had a much stronger relationship with the level of transit use than the city's wealth (Kenworthy and Laube 1999). The 3Ds were expanded to include destination accessibility, and distance from transit (Ewing and Cervero 2010). Building on the above, the Institute for Transportation and Development Policy defined eight core principles to identify gaps and opportunities for integrating urban form and transport at the project level and around transit nodes[5]. These principles combine the Shift elements of complete streets, public transit and travel demand management with Avoid elements of density and mix of uses and incomes. Planners could use the TOD Standard to identify priority areas for investment or for corrective action; whereas citizens and civil society organizations could use it to rate existing conditions or redevelopment proposals and advocate for better transit-oriented communities (ITDP 2017). The key elements of land-use and transport integration are described below.

3.2.1. Public transit as a backbone for structuring urban growth

Frequent, high quality, affordable and accessible public transit within walking distance is at the core of compact urban development. This includes not only mass rapid transit systems such as bus rapid transit, light rail, mono-rail or metro-rail, but also mainline city buses.

3.2.2. Street connectivity to facilitate walking and cycling

Street connectivity affects the degree to which street networks connect people to their destinations. Good connectivity aims to discourage the use of personal motor vehicles by providing direct routes to destinations, making local trips shorter and more pleasant for pedestrians and cyclists. Intersection density (not just for motorized vehicles) can impact how people move - whether by foot, bicycle, public transport, motorized two wheelers or cars (Gebel, et al. 2005). In Ahmedabad, India, only 13 percent of trips made by those living in a neighborhoods with an average block size of 4 hectares, were by foot, compared to 36 percent for an otherwise similar neighborhood with much smaller average block sizes of 1.2 hectares (Swamy, et al. 2012).

3.2.3. Complete streets to balance road space allocation to cater to all users

The term complete streets, used predominantly in the United State and Europe, refers to the design of roads to cater to all transportation modes, and not just maximizing vehicle flow. The emphasis is on facilitating the movement of people and not personal motor vehicles, and on achieving a high level of amenity and safety for all road users (Newman and Matan 2013). Complete streets prioritize the mobility of pedestrians, cyclists (and other non-motorized vehicles), public transport users and also conceive of streets as public space.

[5] The standard has been endorsed by organizations such as the Ford Foundation, Climate Works Foundation, UN Habitat, ICLEI, GIZ, Despacio and Buro Happold Engineering.

3.2.4. Compact[6] regions to discourage urban sprawl

Compactness refers to the number of people living or working in an area and the density of the built environment. A review of 300 academic papers that study the effects of compact city policies suggests that increasing compactness can have positive effects on a city's productivity, innovation, access to services, and amenities, value of space, efficiency of public services delivery, safety, energy efficiency, and sustainable mode of choice (Ahlfedlt and Pietrostefani 2017). China could reduce infrastructure spending by up to US $1.4 trillion by pursuing more compact, connected urban growth (World Bank 2014). However, density, if not managed well, can have negative impacts such as open space preservation and biodiversity, housing affordability, traffic management, health and well-being.

3.2.5. Mixed uses to reduce trips and trip lengths

Mixed land uses enable a range of residential and non-residential uses, which can be co-located in an integrated way to support environmentally sustainable transport. Mixed land uses locate origins and destinations close to each other, thereby reducing travel distances, enabling 'linked trips' where one trip is used to undertake many activities, and increasing neighbourhood safety and amenities. The mix of uses should ideally include a range of employment, education, recreation and retail opportunities and regional transport connections within comfortable walking or cycling distances of dense residential areas. The range of activities in each mixed use development also encourages social interaction as people fulfill more of their needs in their local area.

3.2.6. Mixed incomes to cater to ensure affordability and equity

Transit-oriented development does not automatically equate to better livability and quality of life for all; new development near transit may displace low-income households and mixed-income neighborhoods (Mu and de Jong 2012) typically through increases in property values and rising costs (Hersey and Spotts 2015). Mixed uses must also include a mix of diverse housing typologies, tenure arrangements and employment opportunities catering to different income groups. In Asia, this also includes providing spaces for informal workers such as street vendors and waste workers.

3.2.7. Transportation demand management

Transportation Demand Management (TDM) can be described as a set of measures to influence traveler behavior to maximize the efficiency of the urban transport system by discouraging private vehicle use and promoting more effective, healthy and environmentally sustainable modes of transport. TDM measures may be implemented by transportation agencies, local, regional and national governments and employers. These can include parking maximums, on-street parking management, traffic calming, flexible work hours, road/ congestion pricing, distance-based charges, transit improvements, ridesharing (carpool, vanpool), pedestrian and bicycle improvements, car sharing and compact land use (Broaddus, Litman and Menon 2009).

3.2.8. Urban design for place-making

The integration of environmentally sustainable transport and urban planning aims to provide places for people to live, work, play and meet their daily goods and services. The design of streets, public spaces and urban built form can create vibrant places and a unique identity for each neighbourhood.

[6] The TOD Standard 3.0 uses two indicators of density and compactness in a station area. Density is defined by the residential and job densities, whereas compactness is assessed by whether a development is located in an urban area and the number of transit options available. Since compactness in a city/ region is determined by the density of people living and working in an area, only that indicator is used here.

Development control regulations can shape public spaces through norms for building heights, ground coverage, setbacks, compound walls and façade porosity. Place-making emphasizes designing for human scale, safety, variety and complexity. The design process considers the temporal nature of places, people and their activities, includes various stakeholders during the visioning and design stage to elicit ideas, programming events and activities and understanding the budgeting for maintenance (Jacobson and Forsyth 2008).

3.3. **Cross cutting themes**

The above key elements focus on land use, urban form and transport integration. However, it is essential that there is integration between transit modes as well as sensitivity to the existing ecological and historical context as well as the role of technology enabling better planning as well as new transport services. This is particularly relevant for Asian cities with historic, dense urban cores such as in Indonesia, Viet Nam, Philippines, People's Republic of China, Pakistan and India to name a few.

3.3.1. Multi-modal integration – Mobility as a Service

Multi-modal integration implies physical, information, fare and service integration to ensure seamless travel for passengers. It can expand the reach of a public transport system and obtain maximum benefits from investments. Physical integration entails design of streets and public spaces for seamless transfers between rail, buses, public bicycle sharing and informal public transit. Service integration includes coordinating feeder services and mass rapid transit systems for last mile connectivity, whereas fare integration can improve affordability, and information and time-table integration can reduce waiting times. In recent years the term MaaS (Mobility as a Service) has become a new paradigm which refers to the seamless integration of all modes for the customer including new sharing options like bike and car-sharing. With its origins in Northern Europe, it is now starting to get recognition in countries like the People's Republic of China (L.E.K. Consulting n.d.).

3.3.2. Preserving ecological systems

Environmentally sustainable development must preserve existing carbon sinks and regional ecological systems such as rivers, lakes and other water bodies as well forests and biodiversity regions. This can be done at the metropolitan scale of planning to clearly delineate protected areas and those for future growth, based on which land-use policies can be structured.

3.3.3. Preserving the fabric of historic settlements and adaptive re-use of historic buildings

The integration of land use and low carbon transport must preserve historic, urban cores which are typically characterized by narrow streets and alleyways and compact dense built form. The interventions in these areas can focus on revitalization by upgrading the quality of essential infrastructure and improvement of the public spaces; traffic management to create streets with priority for pedestrians, non-motorized vehicles and where relevant smaller public transport vehicles; rehabilitation of dilapidated housing, adaptive reuse of existing buildings of historic value and construction of new commercial facilities and housing in harmony with the historic settlements (Steinberg 2008), and upgradation of informal settlements.

3.3.4. Leveraging technology

Recent technology is heavily influencing the way cities and places can be planned and designed as well as new transport services can be created. Technology can be leveraged for improving data collection, updating and creating accurate base maps and bridging the distance between governments and residents in urban planning processes. Local governments can use GIS mapping systems for creating accurate base maps, develop spatial planning strategies and also ensure more effective

collection of revenues, as is being initiated in India (Floater and Rode 2014) or for mapping and differentiating between typologies of informal settlements as in Philippines (Baker and Gadgil 2017). Singapore has engaged multiple stakeholders in its Land Transport Masterplan through online portals and accessible public forums (Siemens and C40 2013). Similarly, the Indian State of Andhra Pradesh has begun to use information and communication technologies (ICT) to deliver services in the form of billing, certificates and other record keeping (Ahluwalia 2014).

Simultaneously, new mobility services like ride and bike sharing enabled by technology are revolutionizing the current transportation system. The introduction of dockless bike sharing by companies like Ofo and Mobike in Beijing with more than 2 million bicycles, doubled the vehicle miles traveled by bicycles. According to the Transport Commission in Shenzhen, the city's 500,000 bike-share bikes had replaced nearly 10 percent of travel by private cars, and 13 percent of petrol consumption (Reid 2018). Similarly, the use of ride hailing services like Didi (China) and Ola (India) have enabled new ways for inhabitants to move around. However, there are lots of concerns on the impact of these services like the use of public space and in exacerbating congestion. Therefore, an integration of these services into urban and road design as well as in Sustainable Urban Mobility Plans and integrated services is crucial.

In 2017, international non-governmental organizations (NGOs) developed principles for shared mobility, which provide some guidance for a shared, green and integrated future of sustainable transport. These are now signed by more than 100 organizations and companies (Shared Mobility Principles for Liveable Cities 2017). In the USA, NACTO, the national association of city and transit agencies has released guidelines on how to regulate and manage new shared active transportation companies, from dockless bike share to electric scooters (NACTO 2018). While there are efforts to regulate dockless bike systems in China, an approach to integrate new mobility solutions in urban planning and design has yet to be developed in the EST countries.

However, multiple forms of technologies must be devised considering there is a deep digital divide in many countries (Floater and Rode 2014), with clear gendered divide in the access and use of ICT.

4. Challenges, barriers and opportunities for integrating environmentally sustainable transportation with urban planning in Asia

In 2014, 14 of 24 Asian member countries had adopted varying levels of formal land-use and transportation. These ranged from a comprehensive approach by Japan, Singapore and to a large extent in Bhutan to recent adoption by Brunei and India to capital cities such as Ulaanbaatar, Jakarta or Kathmandu (Litman and Earley 2017). There are multiple challenges in formulating integrated policies and multi-scalar plans and facilitating implementation due to financial instruments, governance arrangements and limited technical capacity. The following sections highlight the key barriers at the national, sub-national (where applicable) and local levels.

4.1. **Policy**

National policies can provide a skeleton for a long-term vision, priority and formulation of urban policies and plans to promote environmentally sustainable transport and urban planning, encourage cooperation and coordination between different departments and amongst local governments, and create a framework to monitor investments and outcomes.

4.1.1. Horizontal and vertical policy coherence

Horizontal integration is policy integration across different policy sectors such as energy, economic development, housing, transport and planning within the same governance level (Curtis and James 2004). A dilemma for governments is that highly diverse environmental challenges cannot be resolved in isolation from one another because they are closely related. Sustainable, long-term development of urban areas requires integrated planning and management, across both administrative and physical boundaries, which is often lacking (UN-Habitat and ESCAP 2015). In 2010, the National Development and Reform Commission (NDRC) in China announced a program for five low carbon pilot provinces and eight low carbon pilot cities in 2010. A number of programs have been initiated by different ministries towards ecological or low carbon cities. They are, however, independently initiated, but are quite similar in their design and implementation. These programs extend the hands of central governments and their impact to the city governance, sometimes criticized as to adding to the burden of cities. The cities have to deal with different assessments from central governments which have similar function but not always consistent (Zhou, He and Williams 2011).

Vertical integration is usually required where different tiers of government overlap (Rode, et al. 2017). The process of creating policies, monitoring and evaluation frameworks to assess implementation or outcomes and transparent decision-making can go a long way in ensuring coherence across different scales of government. The National Urban Transport Policy in 2006 and the ensuing reforms initiated by the national government provide key learnings due to the challenges faced. The policy aimed to design streets for people and not for cars or personal motor vehicles. On one hand, it has mobilized civil society organizations across the country to use the NUTP to advocate for sustainable transport policies and guidelines (Refer Section 5.2.2. Case Study: India). However, a comparative analysis of Comprehensive Mobility Plans (CMPs) of eight cities (Bengaluru, Madurai, Jaipur, Thane, Rajkot, Varanasi, Asansol and Chandigarh) also revealed that cities did not fully follow the provisions of National Urban Transport Policy (NUTP), the CMP toolkit, advisories and guidelines issued by the ministry (Chotani 2010) along with a lack of local buy-in (Hidalgo, et al. 2012).

Similarly, in 1998, Viet Nam adopted the Orientation Master Plan for National Urban Development to 2020, a national urbanization policy to provide strategic direction to the country's urban planning processes. Three types of plans, each the responsibility of different ministries, are prepared for cities and provinces: socio-economic development, for which the Ministry of Planning and Investment is responsible; spatial (also called construction or master plans) for which the Ministry of Construction is responsible; and sector development, for which respective line ministries are responsible. The intended sequence of planning with spatial plans following socioeconomic plans and sector plans does not always occur, and there is fragmentation between ministries as also between the different levels of government (Coulthart, Quang and Sharpe n.d., Yiuen 2009).

4.1.2. Up to date and real time data for effective planning and management

Effective policies for urban spatial planning and management require accurate and relevant, up-to-date and real-time data on urban trends and conditions. People's Republic of China, Hong Kong SAR of China, Singapore and Malaysia have used Geographic Information Systems and Land Information Network Systems to inform spatial policies (Yiuen 2009). But urban data collection and reporting have not kept up with the needs of most countries in the APAC region. Where it does exist – specifically in the case of globally connected cities – data may not be used for urban policy use or shared across departments (UN-Habitat and ESCAP 2015). Additionally, clarity is required over property rights and methodologies for land and property valuation (World Bank 2013).

4.2. **Planning**

National development plans, metropolitan regional plans, city master plans and local area plans are tools to translate policies into time bound proposals with implementation targets, resource mobilization and institutional structures. This section describes the challenges in planning for environmentally sustainable transport as well as for each of the principles of land use and transport integration.

4.2.1. Sustainable urban mobility planning

As mentioned in Section 4.1.1., urban mobility planning is often not integrated towards overarching sustainable development goals, even as cities propose policies for land-use and transport integration. The old-fashioned "predict-and-provide" approach to transport planning has led to large investments in roads and highways (Mobilise Your City 2018). As mentioned above, in India, the focus of the Comprehensive Mobility Plans over 2006-14 was on listing transport projects without an impact assessment, monitoring or evaluation framework, lack of knowledge on comprehensive planning, lack of coordination with the Master Plans and delinking from the city budgets (Hidalgo, et al. 2012). Around 52 per cent of the funds allocated in urban transport were towards roads, road-widening, bridges and flyovers and so the impact from a sustainable perspective was questioned (Anand, et al. 2015). Cities like Tokyo, Hong Kong SAR, Singapore and Seoul, made concrete decision to move towards environmentally sustainable transportation and regulating the use of personal motor vehicles. In recent years, Sustainable Urban Mobility Plans (SUMPs) in Europe (European Commission 2013) and countries like Brazil outline a new way of an integrated, participatory process, which might serve as a blueprint for mobility plans in Asia. This is being facilitating in some countries like India and Philippines as described in Chapter 6.

4.2.2. Non-motorized transport

Walking and cycling does not have a clear priority in urban mobility plans with clear monitoring and evaluation frameworks. Pedestrians are often undercounted or not counted and the emphasis is on

mobility of vehicles and not people, often because the principles of highway designs are adopted in urban areas, focusing on the speed of motorized vehicles. While relatively higher densities in Asia provide an opportunity for non-motorized transport to play an important role, it does not guarantee it. For example, Bangkok had a 10 per cent mode share for work trips using non-motorized transport in 1990, even though the average urban density was about 150 persons per hectare (Barter, Kenworthy and Laube 2003). Even in cities like Mumbai, where 52 per cent of trips are by walking (MCGM 2016), pedestrians are the most vulnerable road user constituting more than half of all road fatalities (The Bloomberg Philanthropies Initiative for Global Road Safety 2017). In Dhaka´s strategic transport plan, out of the USD 5 billion budget, only 0.22 per cent is allocated for pedestrian facilities (Hickman, et al. 2011).

4.2.3. Public transport

Currently at least 43 cities in Asia have operational or under construction bus rapid transit systems (Global BRT Data n.d.)The planning of mass rapid transit and transit-oriented development is perceived as a panacea for solving urban transport problems, while formal public transport is inadequate and served by a variety of partially regulated intermediate public transport. This is particularly evident in peri-urban areas. Additionally, detailed project reports tend to overestimate the ridership by mass rapid transit systems as has been observed in many cities globally (Mohan 2008).

4.2.4. Urban planning

A review of national development plans and transport plans for India and China revealed that in India, the integration between transport and economic development was strongest followed by industrial strategy. Housing and environmental sustainability consistently showed the weakest integration with transport. People's Republic of China's national development plan views transport as a means of regional and territorial integration facilitating a general "opening up" of its economy. By advocating for greater use of green and digital technology in the transport sector, the plan connects transport, environmental sustainability, and industrial strategy (Rode, et al. 2017).

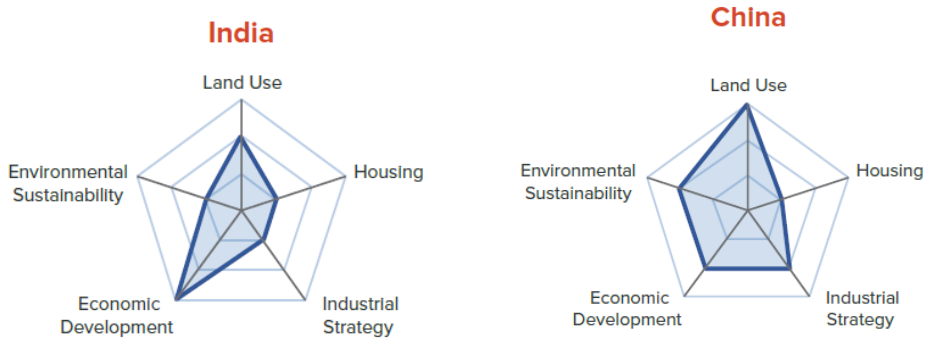

Figure 6: Countries and their emphasis on integration with transport
Source: Rode et al. 2017

Simultaneously, in many Asian cities, transit has been guided primarily by the objective of enhancing mobility. City administrations and transit agencies often adopt a short-term, narrow focus—for example, on rapidly relieving congestion, in order to see results while current city leaders are still in office. In this process, the long-term visions of promoting sustainable patterns of urban growth are often lost. This mindset is reflected in the absence of strategies and regulations to create higher densities along transit corridors and high-quality urban spaces (Suzuki, Cervero and Iuchi 2013). This often results in the lack of coordination between master plans and transport or other sectoral plans at the city/ metropolitan scales. Plan periods and preparation are not aligned, such that transport projects

proposed in the comprehensive mobility plans are not reflected in the city master plans. In Viet Nam, the lack of coordination between the spatial and socio-economic plans has resulted in spatial plans plans being too abstract with insufficient attention given to the "real world" (Coulthart, Quang and Sharpe n.d.).

In 2003, the State Council of the People's Republic of China issued a notice requiring cities to create dedicated land administration plans during rail transit planning, by which the rail transit plans could be evaluated (State Council 2003). However, there has been a lack of clear planning requirements and technical guidance for the various phases of planning, resulting in the disconnect between transit and urban planning at the region, city, district, transit corridor, neighbourhood, and station level. To address this, the Ministry of Housing and Urban-Rural Development (MOHURD) issued transit oriented development guidelines in 2015 for the planning and design of areas along urban rail transit (MOHURD 2015). Since they were issued recently, their comprehensive adoption and implementation in cities is yet to be realised.

Often transit-oriented development policies or regulations cover 20-25 per cent of a city's developed area, with the rest of the city developing in a business as usual, personal motor vehicle centric scenario. There is a need to augment city bus services and orient development along main line city bus corridors based on their carrying capacity to encourage the use of public transport.

Street Connectivity

While regional/ city master plans create an overall framework for land-use proposals, development controls and projects at the city/regional scale, there may be lack of awareness, capacity or legislative backing for planning at the neighbourhood scales for planned expansion of the city. This has the biggest impact on street connectivity as city master plans propose arterial or sub-arterial road networks and the secondary network is planned and implemented through a second tier of local area or neighbourhood plans and town planning schemes. Land acquisition can result in the displacement of original inhabitants and impose a big cost upfront for the local government/ development authority. Land pooling and readjustment offers a viable alternative for planned expansion in the urban periphery, which has been extensively implemented in Japan, Korea, and states like Gujarat in India. However, they may take long to implement due to centralization of approval processes at the state level and does not include the participation of all stakeholders, namely tenants and informal occupants, in the negotiation process (Mahadevia, Pai and Mahendra 2018).

Compact urban form

As mentioned in Section 3.2.4, a key aspect of compact urban form is the built up density, measured in people density (measured in persons per hectare or square kilometre) and floor area ratio. Cities in East Asia have adopted principles of higher density in the central business districts and along mass rapid transit corridors. For example, floor area ratios (FAR) range from 12 to 25 in Singapore; 1 to 20 Tokyo; 1 to 12 in Hong Kong SAR of China, China; and 8 to 10 in Seoul. All of these cities have developed varying levels of density in different areas, taking each area's social and economic features and infrastructure capacities into consideration. In general, all allow for high density around transit lines and stations to integrate transit and land use (Suzuki, Cervero and Iuchi 2013). However, the current incentives for increasing density around mass rapid transit corridors are predominantly to capture land values, without a clear rationale for understanding infrastructure carrying capacity and land markets. A number of cities across Asia have identified increased FAR around mass rapid transit stations without a clear rationale. However, on the flip side, residents in Asian cities are concerned with the impact that the increased number of people would have on the quality of life.

Land Uses

Urban planning guidelines as in the case of India[7], may not have criteria for determining the distance for location of city or district level land uses, facilities and amenities, to ensure that they are accessible by public transport, walking or cycling. For example, information technology parks and universities are being located either outside the city or at its periphery due to cheaper availability of contiguous land. This encourages urban sprawl and motorized trips in the absence of availability of frequent and good quality public transport.

Similarly, one of the biggest challenges to sustainable urban planning is the gentrification of existing residents and businesses on account of increased land prices near rapid transit. The other challenge is how informal settlements are approached. They are currently being redeveloped or relocated to the periphery of cities without access to affordable and frequent public transport as well as social and physical infrastructure. In the decade from 1986 to 1997, cities like Bangkok, Kuala Lumpur, Jakarta and Manila built new housing, office or shopping complexes targeted at the middle class, which had designs predicated upon private vehicle access. There is potential and a need for land uses and regulations to explicitly prioritize public transport and non-motorized transport, even in cities with high density of land use patterns (Barter 2000).

Spatial plans in Viet Nam are prepared at four levels: orientation plans (national policy), regional plans (introduced in 2005), master plans (province or city), and detailed area plans (districts, wards, industrial zone, or development project). The master plans, which have the greatest impact on urban development, are prescriptive in their land uses and prepared with very limited public participation or consultation. Similarly, the detailed area plans predetermine the specific uses of urban space and include the quality, quantity and position of each development type and building footprint. As a result development is either constrained, or proceeds in a manner that is inconsistent with the approved plans (Coulthart, Quang and Sharpe n.d.). While mixed uses can facilitate non-motorized modes of transport, they can also create negative externalities such as traffic congestion in residential areas without parking management. In the city of Bengaluru, non-residential uses are not permitted within residential areas with a right of way less than or equal to 12m (Tejas 2017). On the other hand, there may not be a mixed use category in urban planning legislation.

Parking Management

Conventional approaches to transport perceive the supply of parking as a public good like public toilets i.e. as a demand, whose supply must be augmented. Therefore, building regulations have off-street parking minimums for different types of land uses, irrespective of their proximity to public transport. Further, on-street parking is not managed effectively as a transport demand management tool and building off-street parking is incentivised through increased floor area ratio.

Urban Design/ Place-making

Conventional building regulations are based on the size of the land parcel, land use and width of the road they are located on. These aim to have front setbacks usually with the purpose of road widening in the future. The ground cover is often limited to 30-35 per cent of the plot area on the pretext of providing access for emergency vehicles and lighting and ventilation. Often form based codes facilitating pedestrian friendly design elements such as arcades, porous facades are not considered. There are no urban design guidelines or approach to creating building regulations, resulting in an incoherent urban form. Additionally, trees, which can play a critical role in alleviating local heat

[7] Urban and Regional Development Plan Formulation and Implementation (URDPFI) Guidelines 2015.

island effect, landscaping and beautification, creating better public space for daily life and social integration or religious functions, seem to be neglected or undervalued in the design of cities and streets (Ieda 2010).

4.2.5. Inclusion

Transport and urban plans do not consistently and holistically consider the needs of women and children, elderly and persons with disabilities. In urban India, 84 per cent of women use environmentally sustainable transport modes to travel to place of work[8]. Yet, cities do not collect gender disaggregated data and qualitative perceptions of women and girls' safety, comfort and convenience (Shah, Viswanath, et al. 2017) – which could guide actions to retain and encourage their use of environmentally sustainable transport modes. In 2011, the Census of India's data on travel to place of work in Delhi revealed that 32 per cent of women compared to 25 per cent of men walked to work; and 42 per cent of women used public transport compared to 31 per cent of men (Census of India 2011). However, women's experience was fraught with insecurity and harassment. A survey of around 5000 women and girls in Delhi in 2010 revealed that around 70 per cent of women were harassed on streets, 50 per cent faced harassment inside buses and 42 per cent while waiting at bus stops (Jagori 2010). Additionally, an assessment of the streets and urban built form within 800m radius of 16 bus terminals in Delhi revealed that they were not designed to facilitate safe accessibility**,** due to absence of or difficult walking paths, inconsistent and insufficient pedestrian street lighting, absence of clear sightlines, low gender diversity, single land-use zoning and lack of availability of functional, hygienic public toilets (Shah, Visariya and Packirisamy 2018). In Dhaka, for instance, 75 percent of the people on the streets are men and amongst other things this, reflects the lack of safety and security for women (Kahn, 2009). In a survey conducted by the Asian Development Bank in Karachi, 78 per cent of the female respondents had felt harassed or uncomfortable at some point while using public transportation in the previous year. 53 per cent stated that it had affected their use of public transportation and they chose to use private taxis or rickshaws (Asian Development Bank 2015). While a few cities in Asia have tried to address women and girls' safety in transport, the progress is slow (Litman and Earley 2017).

4.3. **Institutions and governance**

While national and state governments set broad strategies and policies regarding urban development, metropolitan and municipal governments play the essential roles of translating regional or citywide strategies, policies, and plans into implementation (Suzuki, Cervero and Iuchi 2013). Fragmented institutional structures and governing arrangements are one of the biggest obstacles to transit and land-use integration.

4.3.1. Laws and regulations

Many cities in Asia are managed using legal and regulatory frameworks and institutional arrangements that are outdated. E.g., presently, there is no legislation at central, state or local level that comprehensively covers urban transport requirements of Indian cities. Fragmentation or overlap of legislations poses challenges that constrain the ability to effectively manage the problems of urban transport and planning. Firstly, it leads to incoherence in the policy framework given the many different goals for which laws are enacted. And, secondly, it reflects in the timing, coordination and treatment of how states and cities approach a particular problem. Additionally, the relatively weak

[8] Analysis from data from the Census of India, 2011. This does not include workers engaged in agriculture, cultivation, household industry and those who stated "no travel".

enforcement of existing laws combined with minimal penalties contributes to rampant flouting of transport rules and regulations (IIHS 2015).

4.3.2. Institutional coordination

Urban transport, planning, sustainable development and climate change policies require several functions to be performed in a well-coordinated manner. In India, at the central level of the government, the responsibility of urban transport itself is somewhat diffused which is why it is claimed to be an "institutional orphan" (Mohan 2014). The Government of India (Allocation of Business) Rules, 1961, entrusted the responsibility for planning and coordination of urban transport to the Ministry of Urban Development[9]. However, other ministries also have a role to play in cities: the Ministry of Railways in cities with suburban or commuter railway systems, Ministry of Shipping in port cities and the Ministry of Road Transport and Highways for national highways and framing legislation and the Ministry of Environment, Forests and Climate Change, which is responsible for framing national policies on environment and climate change. At the state level, the State Transport Department and Urban Development Department (UDD) are the main departments dealing with urban transport and land use. Unfortunately, there is a lack of horizontal coordination among these agencies at central, state and local levels, making accountability difficult (IIHS 2015). The NITI Aayog is responsible for coordinating the SDG targets and has mapped the schemes and responsible ministries. The Ministry of Statistics and Plan Implementation is responsible for developing national indicators for the SDGs (NITI Aayog 2016). Yet, it is unclear how the SDGs are embedded in the national missions and how the ministries are coordinating with each other towards implementation. In Viet Nam, the poor nexus between socioeconomic and spatial planning is reflected in other problems related to the overlapping responsibilities of central and local agencies. These include: complicated procedures for project assessment and approval (investments require up to fourteen separate official approvals, which can take upwards of one year to obtain); difficulties in sharing information within and amongst agencies; and weak human resource capacity - staff have not been trained to carry out rigorous project appraisal such as financial and economic analyses (Coulthart, Quang and Sharpe n.d.).

4.3.3. Sub-national/ provincial governance

In countries like India and Malaysia, transport and planning are sub-national subjects. There are three overwhelming roadblocks to better urban governance in India: a federal framework that has not empowered its third tier (urban local bodies) despite amending the constitution in 1992 for doing so, a missing link in the institutional framework for metropolitan planning and governance, and a political system that is heavily biased toward the rural sector (Kazmin 2016). Unless institutional reforms effectively implemented, the process of urbanization cannot be taken forward to support the twin objectives of improving the quality of life of India's rapidly growing urban population and achieving economic development (Corbridge, Harriss and Jeffrey 2012)[10]. State governments have an important role to play not only in transferring functions, funds, and functionaries but also in providing an

[9] The ministry is now known as the Ministry of Housing and Urban Affairs (MoHUA).

[10] The Constitution of India placed the responsibility for urban development on state governments. In 1992, the 74th Constitutional Amendment formally recognized urban local bodies as the third tier of government. State governments were mandated to transfer a set of specified functions under the 12th Schedule, such as urban planning, including town planning; regulation of land use and construction of buildings, roads, and bridges; the provision of water; public health; and sanitation and solid waste management. As a result, accountability now rests with the urban local bodies but it is not backed by either adequate finances or the capacity for planning and management (Meloche & Vaillancourt, 2015).

enabling environment through legislative and institutional reform, whereas the Government of India can only provide strategic leadership (Ahluwalia 2017). Similarly, special planning areas are established within cities, over which the local government does not have any jurisdiction. Thus large areas of cities are carved out of the city's master plan[11]

In Indonesia, the organization and functioning of all local governments (municipalities in urban areas; regencies and villages in rural areas) used to be the responsibility of the provincial authorities but the Regional Government Law 22 of 1999 significantly shifted resources and responsibilities from the central and provincial levels directly to the urban (kotamadya) and rural (kabupaten) municipalities. This has often caused conflicts between the provincial and local governments given their equal relationship vis-a-vis the central government (UN-Habitat and UNDP 2014).

4.3.4. Metropolitan and local governance

While national governments can play a critical role in bolstering capacity at the local level, in Asia, decentralization has been more a transfer of administrative function. In some countries, central control over local government is characterized by financial control as in the Philippines, in others by the appointment of senior staff as in China and India (Lindfield 2014). The experience with metropolitan governments varies widely across the region – those with human and financial resources and powers to function as effective regional governments such as in Tokyo or Bangkok, whereas others have limited powers as in the case of Metro Manila.

Tokyo metropolitan region is under the Tokyo Metropolitan Government (TMG) as a regional government with 23 Special Wards, which function as the "internal organizations of the TMG" and as "basic administration units" or municipalities as per the amendment to the Local Autonomy Law in 2000. There is a clear delineation of roles between the TMG and the local governments. For example, arterial roads in city plans are managed by the TMG, whereas other roads are managed by Special Wards (Morita, et al. 2004).

In the Philippines, for example, local government is responsible for land-use planning and housing, but often funding has not matched these responsibilities (ESCAP 2017). Metro Manila is a special administrative region which consists of 17 local governments. In the 1990s, the Local Government Code has promoted devolution of powers, resources, and responsibilities to all local governments. This legislation has enhanced the initiatives of local governments, but sometimes brought a serious disparity among local government units. The Metro Manila Development Authority (MMDA) is a branch office of the national government, and responsible for metropolitan governance. However, it has very limited power due to lack of resources. The MMDA is financed mainly by contributions from the central government, partly by the 17 municipalities, and revenue from waste disposal charges and flood prevention charges (Morita, et al. 2004). No metropolitan governments have been established outside Metro Manila (World Bank 2017).

[11] Mumbai's port trust lands amounting to around 966 Ha, have been designated as a special planning zone and the city's development control regulations may not be applicable to these. The Mumbai Port Trust Authority under the Ministry of Shipping has been designated as a Special Planning Authority (Mumbai Port Trust 2018). In Mumbai, around 9 per cent of its land area as of 2012 has been designated as a special planning zone (Indian Express 2018), giving the sub-national or national government direct control over land use and spatial planning with limited role for the local government.

4.3.5. Leadership and political will

While national and regional policies are critical for steering urban growth, along with sufficient level of autonomy and financial authority for decision-making and service delivery, cities also need strong municipal leadership. The Mayors of Bogota and Seoul are inspiring examples of the role of local leadership in pioneering initiatives towards environmentally sustainable transportation.

4.3.6. Transparency and accountability

A lack of transparency and accountability is a major barrier not only for strengthening the fiscal authority of cities but also for engaging with the private sector and civil society stakeholders who are critical for enabling compact cities (Floater and Rode 2014). Institutional strengthening is important and particularly in small and medium sized developing cities, where transparency, democratic decision making and corruption-free infrastructure procurement are often lacking (UN-Habitat 2013). Institutional frameworks have to be created and technology can be leveraged (Refer Section 3.3.4. Technology) for civil society and stakeholder participation.

4.4. **Financial**

Besides policy and planning, funding for implementation of urban and transport planning is a major issue in many Asian cities. While often a high dependence on national government support is a key part of the budget (See Section 4.4.4), cities trying to increase its local budget raising its own income streams. The following instruments for raising revenues are seen as most relevant: own-source revenue, asset management, managing inter-governmental transfers, loan financing and accessing capital markets (Lindfield 2015). Municipal authorities in the most rapidly urbanizing regions tend to have the smallest per capita budgets (Figure 7), making it difficult for them to address pressing development needs, let alone shape sustainable urbanization (Beard, Mahendra and Westphal 2016). Therefore, it is often recommended to combine new resources of income through congestion charging and parking to price transport and have additional income to reinvest in environmentally sustainable modes as in the case of Singapore.

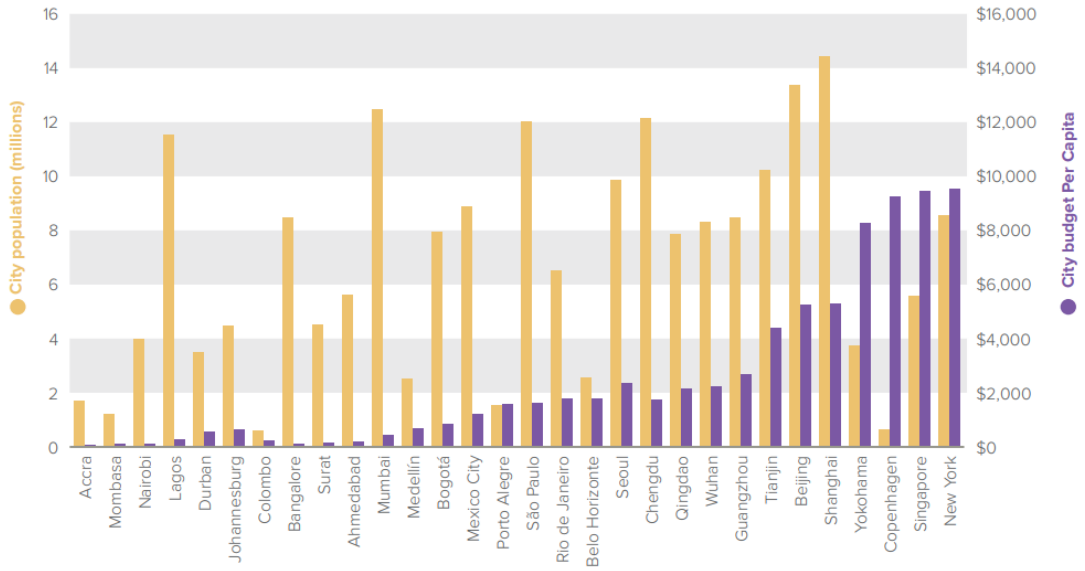

Figure 7: Cities and budgets per capita, budget data represent years 2010-2016
Source: Beard, Mahendra and Westphal 2016

4.4.1. Regional and master plans

Spatial planning instruments do not sufficiently focus on implementation and resource mobilization strategies, which may result in a gap between the approved plan and implementation, as in the case of detailed plans in Viet Nam (Coulthart, Quang and Sharpe n.d.)

4.4.2. Own source of revenue

Local governments have existing instruments such as property taxes, which are not sufficiently leveraged to raise local revenues. Potentially there is a 'race to the bottom' in lowering tax rates among competing local governments. This is constrained only when higher levels of government set minimum rates (Lindfield 2015). Other sources of revenue such as vacant land tax, which has the potential to reduce speculation, and congestion charging and parking management, have not been explored sufficiently. National/ sub-national governments have not provided local authorities with inadequate funding or have prevented them from accessing alternative forms of financing through legal rules that would allow them to meet the increased obligations that accompany decentralization.

4.4.3. Asset management instruments

Cities can leverage the value of their assets - mainly land - to finance public infrastructure. This can be structured by intensifying the use of public land, structuring public private partnerships to build environmentally sustainable transport infrastructure and robust land valuation systems, which is still evolving. The Mumbai Metropolitan Development Authority auctioned 13 hectares of land in 2006/07 in the new financial centre, which generated US$ 1.2 billion (Lindfield 2015).

4.4.4. Intergovernmental transfers

Transfers can be useful to foster sustainability goals or for reform based assistance as in the case of the JnNURM reforms in India. However, such assistance needs to be performance based rather than a list of reforms, as was the case in some JnNURM reforms, especially the setting up of Unified Metropolitan Transport Authorities (UMTAs). Sub-national governments did not devolve power and financial resources to the UMTAs, thus limiting their role in urban transport governance. Further, the transfers should be used to influence the city/ region's transport and urban planning investments and not only focused on a specific area as has been initiated in the Smart Cities Mission.

4.4.5. International development assistance

Regional/ local governments can be enabled to borrow for capital expenditure up to a debt ceiling proportional to their stable cash flow base. However, this can also result in "crowding" of development banks, leading to projectization of measures and duplication of efforts as cities try to comply with different reporting frameworks.

4.4.6. Capital markets/ Private sector

Sub-national and local governments may not be permitted to have access to finance markets. They often do not have consistent standards for infrastructure projects, the lack of viable funding models to pay back upfront capital costs, the lack of transparency in municipal operations, and the lack of clear investment regulations and policies.

Bonds constitute the most common capital market instrument used by local governments (M. Lindfield 2015). However, the limited availability of useful and reliable information published by municipal governments makes it difficult to value a city's creditworthiness, impeding access to credit markets for borrowing to finance infrastructure (Godfrey and Zhao 2016). Countries like India, Indonesia and Philippines are in nascent stages of developing bond markets. Further, infrastructure

projects and procurement processes may not have consistent standards and processes, which can increase the time and resources for investors to assess projects. Simultaneously, private investors may not have expertise in or experience of financing or lending at the municipal level, or might be unfamiliar with local policies and business environments, which may require performing higher diligence. Moreover, there may not be mandatory obligations to disclose the climate performance of urban transport or infrastructure projects and/ or the positive externalities of environmentally sustainable infrastructure may not be appropriated or taken in to account by private sector investors to reflect in risk-reward profiles (Godfrey and Zhao 2016).

4.4.7. Land-based financing tools

Land value capture (LVC) can be a powerful financing and planning apparatus and can include taxes and fees such as betterment levies, premium FAR, tax increment financing or development-based such as joint development, sale of development rights, transfer of development rights and monetizing the value of public land. However, the risks of overreliance, corruption, and gentrification should be carefully addressed. An overreliance on development-based LVC exposes municipalities and transit companies to excessive risk in real estate markets, can create negative perceptions amongst citizens in many developing countries because of a lack of transparency, and displace lower income households (Suzuki, Murakami, et al. 2015). Further, there may not be legislative support to recover the value through a tax or a fee.

4.5. **Technical capacity**

Technical capacity relates to adequate and qualified human resources and their capability in undertaking multiple responsibilities to enable land-use and transport integration.

4.5.1. Staffing and expertise of public administration

Local governments, particularly in developing countries, often lack capacities and expertise related to environmentally sustainable transport and urban planning. They are unable to envision and prepare long-term urban development plans, develop and communicate clear pipelines, secure funding commitments and sufficient guarantees, or manage infrastructure projects effectively (Godfrey and Zhao 2016, Ahluwalia and Mohanty 2014). In India, most of the state and city level agencies responsible for urban transport or urban planning have overstaffing of untrained, unskilled manpower on the one hand and shortage of qualified technical staff and managerial supervisors on the other (Environment Planning Collaborative 2013). In addition, as described in Chapter 3, we observe a significant step in using GPS and other data related technology for urban planning as well as new transport services. The challenge will be to keep the pace of technological development as well as to integrate new ways of movements of people and goods to manage.

Further, when structuring public private partnerships, there is a lack of skills in setting performance benchmarks, investment facilitation and capacities to develop and negotiate effective contracts, which balance the city's goals and the risk for investors (Godfrey and Zhao 2016). The staff and management at these agencies are typically not accustomed to innovation and taking up new tasks, and are more comfortable opting for traditional methods of procurement and working with government grants and loans (Ahluwalia 2011). The integration of environmentally sustainable transport and urban planning will require multi-disciplinary teams with expertise in understanding the social, economic and environmental dimensions of green growth as well as its real estate dynamics. In Hong Kong SAR of China, MTR Corporation (MTRC) functions not only as a planner, designer, architect but also oversees project construction, engineering, management and oversight and in some cases functions as a property manager (Cervero and Murakami 2008).

5. Good practices and lessons learned – from policy to design

To strike a balance between short-term economic needs and the long-term environmental imperative, the emerging Asian economies have begun to put in place policy frameworks for financial and regulatory incentives and to build institutional capabilities for environmentally sustainable growth in the long term (Asian Development Bank and ADB Institute 2013).

5.1. **Learnings**

Japan, city-state of Singapore and the Hong Kong SAR of China are well documented examples for developing regional visions, plans, financing and governance frameworks for integrating land use around urban rail systems. Over the last two decades, numerous policies and plans have been initiated by developing countries in Asia to promote environmentally sustainable transport and its integration with urban development with the goal of creating low carbon cities, eco-cities or promoting green growth.

The analysis of the Voluntary National Reports (VNRs) revealed that almost all countries had provided some reference to transport and required a clarity of goals and explicit policy action (Yiu, et al. 2018). The reported progress on the Bangkok Declaration in 2017 showed that countries were in different stages of formulating policies, plans and implementation (Litman and Earley 2017). An overview suggests that many developing countries in Asia are undertaking ambitious programs to promote green growth with integration of transport and urban planning as a key strategy. Some cities are making leaps towards environmentally sustainable transport, while still learning how to integrate it with urban development. The role of champions at the local government levels and civil society organizations is crucial in this process, both to provide support as well as hold national, metropolitan and local governments accountable. The following sections highlight key initiatives being undertaken by some countries in Asia and the ongoing learnings from implementation.

5.1.1. Policy and planning

National governments in Asia have formulated urban policies explicitly focusing on environmentally sustainable transport, land-use and urban form integration as in the case of Singapore and Japan. The Republic of Korea has adopted national policies to encourage compact city planning and sustainable transportation supported with investments in multi-modal transfer centres, which combine new housing and commercial developments with public transportation (Broekhoff, Piggot and Erickson 2018). Recently, governments have linked urban development frameworks with the aim of achieving sustainable development goals, as in Indonesia. Further, time-bound and reform-based programs have been initiated by national governments (such as in India) to encourage “competition” between cities to create sustainable urban mobility plans, integrated land-use and transport plans and undertake governance reforms.

National governments are beginning to play a lead role in creating and maintaining up-to-date urban development data and create urban spatial planning guidelines for different city sizes and at different scales to ensure consistency of approach across cities, as in the case of the People’s Republic of China. Indonesia created the One Map Initiative in 2010, to compile, integrate and synchronize geospatial information by different ministries to create one base map, which would be accessible to the public free of charge. Thematic layers are built and completed by individual ministries in their own servers and databases, and then linked to a central portal. Although the base maps are ready and available for the public, some information is indicative only and depends on the proactiveness of the

ministry. While the technical progress on One Map is slow, the culture of trust and cooperation between agencies appears to be changing as a result of this effort. Also, participative mapping will also be crucial for ensuring community maps are part of the formal One Map (Shahab 2016).
Monitoring and evaluation frameworks are being created to guide and evaluate performance. Based on the learnings of the eco-cities program in the People's Republic of China, an assessment framework focusing on conserving natural resources, wetlands, green spaces, using land efficiently, encouraging environmentally sustainable transportation and use of sustainable materials, was created to guide and evaluate initiatives (MOHURD 2017). In India, service level benchmarks for urban transport have been created to establish baselines and evaluate performance at the city level (MoHUA 2013).

Numerous cities such as Vientane, Dhaka, Kochi, Ahmedabad, Nagpur have initiated or are beginning to prepare sustainable urban transportation plans (Litman and Earley 2017, Mobilise Your City 2018) and cities like Bangkok, Islamabad, Kuala Lumpur, Ahmedabad, Delhi, Ulaanbaatar have adopted transit-oriented development policies or codes within their master plans (Suzuki, Murakami, et al. 2015, Litman and Earley 2017) with higher densities, mixed land uses around mass rapid transit corridors. Cities like Tokyo have effectively used land pooling and readjustment to develop land around mass rapid transit in peripheral areas and managed on-street parking and regulated off-street parking supply through parking maximums, whereas Singapore has introduced congestion pricing, auctioning and recently restricting registration of personal motor vehicles.

5.1.2. Institutions and governance

National, sub-national metropolitan and local governments need to enable horizontal and vertical integration. Singapore demonstrates an example of horizontal coordination by constituting inter-ministerial and departmental committees to address specific issues, across its three main agencies responsible for urban transport, planning, and housing. Metropolitan governments can play a critical role in crafting regional visions, facilitating implementation of regional infrastructure as well as defining clear roles and responsibilities and coordinating with local governments, as illustrated by the Tokyo Metropolitan Government. A unified transport authority at the metropolitan scale is also essential for planning, coordination, monitoring and evaluation, as demonstrated by the Land Transport Authority in Singapore (Chin 2011).

5.1.3. Financing

Metropolitan and local governments should be empowered to raise and retain a share of their own revenues, prepare asset management strategies and undertake reforms to raise money from capital markets. A number of instruments can be explored such as 'intercepts' of national block transfers as in the Philippines, 'pledging' of a proportion of stable cash flows (such as property tax) as used in the USA, and the grouping of local governments in the 'pooled lending' arrangements used in India by the Tamil Nadu Urban Development Fund (TNUDF) (Lindfield 2015). Congestion charges, parking management charges can also be explored as in the case of Singapore.

Hong Kong SAR of China, China, and Tokyo are examples of how development-based land value capture has been used as strategic apparatus for sustainable urban finance and development. They have been applying development-based LVC not only to recoup the costs of mass transit construction, operation, and maintenance but also to facilitate land-use and transport integration (Suzuki, Murakami, et al. 2015).

5.1.4. Technical capacity

Countries across Asia have adopted varied approaches such as establishing academic institutions as Centres of Excellence for urban transport and planning, enabling peer-to-peer learning, undertaking national capacity development initiatives and building capacity within leaders to undertake decisions that might be politically difficult. A unique approach has been adopted by Kitakyushu in Japan, where the metropolitan authority transfers staff between departments focused on environmental and economic objectives in order to inculcate institutional learning and foster understanding of inter-sectoral linkages (OECD 2013).

5.1.5. Inclusion

Good practice examples in Asia demonstrate how multi-stakeholder partnerships have been created with communities to upgrade informal settlements, with streets being the main focus for the provision of services as in India, Thailand and in China. While access to public transport may not have been addressed, this suggests an area of improvement for upgradation programs going forward. The role of the national government in providing guidelines, standards and good practices to guide local governments, is underscored.

Similarly, countries like the United Kingdom have reformed national legislation to promote gender equity in transport and transport authorities. The city of Vienna demonstrates a proactive approach of establishing a coordination office for gender mainstreaming within the municipality and publishing guidelines for gender mainstreaming in urban planning and design to provide practical guidance.

5.2. **Case studies**

The case studies are structured to outline the key national level policies, their governance, financing and capacity development initiatives followed by city case studies to understand how these were implemented in coherence with the national vision or exceeded national mandates.

Table 3: Case studies

No	Country	National Policies and Plans	Institutions and Governance	Finance	Capacity Development
1	People's Republic of China City: Shenzhen	• National Plan on New Urbanization Plan (2014-2020) • GEF China Sustainable Cities Integrated Approach Pilot Project	• Ministry of Housing and Urban-Rural Development will coordinate with 7 partner cities	• Investment Project Financing • GEF Technical Assistance Grant	• Partnerships at the local, national, and global levels, through knowledge management, training courses, capacity building, peer-to-peer learning and global coordination
2	India City: Pune	• JnNURM 2005-14 • Smart Cities Mission 2015 • National Urban Transport	• Ministry of Housing and Urban Affairs	• Reform based central assistance	• Centres of Excellence • National capacity development initiative • Leaders in Urban

		Policy 2006 • Metro Policy 2017 • National TOD Policy 2017 • Land Value Capture 2017			Transport Programme

5.2.1. People's Republic of China

In 2011, the People's Republic of China's urbanization rate reached nearly 50 per cent, up from around 18 per cent in 1978 when the People's Republic of China opened to international trade. Urbanization is projected to reach more than 70 per cent by 2050 (Chinese Society for Urban Studies 2011, Li and Yu 2011). As communicated at the UN climate talks in Paris in 2015, the People's Republic of China intends to cut GHG emissions per unit of GDP by 60-65 per cent by 2030 based on 2005 GHG levels.

Policy and Planning

In 2010, the National Development and Reform Commission (NDRC) in People's Republic of China announced a program for five low carbon pilot provinces and eight low carbon pilot cities in 2010. The provinces are Guangdong, Liaoning, Hubei, Shaanxi, Yunnan; the cities are Tianjin, Chongqing, Shenzhen, Xiamen, Nanchang, Guiyang, Baoding and Hangzhou. This program covers greenhouse gas accounting, low carbon development planning, communications and international cooperation. Along with low carbon technology, this plan also encourages low carbon lifestyles and a strong focus on renewable energy (Karlenzig and Zhu 2010). Following up on this initiative, more than 40 cities around the country have declared that they are planning to build low carbon cities (Zhou, He and Williams 2011).

In 2014, the People's Republic of China created a National Plan on New Urbanization Plan (2014-2020), based on which the 13th Five-Year Plan for City Public Transport Outline issued by the Ministry of Transport in 2016, highlighted key issues regarding transit-oriented development implementation, encouraging shared mobility and implementing congestion pricing as a way to manage traffic. In February 2016, the central government set out an overarching vision for future urbanization (Communist Party of China Central Committee and State Council 2016). With the above objective, the Global Environment Facility (GEF) and the People's Republic of China have initiated that GEF China Sustainable Cities Integrated Approach Pilot Project to incorporate transit-oriented development principles in their policies and future urban and transit plans (World Bank 2017).

Capacity building

A national transit oriented development platform will be created including policies, guidelines, strategies, and capacity building efforts for integrated urban and transport planning, in consultation at the national level and with cities. This will be followed by technical support and capacity building for participating cities for transit oriented development implementation at multiple scales – city, district, corridor and at the station level. The capacity building activities will include supporting partnerships at the local, national, and global levels, through knowledge management, training courses, peer-to-peer learning and global coordination. The participating cities are Beijing, Tianjin, Shijiazhuang, Ningbo, Nanchang, Guiyang and Shenzhen (World Bank 2017).

Shenzhen, People's Republic of China: Shenzhen demonstrates key principles of low carbon transport and integrated planning, which are described further below.

Policy and Planning: Shenzhen formulated a low-carbon development plan (2011-20), with the goal of increasing the share of public transport among motorized travel from 56 per cent in 2015 to 65 per cent in 2020. In 2015, Shenzhen had more than 28,000 electric vehicles with the bus inventory amounting to more than 4500 (Wu, Tang and Wang 2016). Further, Shenzhen coordinates with agencies and simultaneously adjusts its master plans, detailed land use plans, and transit plans to ensure dense, mixed-use development around transit stations. Planning authorities and the metro company work together continuously to evaluate land values and plan for integrated transit infrastructure and urban development. Shenzhen reformed its zoning code to allow for more flexible commercial, residential, and office development on land parcels that were previously designated for transport use only (Fang and Xue 2015).

Financing: Inspired by the experience with rail and property development in Hong Kong, a few mainland Chinese cities like Shenzhen and Tianjin have adapted the rail and property development for their own transit projects. However, because of multiple legal, regulatory, and institutional barriers, success has been limited (Xue and Fang 2017).

Institutions and Governance: Shenzhen encourages dialogue between different departments and coordinates with developers to match projects to market demand. The local planning institute and the metro company have worked closely from the very beginning of the financing and planning stages. Finally, strong leadership and external consulting services also prove critical to managing complicated urban development (Fang and Xue 2015).

5.2.2. India

Since 2005, the national government has initiated reform based central assistance to encourage investment in urban infrastructure, through the Ministry of Housing and Urban Affairs (MoHUA).

Policy and Planning

The National Urban Transport Policy was introduced in 2006, which emphasized that "roads were to be designed for people and not for cars" (Ministry of Urban Development 2006), which gave impetus to adoption of a number of policies at the local levels such as the Non-motorized Transport Policy for Chennai (The Hindu 2014), the Transit-oriented Development Policy for Delhi[12] (DDA 2007).

The Jawaharlal National Urban Reform Mission was introduced over 2005-14, which focused on Avoid, Shift and Improve strategies and invested in urban transport in 61 cities with a population of 1 million and above. The mission gave impetus to public transport by expanding the bus fleet by around 15000 buses, funded bus rapid transit projects in 22 cities. Simultaneously, it initiated Bharat Stage III and IV emissions norms. By 2014, urban transport constituted 35 per cent of all completed projects, and 27 per cent of expenditure. Metro-rail systems were operational in 7 cities with 5 under expansion (Anand, et al. 2015). Urban transport, land-use and transport integration indicators and service level benchmarks were created in 2011 to introduce accountability in service delivery of urban transport, compare performance levels against set targets or good practices, assess performance trends, investment outcomes and show case achievements/ good practices. It was envisaged as an annual activity to be presented as an annual budgeting exercise (Swamy n.d.). The JnNURM aimed to

[12] Which was finally approved in 2015, with some limitations.

encourage cities to change bye-laws and Master Plan to integrate land use and transport by densification along the Mass Rapid Transit (MRT) corridors and areas around the stations (Gupta 2013). As mentioned in Chapter 4, the mission highlighted the need for reconceptualizing Comprehensive Mobility Plans and the need for capacity development in urban local bodies.

In 2015, the Smart Cities Mission was introduced, which aimed to provide assistance to 100 cities through a competitive process in initiating area-based development and leveraging technology for city-wide initiatives (MoHUA 2017). While the uptake of the scheme has been slow, urban transport projects have largely focused on non-motorized transport oriented street design, smart cards and integrated command and control centres. In 2017, the Green Urban Mobility Scheme was introduced, which aimed to leverage investments of USD 11 billion (at 2017 prices) in environmentally sustainable transport and cities would be encouraged to prepare green mobility plans. The details of the scheme have yet to be finalized. Additionally, the Metro Policy was also approved, which encouraged cities to conduct Alternative Analyses to decide on an appropriate technology for a mass rapid transit system. In 2016, the FAME[13] Scheme was introduced by the Ministry of Heavy Industries and Public Enterprises to incentivize adoption of electric vehicles and public transport. .In 2017, the National Transit Oriented Development Policy and Land Value Capture were also introduced. This reflected the national government's push towards Avoid strategies. Currently 3 states and the city-state of Delhi have adopted state level transit-oriented development policies. A national urbanization policy is also underway.

A number of sub-national states like Madhya Pradesh (Government of Madhya Pradesh 2018) and Jharkhand (Government of Jharkhand 2016) have initiated or adopted transit-oriented development policies. Cities such as Delhi (Government of India 2015), Ahmedabad and Pune have modified their development codes, with others like Nagpur, Naya Raipur and Navi Mumbai are reported to be under progress (The Times of India 2017).

Institutions and governance

The JnNURM mandated the creation of a dedicated Urban Transport Fund and Unified Metropolitan Transport Authorities (UMTA) for the 61 mission cities, which would be responsible for coordination of all transport planning, implementation, monitoring and evaluation for the metropolitan region. The implementation leaves a lot desired as the sub-national state has devolved limited powers and financial resources to the UMTAs.

Capacity building

A national capacity development initiative was introduced under the JnNURM. Additionally, a Leaders in Urban Transportation Planning and Management Program was created to build capacity for mid and senior level in-service professionals and/ or decision-making officials at all levels of government — national, state and city. This was offered jointly by the Centre of Excellence in Urban Transport, CEPT University and the World Bank as part of the ongoing Sustainable Urban Transport Project (SUTP) for the Ministry of Urban Development, Government of India (CEPT University 2018).

Pune, India: The city of Pune has a population of 3 million and was part of both the JnNURM and the Smart Cities Mission. It has leaped ahead of cities across India and of the Smart Cities Mission by moving from pilot projects to initiating city-wide sustainable transport initiatives. A key element of this transformation was the active role played by civil society organizations in critiquing and in

[13] Faster Adoption and Manufacture of (Hybrid and) Electric Vehicles

supporting the Pune Municipal Corporation, and a dynamic leader within the Pune Municipal Corporation, who has recently been appointed as the Director of the Smart Cities Mission.

Environmentally sustainable transport: Pune created urban street design guidelines under the aegis of the NUTP 2006 and created a framework with the aim of designing 100 km of complete streets. Under the Smart Cities Mission, Pune identified 45 km of streets of which 1.5 km were implemented and have set an example for the rest of the city and country. It has also created a bicycle plan for 400 km of streets with aim of increasing the current 9 per cent mode share to 25 per cent. It has also initiated a public bicycle sharing system in the Aundh-Banerwadi-Balewadi (ABB) area as part of the Smart Cities Mission with about 1250 bicycles and 100 stations. Pune has also initiated a parking policy with the goal of transforming 10 per cent of on-street parking to public spaces. Additionally, it aims to support a ridership of 1.9 million trips on buses by expanding its fleet by 1500 buses and introducing a mobility integration card. Pune is expanding the bus rapid transit system from 15 km to 90 km in the Pune Metropolitan Region and aims to build a 68 km of metro network (Pune Municipal Corporation 2018). The draft budget of the Pune Municipal Corporation in 2018-19 allocated 62 per cent of its budget towards sustainable transport (Khairnar 2018).

Urban Planning: The city of Pune has introduced transit-oriented development regulations in 2017 along the mass rapid transit corridors within its Master Plan. There is ambiguity as to what has been considered as mass rapid transit, the delineation of the zone, there are no stated objectives and quantified targets for transit-oriented development in Pune, a uniform floor area ratio has been proposed along the entire corridor without considering the context of the surrounding neighbourhoods, the TOD regulations prevail over the heritage regulations within the delineated zones, public parking has been incentivized within 200m of metro stations and transfer of development rights is not permitted around mass rapid transit. Further there is a lack of clarity on the institutional framework and the role of the special purpose vehicle for constructing the metro-rail, the urban local body and other public authorities.

Figure 8: Redesigned street in Pune; Source: ITDP

5.2.3. Singapore

Singapore's case has been used to describe its strategic approach towards urban planning and governance frameworks created to enable coordination between different ministries and agencies.

Policy and Planning

The key instruments for achieving Singapore's urban visions are:

- Concept plans prepared by the Urban Redevelopment Authority (URA) as the agency responsible for spatial planning.
- Development guide plans (DGPs) also prepared by the URA which together form what is known as the Master Plan;
- Transport policies and plans prepared by the Land Transport Authority (LTA); and
- Detailed plans for the development of new towns prepared by the Housing Development Board (HDB), and for industrial areas, prepared by the Jurong Town Corporation (JTC).

Barter and Dotson (2011) describe the process of Singapore's planning system. The Concept Plan is not a statutory plan but reflects a strategic planning approach, which provides the framework for the preparation (also by the URA) of the statutory land use plans – known as Development Guide Plans (DGPs), which together form what is known as the Master Plan. The mechanism for the preparation of the Concept Plan is notable as a good example of a strategic planning approach, adopted to overcome the problems associated with the preparation of 'master plans'- in particular the time needed to prepare them, the long drawn out process, the amount of detail of such plans and their lack of connection with key levers of influence over urban development, such as infrastructure investments. The Concept Plan lays out the vision for development over at least a 20 year horizon, and the key actions to achieve the vision. The Concept Plans in Singapore are now reviewed and updated every 10 years. There are Development Guide Plans (DGP) for 55 areas, which together with a written statement form the Master Plan. The Concept Plans incorporate transport policies and the major transport infrastructure networks and facilities, and provide the framework for the formulation and implementation of more detailed transport strategies, policies and programs by the LTA in support of the Concept Plans. This division of planning and policy making into three levels – i.e., strategic, detailed/tactical and operational/implementation – is highly effective as it separates out the three stages of the process for the creation of urban environments, which require different skills and mind-sets. The Concept Plans covers aspirations, what the community wants to achieve, and confronts major strategic trade-offs and dilemmas – quite deliberately without getting bogged down in details. The DGP and the Transport Plans (TPs) take the concepts as a starting point and provide the details of how the aspirations are to be achieved. The operational plans then bring the concepts to fruition. The periodic review and updating process in all the levels provides feedback loops that allow adjustments to be made in response to changing aspirations and circumstances (Barter and Dotson 2011).

Institutions and governance

While overall the strategic spatial planning and transport policy directives for Singapore are integrated, this has been largely achieved without the administrative and legal integration of institutions and governance of land use and transport. Instead, inter-agency committees ensure the integration of planning and implementation. This is contrary to a view that is often advocated that integrated plans can only flow from integrated institutions (Barter and Dotson 2011).

5.3. **Inclusion**

Since affordable housing and gender mainstreaming still remain persistent challenges, good practice examples have been inserted under those specific themes. The case studies on affordable housing demonstrate an approach of upgrading low rise and high density informal settlements and urban villages, over redevelopment to high density, high rise developments often associated with transit-oriented development. While they may not have an explicit linkage with improvement of urban transport services, they focus on reducing the vulnerability of the urban poor by providing secure tenure, improving streets and providing basic services. Within this context, the Community Organization Development Institute's Baan Mekong Program in Thailand, which worked with poor communities to upgrade housing is discussed along with upgradation of urban villages in the People's Republic of China. Additionally, the role of national legislation to promote gender equity in the United Kingdom, Vienna's approach to gender mainstreaming in urban planning and the role of women's collectives in housing upgradation in India are presented.

Table 4: Affordable housing and gender equity in environmentally sustainable transport and urban planning

No	Program/ Initiative	City/Country
Affordable Housing		
1	Baan Mekong Program 2003	Thailand
2	Upgradation of urban villages 2014	Guangzhou, People's Republic of China
Gender		
3	Equality Act 2010	United Kingdom
4	Gender mainstreaming in urban planning	Vienna, Austria
5	Parivartan Scheme 1997	Ahmedabad, India

5.3.1. Affordable housing

Communities have often been a resource for urban development. In several countries in Asia, such as Cambodia, Nepal, the Philippines, Sri Lanka and Thailand, federations of poor people in urban areas engage in community-driven initiatives to upgrade slums and develop new low-income housing options (ESCAP 2017).

Baan Mekong Program, Thailand: The 1980s and 1990s, periods of intense economic development and rapid urbanization was accompanied with the spread of informal settlements, which highlighted the need for affordable housing, infrastructure, and appropriate planning. Scattered and small-scale upgrading and "land-sharing" projects attempted to address the needs of the country's most vulnerable urban dwellers, but the projects produced few results. Meanwhile, tenure insecurity and a focus on relocation continually posed challenges and concerns (Bhatkal and Lucci 2015).

The Community Organizations Development Institute (CODI), a national independent public organization, was set up in 2000, to bring community development institutions under one umbrella. CODI established the Baan Mankong Program in 2003 to build on the successful progress of the 1990s with community savings and lending, as well as network-building and community managed housing initiatives (CODI 2008, Boonyabancha 2009). The program directs government-funded infrastructure subsidies and soft housing and land loans to poor communities that negotiate formal tenure and upgrade their housing and living environments according to comprehensive citywide upgrading plans. The collective land title and a requirement that the community keep its land for at

least 15 years help ensure that the housing benefits accrue to and remain with the poor. This also helps mitigate gentrification pressure on account of individual ownership (King, et al. 2017). By 2016, 1,903 poor communities in 345 cities had been upgraded under the program, and 101,224 poor families had secure land, decent houses, and healthy living environments (Boonyabancha 2009, Bhatkal and Lucci 2015). Baan Mankong's success provided a template for the Asian Coalition for Community Action (ACCA) program, which scaled up efforts in cities throughout the region (Bhatkal and Lucci 2015). By 2014 the ACCA program had reached 215 cities in 19 countries in Asia, and almost 400,000 households were engaged in projects (King, et al. 2017).

Urban village upgradation¸Guangzhou*:* Guangzhou has 304 urban villages in the metropolitan area with 6 million residents and an estimated 5 million 'floating' or unregistered population. 23 of these villages are located along its 23 km long BRT corridor. Their major challenges were safety, cleanliness, and transit access. In 2014, a 3-year action plan to upgrade the urban villages was approved to improve their safety. This was implemented by local sub-district offices, each of which managed 10-20 urban villages. Several of the largest urban villages along the BRT corridor were selected as the demonstration areas. In the village of Tangxia with a resident population of 350,000, 70 per cent of the people exiting the village in the morning peak used the BRT. The street surfaces, sewer networks were upgraded, walkways and bicycle parking racks were built, traffic fences erected, garbage and unsafe cables were removed and cars were designated to specific areas. However, in the process, informal stalls were also removed (ITDP 2015). This approach has also been replicated in the neighbourhoods of Fengyuan shequ and Shisan hang, Xiaozhou village and Shipai village (ITDP 2012).

Figure 9: Alleyways in Fengyuan, which are regularly upgraded
Source: ITDP 2012

5.3.2. Gender responsive transport and urban planning

Environments designed with more street lighting and a mixture of land uses that generate foot traffic many hours of the day and days of the week are likely to decrease the risk of violence to women (Meleis 2011). It is difficult to find good practice case studies in developing countries that have comprehensively integrated gender in environmentally sustainable transport policy, planning and implementation. However, national policies and legislation adopted by the United Kingdom provides some insights, along with pro-active roles played by urban local governments as in Ahmedabad, India.

Environmentally sustainable transport

Legislation: The United Kingdom introduced key legislation such as the United Kingdom's Equality Act 2006, which later became the Equality Act 2010. This made gender equality a public duty and aimed to ensure equal treatment between men and women in labour law. The Equality Act 2010 makes it mandatory for public authorities to report on gender pay gaps and take action. In 2007, Transport for London introduced its Gender Equality Scheme, conducted research and consulted with 140 organizations and individuals to identify key areas for intervention. These were accessibility (including availability, vehicles, integration of services and infrastructure), safety and security, affordability, information and employment (i.e. equal pay, recruitment, retention, flexible working and workplace culture) (Transport for London 2007). Transport for London has also published annual workforce monitoring reports, gender pay gap reports over 2016 and 2017 (Transport for London 2018). Transport for London's initiatives is considered one of the most comprehensive efforts by transport operators to respond to the needs of women's riders.

Urban planning

Gender mainstreaming in public projects: The city of Vienna is an example, which began to measure, plan and design for women in the 1990s. It started with a survey of the use of public transportation in Vienna, which revealed that while a majority of men used either a car or public transit twice a day - from home to work and vice versa, the women had varied travel patterns and used the city's network of sidewalks, bus routes, subway lines and streetcars more frequently. The city of Vienna organized an exhibition "Who owns Public Space - Women's Everyday Life in the City" to draw attention to women's experience of the city. Shortly after, the city established the "Coordination Office for Planning and Construction Geared to the Requirements of Daily Life and the Specific Needs of Women" within the Municipality. The Municipality of Vienna initiated a design competition titled Women-Work-City with the Building Cooperative of Austria, managed by women. The central idea behind the competition was to increase the participation of women experts in urban development and focus on women oriented housing. The winning design revolved around a 'village commons' and featured a central square, green spaces, varied typologies for different family constructs and common facilities including shops, kindergartens, day care nursery, health clinics and a police station. In 1997, the construction of Women-Work-City was completed in Vienna's 21st district, with 357 housing units in multi-storey blocks. This pilot project received high levels of resident satisfaction and has acted as a catalyst for new development and design of public spaces. The city of Vienna provides subsidies to other housing projects which meet the standards and requirements set by Women-Work-City. As a consequence, architects and developers consult with the Co-ordination Office in the initial stages to integrate women's needs in housing design. The Co-ordination Office encourages clear, well-lit access routes through housing complexes and discourages hidden corners, narrow passageways and underpasses. The mixed land uses and good connections to the public transport system help to shorten daily trips and disincentivize car use (Shah 2017). The Co-ordination office has coordinated 14 municipal departments to facilitate implementation of 50 model projects. In 2013, a manual for gender mainstreaming in urban planning and urban development was created to provide gender planning aids and tools (City of Vienna 2013).

Figure 10: Women-work-city project
Source: http://www.laciudadviva.org/blogs/?p=22267

Upgradation of informal settlements: Women constitute about two-thirds of employment in the informal sector in Asia. These include self-employed home-based workers, street traders, waste-pickers, domestic workers or construction workers. The lack of basic services, child care facilities, individual toilets, waste disposal and secure tenure increases women's insecurity of living in informal settlements. According to the UN Habitat, women are twice as likely as men to collect water and where slum upgrading programmes focus on the provision of communal toilets, issues of privacy often mean the facilities are not suitable for and accessible to women. Therefore, upgradation of informal settlements providing de facto tenure, delinking provision of services from tenure, provision of individual household water and sanitation facilities, anganwadis can improve women's access to services and reduce their vulnerability (Shah 2017). The Slum Networking Programme (1995) in Ahmedabad was such a project, which included multiple stakeholders - Ahmedabad Municipal Corporation, service providers, community groups, households and non-governmental organizations. This project integrated slums with city infrastructure, provided underground drains, household connections for water supply and drainage, individual toilets and pay for use toilets, paving of internal roads, street lighting and secure land tenure for 10 years. As of 2007, this project had benefitted 34 slums covering around 11,500 households (Water and Sanitation Program 2007). One of the limitations of this project is that it did not improve access to public transport service. However, it is a replicable approach to upgrading informal settlements than redeveloping or relocating them.

6. Recommendations and Conclusions

The former chapters showed clearly the opportunities, but also challenges towards environmental sustainable transport, the nexus with urban planning and green growth. With the trends of urbanisation, motorisation and technology development, it is crucial to act fast to progress towards the sustainable development goal. While we have described incremental changes and good practices previously, a more substantial transformation is crucial and requires stronger commitment and actions from all parts of society.

As the EST Forum is a platform for national decision-makers, the recommendations focus on the role of national governments in creating policy frameworks and initiating reforms for green growth. They include land-use and transport integration, decentralization of key urban planning and management functions and capacity development.

6.1. **Policy**

The first section shows how the contribution of transport to enhancing urban access (SDG indicator 11.1.2) is only addressed in 7 out of 47 VNRs globally and with even less in the EST countries (SLoCaT 2018). This calls for a renewed and stronger governmental commitment to green growth with a focus on sustainable development goals and climate mitigation and adaptation in urban transport and city planning. There is an opportunity to link the sustainable development goals and the nationally determined contributions to deliver and enable change. As shown in the institutional chapter, there is a need for mainstreaming the SDG and make a clear link to the planning and transport ministries by having a dedicated institution to support, track and guide the sectoral implementation.

6.1.1. Environmentally sustainable transport

An early decision to prioritize public transport and non-motorized transport investments over private transport-oriented investments can bring important long term benefits, especially in cities with low personal motor vehicle ownership. We have seen such a shift in countries like South Korea going hand in hand with the economic success of the country in the last two decades. Such investment priorities are made enormously easier to carry out in developing cities if the pace of motorization can be slowed down, which often accompany periods of rapid economic growth and urbanization. The need for better balanced transport systems is particularly acute for cities that are already large and dense, since dense cities are particularly vulnerable to the negative impacts of traffic (Barter 2003).

National urban mobility policies

Currently there is an emphasis on pilot projects with insufficient attention to environmentally sustainable transport policies to provide strategic direction, goals and outline monitoring, evaluation, financing and institutional frameworks. National urban mobility policies need to be framed to promote green growth in cities. They should focus on smart urban mobility with environmentally sustainable transport, multi-modal planning, road safety, land-use and transport integration, travel demand management and information and communication technologies as integral pillars. These need to be supported with accurate data on the impact of transport on city pollution, monitoring data and carbon management of city environments. The national policies could create a framework for preparation of sustainable urban mobility policies (Mobilise Your City 2018) at the city levels to enable city/ region-wide transformation, rather than pilot project implementation.

National governments can restrict and regulate personal motor vehicles ownerships through fiscal tools. Further, national policies can promote vehicle efficiency and clean energy alternatives through standards, incentives, enacting low-carbon fuel standards, and funding infrastructure for cleaner vehicles and fuels (Broekhoff, Piggot and Erickson 2018).

6.1.2. Regulatory frameworks for urban planning

Urban development, housing, transport, environment nexus in national policies

National governments can use their powers to design, implement and enforce regulations that directly or indirectly affect urban development. Although "conventional" urban policy has focused on issues specific to urban areas and measures that expressly target cities, aligning urban policy with sustainable development goals may require a broader approach. Often policies that are not explicitly "urban" can significantly affect urban development (OECD 2013). National energy policies, for example, including fuel subsidies and/or taxes, can influence the relative cost of different transportation modes, which in turn can affect incentives for urban growth and sprawl (Broekhoff, Piggot and Erickson 2018, ESCAP 2017). While compact urban planning has beneficial outcomes, it also requires upgradation of existing infrastructure, efforts to meet local energy resources, urban waste management as well as green spaces and other amenities. Recognizing these linkages can result in coherent policy-making across multiple sectors- such as housing, environment and energy (Broekhoff, Piggot and Erickson 2018) - and social groups – such as women, children and persons with disabilities – requiring leadership and coordination between multiple ministries.

National urbanization policies, indicators and guidelines

National policies can explicitly focus on urban development through national urbanization policies, and create indicators and benchmarks underpinning the sustainable development goals, and spatial planning guidelines for land-use and transport integration at multiple scales from metropolitan region, city, corridor and station areas.

Targeted focus in rapidly growing cities

Further, national governments can focus specifically on high growth mega-urban regions or smaller booming cities to facilitate metropolitan governance, direct investments in environmentally sustainable transport infrastructure and targeted capacity building efforts. This needs to be underpinned with relevant and up-to-date data, benchmarking and research on environmentally sustainable transport and urban planning technologies and practices (Broekhoff, Piggot and Erickson 2018). Centres of Excellence could be established within academic institutions to drive this research and development.

6.2. **Planning**

6.2.1. Environmentally sustainable transportation plans

National urban mobility policies can encourage creation of sustainable urban mobility plans for metropolitan regions, underpinned by a vision for green growth. Brazil adopted a national urban policy in 2012, which made it obligatory for all municipalities with a population over 20,000 inhabitants to prepare an urban mobility plan by 2015 (European Commission 2014). This approach in Brazil, which was adopted from Europe (European Commission 2013) could also be considered in Asia.

6.2.2. Urban planning

In the previous recommendation on policies it was highlighted, that national and local governments can reform zoning ordinances, building codes, and tax incentives that favour urban sprawl (New

Climate Economy 2018). In addition, there is also a need for strengthening and enabling local and regional planning.

Metropolitan plans can provide a long-term vision of development with transit infrastructure as the back bone of spatial development strategies and help guide planning, funding, construction, and operations to support environmentally sustainable transport. This long-term vision should be consistently reflected in other planning instruments such as diverse sector plans and local area plans. Multi-level stakeholders and cross-sectoral professionals need to be involved to address mutual interests and formulate and revise master plans in a pragmatic way. While emphasizing land-use, urban form and transport integration, master plans should not be too prescriptive as urban development depends on diverse site conditions and changing market demands. There is also the need to link the plan with a financial plan to ensure the implementation.

Further, various sector or local area plans must be consistent vertically among national, metropolitan, and local governments and horizontally among departments of urban planning, land administration, transport, economic development, climate and housing. For example, new public transport investments cannot create enough ridership and associated land value if sub-plans encourage public spending on road widening, flyovers and automobile-dependent development (Suzuki, Murakami, et al. 2015).

New technology must be leveraged for collect and update data. Additionally, new mobility solutions leveraging this technology needs to be regulated and managed through guidelines as published by NACTO and having mobility providers subscribe to the shared mobility principles highlighted in Chapter 3.

Cities implementing BRT systems deserve special attention, as the majority of future urban growth is expected to take place in medium-size cities (cities with not more than 500,000 people) with limited fiscal capacities. BRT systems, which are less costly than other forms of mass transit, can meet these cities' travel demand. With more than 130 BRT systems having commenced operation in the past decade world-wide and 43 in Asia (Global BRT Data n.d.), promoting land-use and transport integration will be particularly important. However, a judicious approach to station area development or redevelopment must be undertaken to concentrate resources effectively. Here a comprehensive approach to include road safety through early assessment and design is crucial (Duduta, Adriazola, et al. 2015)

In the face of increasing skepticism from civil society towards the deleterious effects of increased density in Asian cities, it is important to demonstrate that positive land-use changes are possible in conjunction with transit investment. This will also serve to create models, which the larger development community can emulate as well as for convincing lenders that investing in station area projects can be financially remunerative (Suzuki, Cervero and Iuchi 2013). A concerted effort must also be made to orient growth along mainline city bus services based on their carrying capacity, such that land-use and transport integration forms the backbone guiding a city's growth, and is not restricted to mass rapid transit corridors only.

6.3. **Financial**

Reform-based central assistance towards green growth development can be encouraged by national governments. They can expand metropolitan and local governments' fiscal powers along with building municipal creditworthiness, building capacity on finance and revenue generation, alleviate

revenue losses associated with reforms and revising fiscal transfer rules. Simultaneously, they can initiate property tax reforms, development charges and revise tax or regulatory incentives favoring urban sprawl (Broekhoff, Piggot and Erickson 2018). For small and medium-sized cities, pooled finance can be considered to facilitate borrowing. National, metropolitan and local governments can manage their assets to enable more efficient utilization of land. Land value capture instruments such as betterment levies, premium floor area ratio can be considered carefully while assessing their impact on housing affordability and small businesses.

6.4. Institutions and governance

Within national frameworks, effective, accountable governments and institutions can facilitate public participation and develop and implement spatial plans and policies. Civil society organizations can foster environmental citizenship and harness community capabilities. Domestic financial institutions, such as commercial banks and asset management companies, can provide much of the necessary investment. Property developers, engineering firms, and construction companies can bring important technical and management capabilities for infrastructure and service delivery. Partnerships among these diverse organizations will be key (New Climate Economy 2018) to realizing compact, connected and coordinated cities.

National and sub-national legislation should devolve authority to metropolitan governments to undertake environmentally sustainable transport and urban planning and provide incentives for local governments within a metropolitan area to collaborate and establish new governance structures. They could play a more strategic role in metropolitan wide development and land use planning and coordination and on direct infrastructure provision on a case by case basis.

Metropolitan regions should create unified transportation authorities for overall planning, monitoring and evaluation of projects and enable coordination between different transport authorities/ agencies. For smaller cities, a more practical approach may be to strengthen mechanisms and incentives for inter-local government coordination for spatial and land-use planning and collaboration for service delivery (World Bank 2017).

Further, creating a town planning and urban design departments within a transit authority to ensure that joint development projects are of high quality and architecturally integrated is another key institutional reform, as demonstrated by the case of Hong Kong SAR of China, People’s Republic of China (Suzuki, Cervero and Iuchi 2013).

6.5. Capacity building

National governments can build local administrative and technical capacity for green growth development to provide low carbon planning tools for cities, training opportunities related to sustainable urban planning, facilitate peer learning opportunities (Broekhoff, Piggot and Erickson 2018). Gender and social inclusion should be a core theme underpinning the concept of green growth. International networks like the C40 cities partnerships and the EST Fora for Asian cities provide a platform for exchange between cities.

Recognizing the role of leadership in cities and metropolitan governments in driving a green growth agenda, programmes targeted at them could be considered. For example, the Leaders in Urban Transport Programme, funded by the World Bank, uses a "hands on" learning approach that makes extensive use of case studies, group exercises, and site visits to highlight the linkages among the

different components of the urban transport system (World Bank 2018). Other initiatives include the Bloomberg Harvard City Leadership Initiative, which is collaboration among Harvard Kennedy School, Harvard Business School, and Bloomberg Philanthropies. Its mission is to inspire and strengthen United States city leaders, as well as equip them with the tools to lead high-performing, innovative cities (Harvard University n.d.). Such a program can be initiated in reputed institutions in Asia to draw on the wealth of experience and knowledge of Asian countries.

7. The Way Forward: Opportunities for the EST Forum to deliver on the SDGs and NDCs

As the paper has shown, the need for transformative action in the transport sector will be crucial to deliver on the SDG and the Paris Agreement. This requires building on often isolated good practices towards mainstreaming of all options within the Avoid, Shift and Improve paradigm. The EST Forum in Asia is a successful platform, to agree on a common approach for the region through the Bangkok Declaration (UNCRD, Bangkok Declaration for 2020: Sustainable Transportation Goals for 2010-20 2010). The declaration in 2010 set the foundation to track progress, share good examples and identify key areas of action for member countries. Litman and Early (2017) have tracked the progress made by countries.

With the upcoming end of the declaration in 2020, there is an opportunity to lay the foundation to accelerate impact and further strengthen the support and the country commitments towards international agreements.

An overarching vision would be to become the **key platform for environmental sustainable transport to enhance action on delivering on the SDG and the Paris Agreement for Asian countries.** The following elements might be considered as core elements for the future forum:

- The EST Forum could be an important platform and opportunity for member countries to enhance their reporting of SDG and NDC implementation **by exchanging good practices on environmentally sustainable transport, urban planning and accountable, coordinated governance.**
- **Key Performance Indicators** established under the Bangkok Declaration also served as important tools for countries to report data related to SDG and NDC implementation.
- The follow-up declaration to the Bangkok Declaration should consider helping EST members to **set and report specific, quantified output and outcome targets for integrated sustainable transportation, urban development and improved governance.**

This paper had provided some background and recommendations for the implementation of such a future agenda highlighting the need to go beyond the focus on national transport policy and its decision makers. In particular, the following elements could be considered to increase the impact of the future development of the Forum:

- Horizontal and vertical policy coherence and coordination, along with improved metropolitan governance are key elements to enable a transition towards EST in member countries. At the international level, the link with the Asian Mayors Forum might be a good collaboration to build on.
- Mainstreaming of SDGs including key issues like affordable housing, informal settlements and gender need to be part of the future national governance including a link to finance and;
- An increased effort towards capacity building is crucial – a pact on capacity building and training between national governments, development banks and donor countries might be a way to tackle this challenge. This should also enabling further collaboration between the EST countries.

The member countries and stakeholders in the EST Fora in 2018 and 2019 have the potential to build a future action agenda to deliver on EST in the forthcoming decade, which can become a blueprint for other continents to follow.

Abbreviations

ADB	Asian Development Bank
APAC	Asia Pacific Region
ASI	Avoid-Shift-Improve
EST	Environmentally sustainable transport
GHG	Green house gas
HLPF	High Level Political Forum
IPT	Intermediate public transport
LUTI	Land-use and transport integration
LVC	Land value capture
MMDA	Manila Metropolitan Development Authority
MYC	Mobilize Your City
NCE	New Climate Economy
NDC	Nationally Determined Contribution
NUA	New Urban Agenda
NUTP	National Urban Transport Policy
SDG	Sustainable Development Goals
SLoCAT	Partnership for Sustainable and Low Carbon Transport
SUMP	Sustainable Urban Mobility Plan
TDM	Transportation demand management
TMG	Tokyo Metropolitan Government
TOD	Transit oriented development
TPS	Town Planning Schemes
UN	United Nations
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
VNR	Voluntary National Report
WHO	World Health Organization
ADB	Asian Development Bank
ASI	Avoid-Shift-Improve
EST	Environmentally sustainable transport
ICT	Information and Communication Technology
MMDA	Manila Metropolitan Development Authority
NCE	New Climate Economy
NDC	Nationally Determined Contribution
NUA	New Urban Agenda
SDG	Sustainable Development Goals
SLoCAT	Partnership for Sustainable and Low Carbon Transport
TDM	Transportation demand management

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