TRANSPORT AND MOBILITY SNAPSHOTS

2011/2012

UN/ACLA
UNITED NATIONS / ADVISORY COMMITTEE OF LOCAL AUTHORITIES

This illustrated report provides a rich collection of images of sustainable urban transport and mobility initiatives from cities around the world which are represented in the United Nations Advisory Committee of Local Authorities (UNACLA). The collection considers the current transport situation and challenges faced by each city - this includes high levels of energy consumption, carbon dioxide emissions, congestion, road casualties, urban sprawl, and social exclusion. The report also describes how these cities have implemented creative solutions aimed at improved urban planning, traffic demand management, public transit, non-motorized transport, streetscape design, road planning, low-emission vehicles, and logistics planning. The ultimate goal for each of these cities is to improve the quality of urban life for its citizens. The intentions of this report are to share, inform and hopefully inspire a wide variety of readers. UNACLA believes that the dissemination of good practices and the sharing of knowledge, especially by and among cities, are indeed very important tools in facilitating sustainable policies and solutions to the practical issues faced by cities.

The report is published by UNACLA, which is acollaboration between the United Nations Human Settlements Programme (UN-Habitat) and the United Cities and Local Governments (UCLG). Established in 2000, UNACLA is a high-level group of selected Mayors and representatives of local authority associations specially chosen on the basis of their local, national and international contributions and achievements in the context of the implementation of the Habitat Agenda. UNACLA seeks to offer a positive and innovative vision for the future of the world's cities, and to advise UN-Habitat in the implementation of the agency's mandate. Each year the Committee focuses on a specific thematic issue that is of importance to cities worldwide.

Following this report on Sustainable Urban Transport and Mobility (2011/2012), UNACLA will produce reports on the issues of:

Job Creation and Local Productivity (2012/2013)

Flood Protection and Environmental Resilience (2013/2014)

Municipal Fiscal Systems and Finances (2014/2015)

"For cities to operate in a functional and efficient manner, sustainable urban mobility demands symbiosis between transportation and urban planning. Sustainable mobility in cities is essential for improved quality of life, access to opportunity, reduction of environmental degradation and for creating inclusive environments accessible to all."

Quote from the Foreword by Kadir Topbas, Mayor, Metropolitan Istanbul; President, United Cities and Local Governments; and Chairman, United Nations Advisory Committee of Local Authorities.

DISCLAIMER

ACKNOWLEDGEMENTS

MESSAGE FROM UNACLA'S CHAIRMAN

Kadir Topbas
Mayor of Metropolitan Istanbul
Chairman of UNACLA, President of UCLG

Faced with the challenge of accommodating rapidly growing cities which are projected to be home to approximately five billion people by 2030, cities will act as the epicenter for developing thoughtful solutions to reduce future risk and prepare for accommodating the growing population. In an era of unprecedented urban growth, cities are presented with dynamic circumstances which need to be proactively addressed in order to make human settlements habitable. If sensitively managed, the economic and social gains of urbanization will naturally follow. Part of this challenge is the growing mobility demand and the accessibility of our cities for its citizens. Addressing mobility is essential to the responsible management of today's cities.

For cities to operate in a functional and efficient manner, sustainable urban mobility demands symbiosis between transportation and urban planning. Sustainable mobility in cities is essential for improved quality of life, access to opportunity, reduction of environmental degradation and for creating inclusive environments accessible to all. In the modern context, cities function as a laboratory for developing and testing solutions to everyday urban challenges. With a focus on mobility and urban transport achievements, this publication seeks to showcase recent advances in research, technology, community engagement and urban management, demonstrating how cities can improve their transportation situation while also increasing efficiency and promoting sustainable urbanization. By showcasing advancements in sustainable urban mobility from a multitude of cities globally, we can demonstrate how transport can provide healthy alternatives, move towards greener economies and assist in reducing technical, political, social and institutional constraints.

By providing transport as this year's core theme, some municipalities will witness immediate solutions. Others may need further assistance defining both their goals as well as a forward moving approach.

The global community of local authorities, represented by the United Cities and Local Governments (UCLG) stresses the importance of close communication and assuming a localized approach when confronting these challenges.

Through sharing ideas, local governments around the world can assist in demonstrating plausible solutions to mobility challenges that would otherwise be tackled alone.

Where support is lacking, organized local authority associations can seek to expedite action from central government and increase communication between municipalities worldwide. UCLG is a proud partner of UNACLA because we now are presented with a venue for formal cooperation and collaboration with the United Nations body on many practical issues.

There is a need to prioritize the comfort, safety, efficiency and value of public transport modes in cities and to understand sustainable approaches to tackling these urban dilemmas.

MESSAGE FROM THE UN–HABITAT EXECUTIVE DIRECTOR

Local authorities are the prime movers in managing the world's cities. In recognition of their important role, the United Nations Advisory Committee of Local Authorities (UNACLA) was established to ensure that the dialogue between local authorities and the United Nations, and between local authorities and central governments, is enhanced and revitalized.

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Joan Clos
Under-Secretary General, United Nations
Executive Director, UN-Habitat

UNACLA, established in 2000, is a high-level group of selected Mayors and representatives of local authority associations specially chosen on the basis of their local, national and international contributions and achievements in the context of the implementation of the Habitat Agenda.

UNACLA seeks to offer a positive and innovative vision to the future of the world's cities, and to advise UN-Habitat in the implementation of the agencies mandate.
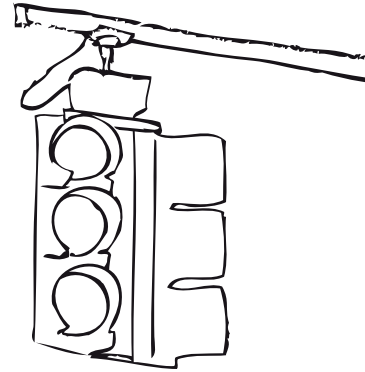
Each year the Committee focuses on a specific thematic issue that is of importance to cities worldwide. Based on a careful understanding of local authorities and the current global pressures at work, the following topics were defined for the coming years: 2011/2012- Sustainable Urban Mobility; 2012/2013- Job Creation and Local Productivity; 2013/2014- Flood Protection and Environmental Resilience; and 2014/2015- Municipal Fiscal Systems and Finances.

Functioning transportation networks are a key element for cities and towns across the globe and a precondition for economic activity and access to basic services. Nevertheless, urban travel is often accompanied by negative externalities, such as congestion, social exclusion, accidents, air pollution and energy consumption.

Against the background of the related challenges worldwide, this year's thematic emphasis for UNACLA was placed on urban mobility, highlighting an exchange of experiences for establishing effective public transport strategies as a key element for sustainable urban development. In the context of this theme, it was agreed that activities during the course of the program year 2011-2012 should focus on the following components important for sustainable urban mobility:

1. *Linking transport to urban planning to reduce the need for motorized travel*

2. *Establishing effective public transport systems*

3. *Expanding non-motorized transport infrastructure*

4. *Mobility management for integrated service solutions*

5. *Facilitating more efficient vehicle and fuel technologies*

CONTENTS

UNACLA THROWS THE SPOTLIGHT ON SUSTAINABLE URBAN MOBILITY

There is a distinction between two interacting concepts: transport and mobility. Transport is the steel and the pavement and the bus and the physical elements that comprise the traditional role of transportation. Mobility, however, is the ability to move about independently, without restrictions or barriers. Our mobility is a function of the transport options available to us. More often than not, our desire for mobility transcends the physical restraints of transport.

Transport indeed plays a major role in the life of anyone living in a city. Yet, for many, the experience of travel can be traumatic. Transport is a critical part of the future livability of cities and societies depend on efficient transport, but this needs to be developed without detrimental adverse impacts.

The dominant investment in transport has conventionally been in infrastructure. However, a revised approach is emerging that advocates managing the transport system in a way that supports sustainable urban living. We need to focus on all elements of mobility instead of solely on transport. Offering new tools and services that allow users to embrace their own mobility is the next greatest challenge for policy-makers, planners and service providers.

In the old paradigm of transport, the one which most of us still interact with today, we have a choice between two or three methods of transport. Shifting the paradigm from transport to mobility means offering a broad menu of options – "trans-modality" – which can mean a multitude of mobility solutions. Ideas and innovations along these lines are becoming more prevalent. For instance, there is a rise of carpooling, car sharing, bus rapid transit and bike sharing as easily implementable examples of a move towards "trans-modality." A better focus for policy and investment would be packaged strategies that include urban planning to support transport, traffic demand management, mass rapid transit, light rapid transit, bus rapid transit, informal non-motorized transit (like walking and bicycling), low-emission vehicles and alternative fuels, and freight planning.

This illustrated report provides a rich collection of images of sustainable urban transport initiatives from UNACLA member cities around the world.

This report takes into consideration the current transport situation and dynamic challenges of each city, including high levels of energy consumption, carbon dioxide emissions, congestion, road casualties,

urban sprawl, and social exclusion. It also describes how these cities have implemented certain solutions that aim at improved urban planning, traffic demand management, public transit, non-motorized transport, streetscape design, road planning, low-emission vehicles, and logistics planning. The ultimate goal for each of the cities is to provide much better quality of urban life.

The report is published by UNACLA, which is a collaboration between UN-HABITAT and the United Cities and Local Governments (UCLG).

Strategies and implementation programs have been tailored specifically to the needs of each city. There is a limit to the detail by which we have presented the cases in each of the cities. However, photographs, complemented by textual highlights, present each of the cases in a way that we hope would inform and inspire a variety of readers. Dissemination of good practice and the sharing of knowledge are indeed very important tools in facilitating sustainable urban mobility solutions. There are, of course, many difficulties surrounding the transferability of practices, and often many good practices from more efficient run cities, are not easily communicated and shared with other cities. The effort by UNACLA cities to compile recent experiences is one way by which our cities can communicate what has worked effectively (or ineffectively) for them, as a means for formulating pieces of advice that would translate to more effective policies for mobility and transport in the future.

MOBILITY AND URBAN FORM

Worldwide, cities are being designed and altered to reduce the use of private cars, shorten trips, and promote healthier, more sustainable forms of travel. Part of the motivation is environmental, such as reducing tailpipe emissions. Social concerns are also at play. Physical separation from jobs, schools, and health clinics can mean devoting as much as a third of ones income to public transport fares and enduring lengthy journeys. In developing countries, small interventions e.g. siting of basic services such as schools, health centres, and markets to reduce travel distances can make a big difference in the time and energy dedicated to transport. The following are strategic interventions that have had profound impacts in the areas of reducing environmental degradation, improving social integration and providing better connectivity to reduce physical separation.

PLANNING AND DESIGNING THE ACCESSIBLE CITY

The reason people travel is not to move but rather to access places. Rather than building more and more roads to connect people and places, activities themselves can be brought closer together. Thus the design and location of urban activities can be every bit as important as road construction in creating an accessible city. Step one in the planning process is to frame a cogent vision of the future city, one shared by city government and major stakeholders of civil society. A strategic plan then needs to be put into place to realize the shared vision, which must include, among other things, building the institutional, regulatory, and fiscal capacities to implement the plan.

A text-book example of long-range planning visions shaping rail investments which in turn shaped urban growth comes from Copenhagen, with its celebrated "Finger Plan". In the 1950s, Copenhagen planners identified corridors for channeling suburban growth. A hand became the metaphor for defining where growth would occur and, importantly, where it would not. To steer growth along the desired growth axes, rail transit was built, in advance of demand. As shown below, a finger-like pattern of urbanization followed rail corridors. Thus the Finger Plan shaped the transportation investment which in turn shaped the growth of the city. This is how the successful integration of transport and urban development is intended to work.

" *The reason people travel is not to move but rather to access places.* "

Copenhagen's Spatial Evolution: From Finger Plan (left), to Five-Corridor Railway Investment (middle), to Rail-Oriented Urbanization. Source: Cervero, 1998

**Transport-related energy consumption
Gigajoules per capita per year**

Urban density and transport-related energy consumption

Source: Newman and Kenworthy, 1989; Atlas Environment du Monde Diplomatique, 2007

Huston
Phoenix
Detroit
Denver
Los Angeles
San Francisco
Boston
Washington
Chicago
New York
Toronto
Perth
Brisbane
Melbourne
Sydney
Hamburg
Stockholm
Frankfurt
Zurich
Brussels
Paris
Munich
London
West Berlin
Copenhagen
Vienna
Amsterdam
Tokyo
Singapore
Moscow
Hong Kong

● North American cities
● Aurstralian cities
● European cities
● Asian cities

**Urban density
Innhabitants per hectare**

Urban density and transport related energy consumption. Sources: Newman and Kenworthy, 1989; Lefevre, 2009

Individual car is the only effective means of transportation

Dominantly polycentric

Atlanta

Teheran

A combination of public transport and individual cars are effective means of transportation

Jakarta (Jabolabek)

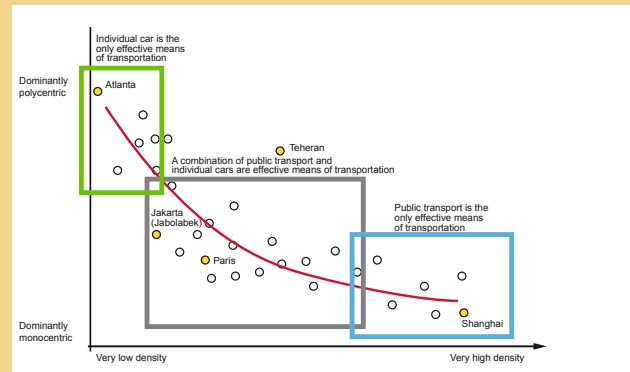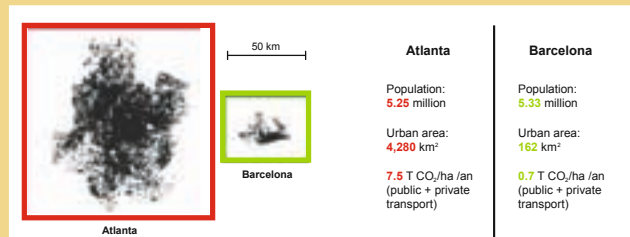Public transport is the only effective means of transportation

Paris

Dominantly monocentric

Very low density

Very high density

Shanghai

Relationship between Urban Form and Cost-Effective Public Transport Source: Bertaud and Malpezzi, 2003

50 km

Barcelona

Atlanta

	Atlanta	Barcelona
Population:	**5.25** million	**5.33** million
Urban area:	**4,280** km²	**162** km²
	7.5 T CO₂/ha /an (public + private transport)	**0.7** T CO₂/ha /an (public + private transport)

Comparison of Urban Forms and Transport-Sector Carbon Emissions in Atlanta and Barcelona. Sources: Bertaud and Richardson, 2004; Lefevre, 2009

> *"Very low density cities with predominantly polycentric, or multi-centered, forms are highly car-dependent.* **"**

DENSITY AS DESTINY

Urban densities are a critical component of creating an accessible city since they strongly influence travel. A comparison of 32 global cities showed that transport-related energy consumption declined precipitously with urban densities.

Density is especially critical to the most sustainable form of motorized travel, public transport – i.e., mass transit needs "mass". Very low density cities with predominantly polycentric, or multi-centered, forms are highly car-dependent. In sprawling U.S. cities like Atlanta, Georgia, public transit has a difficult time competing with the private car. Only when urban densities are high, as in Shanghai, China, can public transport be cost-effective.

Atlanta, it might be noted, has a population that is similar in size to Barcelona, Spain. However, Barcelona's longstanding commitment to planning and designing a compact, mixed-use, walkable city has produced a land coverage and carbon footprint that is but a fraction of Atlanta's. The short distances created by a compact city have meant that 20 percent of trips made by Barcelonans are by foot.

POLICY RESPONSES

The following smart-growth strategies will be critical in charting sustainable futures for cities of the 21st century.

TRADITIONAL NEIGHBORHOODS are the original neighborhood before the advent of the private car: compact and highly walkable, with the majority of everyday activities within a five minute walk of one's residence. Studies show such places can reduce the kilometers logged in vehicles each day by residents upwards of 40% in comparison to car oriented suburbs.

TRANSIT-ORIENTED DEVELOPMENT (TOD) is compact, mixeduse, pedestrian-friendly development focused on rail and busway stations. TOD prompts residents and workers to take transit for out of- neighborhood trips and walk or ride a bike for shorter withinneighborhood trips. TODs also aim to function as community hubsplaces to not only "pass through" but also "to be" – e.g., for public celebrations , outdoor concerts, and farmers markets. An ultraenvironmentally friendly version, Green TOD (a marriage of TOD and green urbanism), is taking form in European cities like Stockholm, Sweden and Freiburg, Germany. Studies show Green TODs can reduce carbon dioxide emissions by 30% compared with those of a typical car oriented development.

BALANCED CORRIDORS: Some global cities, like Stockholm and Singapore, have created networks of TODs –i.e., Transit Oriented Corridors (TOC). This "necklace of pearls" built form not only encourages transit riding but also can produce balanced, bi-directional flows (and thus more efficient use of infrastructure).
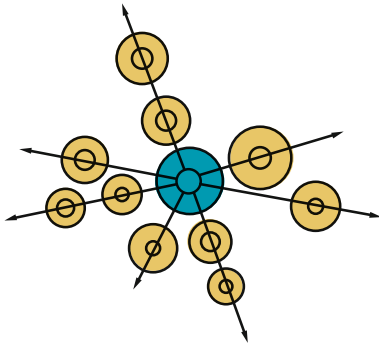
Necklace of Pearls: Strings of TOD along transit corridors.

Curitiba, Brazil, one of the world's most sustainable, well-planned cities, has a TOC built form. Along some corridors, streams of double articulated buses haul 16,000 passengers per hour, comparable to what much pricier metro-rail systems carry. To ensure growth is transitoriented, Curitiba's government mandates that all medium- and largescale urban development be sited along a BRT corridor. Orchestrating regional growth is the Institute for Research and Urban Planning (IPPUC) – an independent entity charged with ensuring integration of all elements of urban growth.

The mobility and environmental benefits from Curitiba's threeplus decades of integrated development along transit corridors are impressive. Curitiba has Brazil's highest public transport mode splits (45%); the lowest congestion-related economic losses; and lowest rate of urban air pollution (despite being an industrial city). On a per capita basis, Curitiba is one of Brazil's wealthiest cities yet it averages considerably more transit trips per capita than much-bigger Rio de Janeiro and São Paulo.

TRAFFIC-RESTRICTED URBAN DESIGNS: Some new communities, like Houten in the Netherlands, have been designed to de-emphasize car travel and promote walking and cycling. Green corridors lace Houten's interior, providing direct connections between neighborhoods and the rail-served urban core. Motorists, on the other hand, must take a ring road when driving from one residential district to another. More than half of trips by Houten residents are by walking or cycling, car use is 25 percent lower than in similar-size Dutch cities, and traffic accidents are one-third the national average.

The Pro-Bike/Car-Restricted Design of Houten, The Netherlands.
Source: Foletta, 2011

" Green corridors lace Houten's interior, providing direct connections between neighborhoods and the rail-served urban core. "

TOWARD SUSTAINABLE CITIES OF TOMORROW

Given that 90% of the world's urban population growth over the next two decades will be in developing countries, the opportunities for successfully linking urban development and transport in the Global South are unprecedented. Much of this growth will occur in medium size cities below one-half million population, thus a bus-based form of small-scale TOD interlaced by high-quality infrastructure for pedestrians and cyclists may be appropriate in many settings. In Jordan, Amman's recent Master Plan calls for extensive BRT investments flanked by high-density, mixed-use development. Similar transit-oriented master plans have been prepared for BRT networks in Islamabad, Ahmedabad, Mexico City, and Johannesburg.

Experiences show that a cogent regional vision and the institutional capacity to carry out visionary planning helps considerably in ensuring that transportation investments produce desired urban-form outcomes. In addition, visions need visionaries, which based on experiences in places like Curitiba and Seoul, means strong political leadership and an unwavering commitment to strategic, long-range planning.

FIVE PRINCIPLES FOR SUSTAINABLE URBAN MOBILITY

To achieve sustainable urban mobility requires an integrated approach that can be encompassed by five overall principles as presented below. These principles revolve around three entry points for achieving sustainable urban mobility, which includes: improved physical infrastructure through planning and designing, improved policies and regulations that encourage sustainable mobility behavior and/or improved mobility management and vehicle technology.

As shown in the following case examples, the five principles are incorporated in a variety of ways around the world. It is evident that there is not one single recipe to achieve sustainable urban mobility, but instead a multitude of combinations that are tailored to most effectively address the transport needs of the people, while accommodating the context of the city.

REGULATORY FRAMEWORKS AND MOBILITY MANAGEMENT FOR INTEGRATED SERVICE SOLUTIONS

Improved mobility management and mobility behavior

Strategies and legislations that result in a more efficient use of existing transportation resources as opposed to increasing transportation supply by expanding the vehicle fleets and infrastructure.

Mobility management includes incentives and regulations for users to change the frequency, mode, destination, route or timing of their travel. Mobility management and legislations reduce the need for physical travel by creating incentives for mobility substitutes and regulations for efficient land use and policy reforms to correct current distortions in transportation planning practices. Mobility management can provide increased efficiency, reliability and sustainability to the existing transport infrastructure through political or technological interventions, as well as enabling mobilization of resources through congestion charging, road pricing and parking fees.

LINKING TRANSPORTATION TO URBAN PLANNING AND URBAN DESIGNS TO REDUCE THE NEED FOR MOTORIZED TRAVEL

Improved physical infrastructure

Initiatives that encourage joint coordination of land use, street design and transport planning, especially spatial settlement patterns that facilitate access to such basic necessities as workplaces, schools, health care, places of worship, goods, services and leisure, hence integrated planning for reduced number, distance and time of travel.

By integrating the concept of sustainable transportation and urban planning, urban sprawl can be prevented. Implementation of densification policies and street designs that encourage cycling, walking and public transportation minimize travel time, Co2 emission as well as the urban space dedicated to transport. This increases opportunities for more sustainable mobility patterns and higher levels of urban transport services.
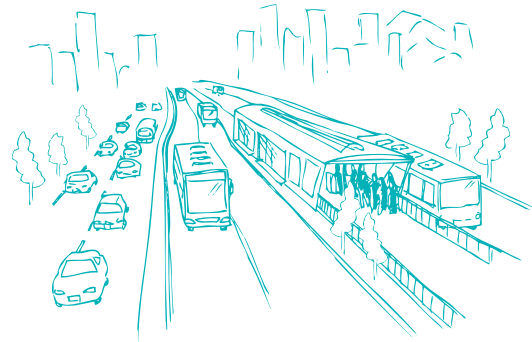
ESTABLISHING EFFECTIVE PUBLIC TRANSPORT SYSTEMS

Improved physical infrastructure and technical vehicle solutions

Initiatives to expand or create more effective, affordable, physically accessible and environmentally sound public transport and communication systems, giving priority to collective means of transport with adequate carrying capacity and frequency that support basic needs and the main traffic flows.

By establishing effective and reliable public transport systems, access to the urban infrastructure systems are more equally exposed to all urban dwellers with sustainable public transport solutions that provide feasible alternatives for private car ownerships and use.

EXPANDING NON-MOTORIZED TRANSPORT INFRASTRUCTURE

Improved physical infrastructure

Initiatives to expand or establish comprehensive and safe infrastructure services for pedestrians and cyclists in cities.

Expanding non-motorized transportation infrastructure provides urban transport solutions with direct impact on the urban economy, environment and public health. Expanding the designated infrastructure for non-motorized transportation in cities increases the safety for non-motorized commuters and provides an enhanced equitability as well as increased ranges of mobility for all income groups in the city. Walking and bicycling links all other means of urban transportation and starts and ends every journey that is made.

FACILITATING MORE EFFICIENT VEHICLE AND FUEL TECHNOLOGIES
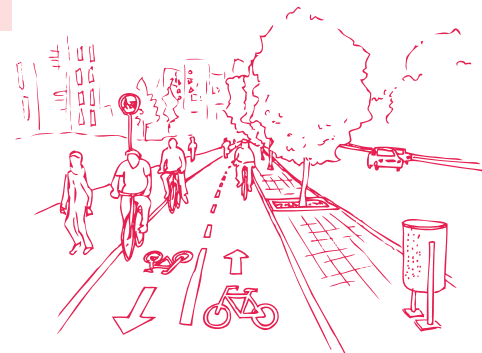
Improved vehicle and fuel technology

Initiatives and strategies aimed at facilitating more efficient vehicle and fuel technologies.

Technological development provides solutions to improve the efficiency of fossil fuel in current mobility systems. This is partly done through fuel efficiency of combustion engines and advanced particle filters to decrease the level of fuel usage and number of particles from conventional combustion engines. And partly through technological development of unconventional fuel solutions such as electricity and fuel cells, biodiesel and bio-alcohol that provide a more sustainable alternative to fossil fuel. This can be implemented through policies and innovative incentive systems as seen in United Nations Environmental Programme's Global Fuel Economy Initiative. Technical solutions do not require a change in existing mobility patterns, but are applied as sustainable alternatives to the existing urban vehicle fleet.

9

CITY SNAPSHOTS

OUAGADOUGU

MONROVIA

KINSHASA

KIGALI

KAMPALA

DAR ES SALAAM

HARARE

DURBAN

AFRICA

5 PRINCIPLES
FOR SUSTAINABLE URBAN MOBILITY

11

DAR ES SALAAM TANZANIA

POPULATION: 3,349,134 (2010)
AREA: 518 KM^2
DENSITY: 6,466 PER KM^2

Nearly half of daily trips in Dar es Salaam are made on the city's public transport system. While walking accounts for more than 40% of daily trips, the percentage of trips made by private motor vehicle is still comparatively low but rising, and the city is subject to rapid population growth, increasing traffic congestion, rising air pollution, and inadequate public transport service.

To enhance mobility within Dar es Salaam, the city is currently implementing the Bus Rapid Transit (BRT) system called Dar Rapid Transit (DART).

With vehicles being the major source of urban air pollution in Dar es Salam, DART organized a media campaign to promote cleaner fuels in particular low sulphur diesel for use in the Dar Rapid Transit System in 2009. The campaign resulted in the Government adopting new standard for diesel with sulphur levels at 500 parts per million (ppm) down from 5000ppm from January 2011. The low sulphur diesel is required for use in the cleaner buses (Euro III standard) that will operate along the BRT corridor. This will significantly reduce the level of particulate matter emission from the transport sector.

DURBAN SOUTH AFRICA

POPULATION: 2,879,233 (2010)
AREA: 829 KM^2
DENSITY: 3,473 PER KM^2

Urban public transport in Durban mainly relies on informally operating minibuses.

In anticipation of the FIFA World Cup 2010, the city launched the 'People Mover' bus service and introduced pedestrianisation initiatives and a park and ride system.

The 'People Mover' is a fleet of modern, wheelchair accessible, air-conditioned buses, providing service on a scheduled timetable. While the buses were initially mainly used by tourists during the World Cup, nowadays they serve an increasing number of daily commuters within the Central Business District (CBD). This can be attributed to the extended service coverage from one up to three lines. In addition, the city of Durban plans to develop a Bus Rapid Transit (BRT) system for a further renewal of the nearly non-existent formal public bus service.

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HARARE   ZIMBABWE

POPULATION: 1,631,594 (2010)
AREA: 596 KM^2
DENSITY: 2,738 PER KM^2

The main means of transportation in Zimbabwe's capital Harare are the numerous operating minibuses whose number significantly increased after the deregulation of the urban public transport sector in Zimbabwe in 1993. Even though the sharp increase in the number of privately operating public transport vehicles contributed to an expanded public bus network and an increased capacity reducing the average waiting times for passengers, the highly fragmented market of commuter buses encompasses a fleet of outdated buses offering increasingly unsafe services. The government recognizes the need to refurbish the current fleet and to gradually shift it to large-capacity buses.

The government of Zimbabwe recently passed a law exempting large capacity buses from the payment of import duties and announced a supply of new buses as part of an urgently needed recovery plan.

KAMPALA   UGANDA

POPULATION: 1,597,916 (2010)
AREA: 492 KM^2
DENSITY: 3,248 PER KM^2

Urban transport in Uganda is currently facing a significant motorization rate with 50% of all vehicles operating within the City of Kampala. However, the majority of urban residents rely on poor public transport while use of non-motorized means of transport becomes more and more dangerous. Related negative economic and environmental impacts are flanked by one of the lowest road safety standards worldwide.

In response to the challenges faced, the national government and its local counterpart have already started towards developing and implementing sustainable transport policies. The Global Environment Facility (GEF) funded the project; "Promoting Sustainable Transport Solutions for East African Cities" (Sustran) implemented by UN-Habitat with the support of the United Nations Environment Programme (UNEP) assisting the cities of Kampala, Nairobi and Addis Ababa in formulating and implementing sustainable transport strategies.

The project's strategic goals are to upgrade the public transport systems (introducing a Bus Rapid Transit (BRT) System), implement improved non-motorized transport infrastructure (such as bicycle lanes and walkways) and apply travel demand management (e.g. parking reforms) as well as other supporting policies.

KIGALI RWANDA

POPULATION: 939,425 (2010)
AREA: 114 KM^2
DENSITY: 8,241 PER KM^2

Kigali is one of the fastest growing cities in Africa, with a population to treble from one to three million people in the next two decades. This puts enormous constraints on the city's infrastructure, particularly for mobility. The current modal split for Kigali is about 75% for public transport, which consists of privately owned minibuses, shared taxis (moto-taxis), conventional buses, and motorcycle taxis. The majority of Kigali's inhabitants also depend on walking and cycling, therefore the city sees the urgency of providing appropriate pedestrian and cycling facilities.

The national government has recognized that investments in infrastructure for non-motorized transport lead to a reduction of air pollutants and greenhouse gases, an improved safety for vulnerable road users and an enhanced accessibility to basic services and employment.

Following this policy direction, the city's leadership commissioned the development of a Kigali City Public Transport Master Plan which aims at improvement of public transport facilities and operations, provision of safe pedestrian and bicycle-ways, and development of parking policies and guidelines that promote public transit, while maintaining the present modal split. The current phase (2012) focuses on infrastructure upgrading, rehabilitation and maintenance. The following phase (2012-2017) will focus on implementing the priority phases of the Master Plan, increasing road and transport facility coverage, operationalization of public-private partnerships on public transport, and phasing out of the 18-seater taxis to bigger, modern buses.

© Julius Mwelu, UN-Habitat

MONROVIA LIBERIA

POPULATION: 827,465 (2010)
AREA: 233 KM^2
DENSITY: 3,551 PER KM^2

As a result of the Liberian civil war, the country's transport infrastructure and the fleet of private and public transport vehicles were severely damaged or destroyed. About 400,000 people commute daily to Monrovia's city center and its surroundings, overwhelming the city's public transport service comprised of informally operating minibuses, shared taxis, and a fleet of large buses run by the National Transit Authority (NTA).

NTA is a publicly owned company providing the only formal public transport service throughout the country and is an example of how a Transit Authority can reestablish a country's urban mobility strategy.

The then transit authority was out of service for over 20 years due to the civil war. However, in 2007, a team has been put in place to reestablish the only transit system in the country. Most of those who utilize NTA's services are the urban poor. Technically, the viability of NTA is a crucial issue as the national government strives in its quest to reduce poverty. The team put into motion a three-year plan to put some form of organized but affordable urban transit system into operations. Due to limited financial empowerment, the NTA initially used buses donated by the Spanish government. To date, NTA transports approximately 300,000 persons monthly throughout Monrovia and its suburbs.

NTA recommended the "4E Process" when lobbying for public or nonmotorized transport designs: (1) Educate Government and Political Leaders, (2) Educate Policy and Decision Makers, (3) Educate and train your consumers/population, (4) Educate stakeholders like businesses people and consultants (foreign and local). Currently the agency is working on stabilizing the bus system and increasing the number of buses on the routes.

© NTA

KINSHASA
DEMOCRATIC REPUBLIC OF THE CONGO (DRC)

POPULATION: 8,753,869 (2010)
AREA: 583 KM^2
DENSITY: 15,015 PER KM^2

One of the capital city's key infrastructure challenges is to ensure the mobility of about 10 million people. While the majority of Kinshasa's residents depend on walking as the primary mode of transport, the city's public transport system is mainly dominated by the informal sector with minibuses as the major transport mode. Formal public transport services are provided by the Société des Transports Urbain du Congo (STUC) with the Congolese State as the major shareholder.

The creation of STUC in 2006 is one major step taken to improve public transport service in Kinshasa. Numerous buses were donated from the Government of India and conductors professionally trained.

Due to poor road conditions throughout the city, only a limited number of vehicles are currently operational, making the rehabilitation of main roads across the capital a high priority for the provision of an efficient bus service. The city is in urgent need of a mass transit system. The urban rail service carries less than 8,000 passengers daily and is therefore of minor importance, mainly due the poor condition of its fleet. One step forward towards improved urban mobility is the envisaged rehabilitation of the urban railway system funded by the Belgium government.

OUAGADOUGOU
BURKINA FASO

POPULATION: 1,907,951 (2010)
AREA: 350 KM^2
DENSITY: 5,451 PER KM^2

Ouagadougou's population is expected to double within the next decade, challenging the city to meet the transport needs for an increasing number of residents. As Ouagadougou is currently sprawling at the city's fringe while major commercial, employment, and educational facilities are still located in the traditional city center, transport demand and the need for long motorized trips increases.

Nearly 60% of Ouagadougou's working population goes by privately owned motorcycles, which are the main contributors to the city's worsening air pollution. The high share of motorcycles is partially attributed to the limited bus networks available, due to a limited road network, haphazard urbanization and low population density which hamper the operation of a cost-effective bus service. The current public transport service is divided into informally operating shared taxis and a number of large-capacity buses provided by Société de Transport en Commun de Ouagadougou (SOTRACO). The national government and its local counterparts are committed to address the city's urban transport challenges.

The launch of SOTRACO in 2003 was an important step to improve public transport service in Ouagadougou. Burkina Faso phased out the use of leaded gasoline to address urban air pollution and reduce GHG emissions.

Another step forward is the World Bank project to be funded under the Global Environmental Facility Trust Fund (GEFTF) that encompasses various components on the institutional and technical level to induce a transport modal shift in the city.

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UNITED STATES AND CANADA

VANCOUVER

QUEBEC

CHICAGO

PHILADELPHIA

5 PRINCIPLES
FOR SUSTAINABLE URBAN MOBILITY

CHICAGO   USA

Traffic congestion in Chicago has increasingly become a problem for commuters working and living in the city. Roads have become overwhelmed, as public transport is fragmented resulting in inefficient linkages between multiple modes of transport. This poor design has led to an over reliance on automobiles, creating stop and go traffic that results in increased fuel emissions. Texas Transportation Institute's Urban Mobility Study ranks Chicago as the Traffic Congestion Capital of the nation for 2009.

The Chicago Transport Authority has made significant strides since 2009 and now maintains a fleet of 1,800 buses which transport a large portion of the population. Chicago has now converted their bus fleet to ultra-low sulfur diesel and began operating diesel-electric hybrid buses which achieve approximately 20 percent greater fuel efficiency than standard diesel buses.

CTA has 1,781 buses that operate over 129 routes and 1,959 route miles. Buses make about 19,709 trips a day and serve 11,493 posted bus stops. Being the second largest public transportation system in USA, CTA also operates the city's rapid transit system and rail service. A core mission is to be the environmentally-conscious provider of public transit as a means to enhance quality of life of customers, neighbors and employees through reduced regional emissions, improved energy efficiency, increased recycling and other best practices in resource conservation.

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PHILADELPHIA   USA

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High pollution levels are a result of major traffic congestion and longer commute times caused by residents relocating to the outlying suburbs.

The city makes a strong effort to use B20 biodiesel (20% biodiesel, 80% petroleum diesel blend) in all diesel equipment. The biodiesel is from a local processor in the City of Pittsburgh and is made from the byproducts of animal rendering operations. Biodiesel burns cleaner than traditional diesel, reducing basic emissions by up to 40% and reduces dependence on foreign oil. As the biodiesel market grows, it will help to protect this region from highly volatile and rising petroleum prices. The city is serviced by the Southeastern Pennsylvania Transportation Authority (SEPTA), which is one of only two U.S. transit authorities that operate all of the five major types of transit vehicles: regional (commuter) rail trains, "heavy" rapid transit (subway/elevated) trains, light rail vehicles (trolleys), electric trolleybuses, and motor buses.

QUEBEC CITY
CANADA

POPULATION: 491,142
AREA: 454.26 KM^2
DENSITY: 1,081.2 PER KM^2

Old Quebec, a UNESCO World Heritage Site since 1985, is a major Canadian tourist destination, welcoming more than four million tourists a year. Old Quebec generates around 50,000 trips on a daily basis, of which over 80% are made by motorized vehicles. Average daily vehicular traffic includes 24,000 automobiles, 250 public transit buses, and 1,000 trucks.

The Écolobus project is the first electrical minibus system implemented in a North American city. The system, which operates in the historic Old Quebec district, consists of eight emission-free and silent electric minibuses. The buses provide free rides within Old Quebec and offer a direct link between Upper Town and Lower Town, as well as links between parking lots and major intermodal transportation hubs on the district's periphery.

In terms of sustainability, the Écolobus is seen as a means of mitigating greenhouse gas emissions in Old Quebec. Being electrically powered, the Écolobuses do not produce any tailpipe emissions. The electricity used to charge their batteries is drawn from the local electrical grid, which is almost entirely fed by hydroelectric power stations. As such, the power source for the Écolobuses can be said to be both clean and renewable. In quantitative terms, the project aims to reduce the amount of fuel consumed by conventional tour buses and transit buses by 67,500 litres per year. This will be achieved by reducing the total distance travelled by conventional buses by 112,500 km per year. This is expected to yield a 186 tonne annual reduction of CO_2 emissions.

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VANCOUVER
CANADA

POPULATION: 578,041
AREA: 114.67 KM^2
DENSITY: 5,335 PER KM^2

As host to the 2010 Winter Olympics, Vancouver had to make many adjustments to accommodate 135,000 spectators, 6,100 athletes and officials, 10,000 accredited media and 55,000 workers on a daily basis.

Many of the transport solutions for the Olympics became permanent additions to the landscape. Translink, the regional transportation authority, used a $17 million contribution from the Vancouver Olympic Committee to permanently add 48 SkyTrain cars, 200 buses and a new SeaBus to Vancouver's transport infrastructure. The Games also jumpstarted some valuable infrastructure projects, such as the Canada Line, the city's newest rapid rail line linking Downtown to the Vancouver International Airport.

In addition, when the Olympics and Paralympics finished, the athlete's village became a mixed-use community called Millennium Water, where residents are able to walk to goods and services and take transit to work. Proposed transportation options included rapid transit, a "skytrain," the streetcar, multiple bus lines and greenways with cycling facilities. The neighborhood comprises the newest section of the Seaside Greenway/Bikeway, part of Vancouver's 22-kilometer Seawall. Temporarily implemented Olympic Lanes provided priority service to Translink buses. Specific road lanes were designated for public transport and emergency vehicles during the event with fines being allocated to those who violated these rules by operating personal vehicles in these lanes.

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ISTANBUL

BEIJING

SEOUL

GWANGJU

BUSAN   HAMAMATSU

FUKUOKA

KATHMANDU

AHMEDABAD

GUANGZHOU

JAKARTA

WAKATOBI REGENCY

MELBOURNE

ASIA AND PACIFIC

5 PRINCIPLES
FOR SUSTAINABLE URBAN MOBILITY

19

AHMEDABAD

INDIA

POPULATION: 5,720,000 (2010
AREA: 298 KM^2
DENSITY: 19,195 PER KM^2

During the past decades, Ahmedabad has been a fast urbanizing city struggling with a rapid increase in motorized vehicles, a deteriorating public transport service, worsening traffic congestion, and rising air pollution. The state and city governments of Ahmedabad have undertaken major steps to move the city towards a more environmentally friendly and socially equitable urban transport system. Ahmedabad won the Sustainable Transport Award 2010 for its remarkable advances in sustainable transport policies.

The city's key achievement has been the launch of a high-level, full-fledged Bus Rapid Transit (BRT) system in 2009. The BRT system Janmarg ('The People's Way' in Hindi) sets an outstanding example for BRT in Asia.

Pre-board ticketing at bus stations to allow rapid boarding and alighting, median-located bus stations with level boarding and real time information have been incorporated as high-end BRT features. Vehicles meet international standards for BRT and are especially designed with doors on either side to allow rapid boarding on and off the corridor. Ahmedabad is the first city in India that has set up a BRT management agency. Janmarg enjoys high acceptance by the city's residents and daily ridership continues to significantly exceed

the number of passengers who were using the bus service formerly operating on this corridor. Janmarg is projected to cut CO2 emissions by 288,000 metric tons per year, partly because the improved bus service will prevent passengers from switching their mode of transport from bus to private motorized vehicles in the future. The city's current BRT network consists of 31 kilometers and will be extended by an additional 90 kilometers. Furthermore, to improve the environment for non-motorized transportation, the city constructed cycling lanes and pedestrian facilities linked to the public transport system.

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BEIJING

CHINA

POPULATION: 20,180,000 (2011)
AREA: 16,800 KM^2
DENSITY: 1,230 PER KM^2

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Beijing has undergone rapid growth within the last decades and is facing enormous challenges in accommodating the additional 1,000 vehicles being registered daily. In preparation for the Olympic Games in 2008 and to relieve congestion, the city made tremendous investments in improving the public transport system. In addition, more stringent vehicle emission and fuel quality standards were adopted and a prohibition on highly polluting vehicles was imposed as one of the temporary measures during the Olympic Games. The city's public transportation system consists of subways, suburban railways, conventional buses, trolleybuses and a Bus Rapid Transit (BRT) service. The subway system is currently comprised of 14 lines and 336 km of tracks and is planned to be expanded up to 19 subway lines and 561 km by 2015, making Beijing's subway system one of the largest in the world.

The increasing share of public transport in Beijing within the last couple years can be attributed to the city's achievements in sustainable urban transport with the Olympic Games as a key driver.

BUSAN
SOUTH KOREA

POPULATION: 3,425,291 (2010)
AREA: 259 KM^2
DENSITY: 13,225 PER KM^2

In line with the its ambition to become a global city of the 21st century, Busan, the second largest city in South Korea, is applying advanced electronics communication technology to its transportation system. The bus and subway are primary modes of public transport. The city launched a Bus Information System that provides citizens with real time bus arrival information through devices installed at bus stops, via websites and smartphones.

A voluntary 'No-Driving Day' once a week to meet the national government's new 'Low Carbon, Green Growth' policy is being observed. Citizens who have registered their vehicle to take part in the scheme select one day per week that they are using alternative modes of transport, and are then entitled to incentives, such as discounted petrol, reduced parking fees, lower car taxes and congestion charges. Compliance is monitored through a Radio-Frequency Identification (RFID) system and an e-tag attached to the car's windscreen.

In 2010, the city launched a bicycle rental system to encourage the usage of cycling. Through its various mobility initiatives, the city of Busan aims to improve air quality, reduce congestion and save energy.

© City of Busan

FUKUOKA
JAPAN

POPULATION: 1,463,743 (2010)
AREA: 341.32 KM^2
DENSITY: 4,288.5 PE.R KM^2

Fukuoka city's advanced and comprehensive public transport network is based on three subway lines supplemented by an extensive bus network. Similar to other Japanese cities, walking and bicycling is a common mode of transport. The city administration of Fukuoka has initiated a series of measures to improve the city's urban transport infrastructure and services. For its public transportation services, Fukuoka has actively developed the city's subway network. The city also takes actions like car-free days to encourage its residents to use public transportation as a response to the increasing number of private car ownership.

In addition, an experimental policy of Park-and-Ride (or Fringe Parking) is applied in downtown areas prone to heavy traffic. This policy ensures that enough parking spaces will be available on the outskirts of the city center, and that people can travel downtown using public transport.

© Fukuoka City

GUANGZHOU
CHINA

POPULATION: 11,710,000 (2010)
AREA: 2,266 KM^2
DENSITY: 5,168 PER KM^2

As with cities experiencing rapid urbanization and motorization, Guangzhou is facing immense mobility challenges. Traffic congestion caused by a rapidly rising number of cars is worsening and the city's walkability is increasingly endangered. In response, the last years marked a turning point in the city's transport strategy with the launch of a high quality Bus Rapid Transit (BRT) system in 2010. Integrating the BRT with metro stations, bike lanes, and bike sharing encourages the use of public transport and non-motorized transport facilities. High quality interchange facilities and an assimilated fare system ensure a seamless connection between bus and metro, exemplifying the city's way towards a more integrated urban transport system. The city also envisages a massive expansion of the current subway system.

An outstanding initiative improving the city's walkability is the transformation of a polluted canal, running underneath a highway, into a bike and walking path as part of the Donghaochong Greenway Project.

In preparation for the 2010 Asian Games and to promote clean energy, Guangzhou furthermore converted most of the city's buses and taxis to run on Liquefied Petroleum Gas (LPG). For these efforts, the city won the Sustainable Transport Award 2011.

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GWANGJU
SOUTH KOREA

POPULATION: 1,475,745 (2010)
AREA: 501.24 KM^2
DENSITY: 2,900 PER KM^2

© Gwangju Guide

The city of Gwangju's public transport system is comprised of a comprehensive bus system, one subway line and a second line that was under construction in 2012.

To increase the attractiveness of walking and cycling, a former railway section that was closed down due to a change in service route has been converted into a non-motorized transport corridor with provisions for recreational and cultural activities.

The walkway and bicycle path is flanked by trees and embedded into a green corridor as part of the 'Green Road' project. A park was also created to provide a stage for local artists to perform, while cultural sites are being installed alongside the road. The implementation of the Green Road project entailed a multi-stakeholder collaboration between the government, civic groups and the private sector with each group contributing to the project's successful revitalization. The joint project increases the city's livability through the creation of new green space and the furthering of a pedestrian and cycling network in Gwangju.

HAMAMATSU JAPAN

In Hamamatsu, a city located right in the center of Japan, the use of motor vehicles has increased with the expansion of the city area, with the motor vehicle usage rate increasing from 37% in 1975 to 66.8% in 2007 (an average increase of 10% every decade). Because of the resulting traffic congestion, increased risks of traffic accidents and decline in use of public transport, the control of motor use and expansion of public transport have become important issues. Users of rail transport have remained steady, but the significant decline in the number of bus users has been alarming. The 771,000 bus users of 1975 had dropped to below half of that figure by 2005.

The city has sought to link the issue of improving the public transport system with addressing its decreasing population and ageing society.

Recently, bus usage promotion projects and pioneering advances in the convenience of bus services such as the introduction of low floor buses, the installation of bus lanes and bus location systems and the introduction of IC Smart Cards, have been implemented. In 2010, a comprehensive transport plan was drawn up, following a participatory and consultative process, where local residents, transport business operators and the local government were engaged in determining the operational priorities as well as direction for expansion of the city's public transport system. Pedestrian and cyclist networks, especially within the city center, were also significantly expanded. Since 2010, global businesses like Suzuki and Yamaha that originate from Hamamatsu have teamed up with local universities in experimenting with next-generation environmental automobiles.

Local business, academia and government have joined forces in experimenting with and testing the practicality of next-generation environmental automobiles, collaborative research and installation of electric transport infrastructure.

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JAKARTA
INDONESIA

POPULATION: 21,700,000 (2010)
AREA: 2,784 KM^2
DENSITY: 7,795 PER KM^2

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For several decades, the roads of this sprawling city have become increasingly overwhelmed with a rising number of cars and motorcycles, while the bus mode share currently at about 50% of total trips is on rapid decline. To encourage public transport use and to curb negative impacts of excessive cars use, the Bus Rapid Transit (BRT) system TransJakarta was put into operation in 2004 and has been expanded up to ten corridors, with five more corridors to be built by 2015.

TransJakarta is the first BRT system set in place in South and Southeast Asia and the current system length of 172 km makes it the longest of its kind in the world.

The city is currently upgrading all footpaths in close proximity to BRT stations and initially launched three bus routes as a feeder service in 2011. The city herewith responds to the urgent need of a good pedestrian accessibility to BRT stations and a feeder system to increase the system's ridership by expanding the catchment area. The construction of the Jakarta Mass Transit System began in 2012 as part of an envisaged extension of the city's mass rapid transit system.

KATHMANDU
NEPAL

POPULATION: 1,037,073 (2010)
AREA: 60 KM^2
DENSITY: 17,285 PER KM^2

Nepal's capital city and its surrounding valley have been facing the challenges of rapid urbanization, rising motorization, limited access for pedestrians, inefficiencies in its public transport service, resulting in congestion and degradation of the city's urban environment. Air pollution is particularly a serious problem and is exacerbated by the city's location in a bowl-shaped valley with little airflow.

The Government of Nepal and the local authority of Kathmandu have shown high commitment to implement sustainable transport policies that respond to the problems in the medium- to long-term. Investments are being directed towards the sustainable development of an urban transport system for the capital city. The ongoing project is expanding pedestrian infrastructure in the city's historic core, upgrading the current public transport network, improving traffic management and enhancing monitoring of air quality.

The city is developing pedestrian-only zones along the heritage routes in the core of the historic city. The reorganization of the current public transport network involves construction of two pilot bus corridors.

Vehicle restriction, parking management, junction improvements, traffic control and enforcement are part of the project's traffic management's component. To reduce emissions of air pollutants and greenhouse gases, the usage of electric or low-emission vehicles will be further promoted.

© Image Nepal

ISTANBUL

TURKEY

POPULATION: 13,000,000 (2010)
AREA: 5,343 KM^2
DENSITY: 2,433 PER KM^2

Traffic congestion is the number one concern for Istanbul residents. According to a recent survey, only 7% of the city's residents believe building more roads would relieve congestion, but over 50% are convinced that public transport is the key to reducing congestion.

Even though Turkey's fuel prices are one of the highest in the world, an additional 84,000 cars are added yearly on to the city's streets and the rise in motor vehicles exceeds population growth. To improve the severe traffic situation, Istanbul has already made major achievements in upgrading the city's public transport service. The City Government prioritized ensuring that the Transportation Master Plan is in line with the city Environment Plan. A rapidly implemented Bus Rapid Transit (BRT) system was put into operation in 2007 and carries 530,000 passengers daily, reducing the number of individual trips by 70,000. The city further introduced a common ticketing and integrated fare system that facilitates easy transfer between the city's different modes of transportation such as the bus, subway, tramway, ferryboat, and commuter train.

A new ITS system for fleet tracking/guidance and passenger information is providing drivers with information about the traffic situation, congestions and passengers with estimated bus arrival times at bus stops, via mobile phones and the website.

Another ongoing project is the expansion of the city's subway underneath the sealinking the European and Asian side. These investments and follow-up initiatives are urgently needed since rapid urbanization and motorization are overwhelming Istanbul's transportation system.

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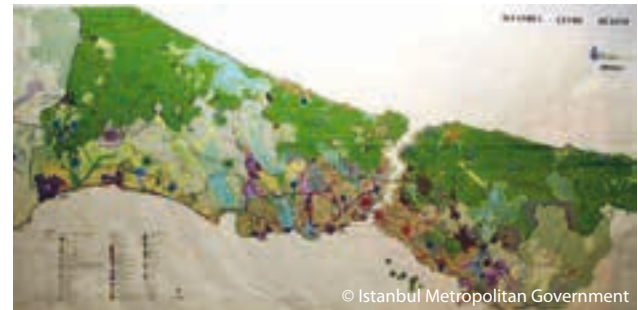
SEOUL
SOUTH KOREA

POPULATION: 22,500,000 (2010)
AREA: 2,163 KM^2
DENSITY: 10,402 PER KM^2

Seoul is renowned for having one of the largest and most advanced global transportation networks in the world. The city is served by an extensive bus and subway network and its public transport share of 65% is one of the highest in the world. One crucial turning point in Seoul's transportation policies was the Cheonggyecheon Restoration Project. Express highways covering a stream have been removed and replaced with a riverfront park, walkways, and public squares, reclaiming the stream as public space. The city of Seoul has made continuous efforts to tackle the city's transport problems by installing Bus Rapid Transit (BRT) corridors and adopting various intelligent transportation solutions such as the introduced smart card integrating the current fare system between bus and subway for enhanced intermodality. A comprehensive traffic management center has been launched to operate and manage the overall traffic situation of Seoul by collecting real time traffic information.

The city is further investing in multiple electric car projects and launched an electric commercial bus service in 2009 in order to mitigate its share of greenhouse gas emissions.

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WAKATOBI REGENCY
INDONESIA

POPULATION: 112,000 (2011)
AREA: 559.54 KM^2
DENSITY: 166.2 PER KM^2

The municipality of Wakatobi, formed recently in 2003, is situated in South Eastern Sulawesi. It is an archipelago made up of 142 islands, its name an acronym of the four most prominent islands: Wangi-wangi, Kaledupa, Tomea and Binongko. Water covers 97% of the municipalitywaterand it is known for its expanse of blue sea, white sands, crystal clear water, pristine coral reefs, and stunning underwater scenery. This makes fishing and eco-tourism the main sources of income for the Regency. In 2012, UNESCO confirmed the Wakatobi Marine National Park as a World Biosphere Reserve.

Wakatobi is home to the Bajo tribe, the sea wandering nomads who rely entirely on marine resources for survival. Today, the existence of the Bajo people is threatened as the coral triangle is being damaged by destructive fishing and climate change. In 2011, the Indonesian Ministry of Transportation funded the construction and improvement of three ports as a means of boosting tourism in the area. The current Regent Mayor of Wakatobi has also launched a program that he calls a "bottom-up, low-carbon initiative". This is comprised of municipal policies and projects on bioenergy and implementation of low carbon technology covering transportation and waste management. Wakatobi is also seeking cooperation with other cities on climate change adaptation.

MELBOURNE
AUSTRALIA

The City of Melbourne is the municipality at the centre of greater metropolitan Melbourne and contains the Central Business District and many of the cultural, academic and sporting institutions of Melbourne. In 2009 there were around 2.1 million trips per day to, from and within the City of Melbourne. This number is predicted to increase to around 3.3 million by 2030 as more people come to live, work and play in the city. Currently, travel to the city occurs largely by Public Transport (46%) and private car (47%). Cycling is the fastest growing mode comprising 11% of all vehicles on roads and paths in the morning peak. The mode share of cars in the inner city has been declining since 2004.

Melbourne has an international reputation for the quality of its walking environment. Within the central city, walking is the predominant mode comprising 88% of all trips. Recent growth in public transport use has highlighted the need to significantly expand public transport services. Managing the complex and changing interactions between different modes (trams, buses, pedestrians, bicycles, cars, freight vehicles) in a small, busy central city area requires high levels of cooperation as well as sophisticated analysis to ensure that the city is operating as efficiently as possible and is supporting the range of diverse land uses and activities that occur there. The strength and vibrancy of the city is enhanced by the strong and symbiotic relationship between different land uses and their proximity to each other. The role of pedestrians in the city is extremely important and growing. Walking links jobs and other activities to the public transport system as well as being a key transport mode for shopping and business trips in areas where financial service businesses are clustered.

Melbourne is demonstrating that investments in public transport infrastructure can and will stimulate more pedestrian activity. In June 2012 the City of Melbourne committed USD 5m to construct new bicycle lanes in the central city. A new 4-year bicycle plan for the City of Melbourne is nearly complete and a pedestrian strategy is being developed this year. Melbourne Metro, a major new railsystem through the centre of the city, is a priority project for the Victorian Government.

The city's program of invigorating city laneways has generated a fine grain network of interesting walking routes which has stimulated retail and dining business in the central city. Melbourne's traditional spine, Swanston Street, is one of the busiest tram (light rail) corridors in the world. Melbourne is about to complete the USD 25 million conversion of this road into a car-free tram and bicycle mall linking a series of high quality pedestrian spaces.

Integrating transport and land use is becoming ever more important as the city grows and the use of public transport increases. This requires the cooperation of all transport and planning bodies at local, state and federal government levels. Recent legislation has enshrined principles such as integrated decision making, triple bottom line assessment, equity, the perspective of the transport system user, stakeholder engagement and community participation and transparency.

5 PRINCIPLES
FOR SUSTAINABLE URBAN MOBILITY

ARAB STATES

RABAT

AMMAN

BASRAH

KUWAIT

AMMAN JORDAN

To the city of Amman, public transportation can be singled out as its biggest challenge over the past decades. Oil revenues from the Gulf in the mid 1970s rapidly increased the wealth of the country; as a result, the city expanded in area, and addressing the transport demands in Amman became a matter of building bridges and underpasses to accommodate the rapidly growing number of motor vehicles.

From the previous decades being managed as a car city, the city of Amman is currently implementing a relatively radical public transport reform. This involves developing a rapid transit backbone, constructing rail lines serving central Amman, and establishing a network of BRT corridors.

Additional elements of the transport reform include restructuring and significantly improving bus, minibuses and taxi services, integrating the current light rail transit with other transport networks, expanding interchange and terminal facilities, integrating all transport services, and establishing the regulatory and institutional capacity following world-class standards. Improving pedestrian facilities and services is also an important part of the strategy.

© Al-Shorfa

BASRAH IRAQ

Situated in the south eastern corner of Iraq, Basrah is the socioeconomic hub of southern Iraq and Basrah Governorate is Iraq's third largest city. The governorate's geography is diverse, ranging from the marshland areas in the north to plains and desert further south. Basrah contains a significant proportion of Iraq's oil reserves, and the Umm Qasr port is the country's only shipping hub. Basrah is also home to all six of Iraq's ports, including its only deep-water port, and is thus the major transportation nexus in the southern part of the country. The provincial government's economic development priorities therefore focus on oil and transport.

Given its post-war conditions, ongoing priority efforts on transport and mobility mainly involve the reconstruction and upgrading of major roads, bridges, and railways. Activities include new highway systems to connect Basrah to surrounding provinces; completing the branch, secondary, and rural roads networks; building second lanes for single-lane roads; building parking lots on the main outer roads; lighting hazardous intersections; supplementing the outer roads with modern traffic and bridging informational signs; substituting floating bridges with fixed bridges; restoring Basrah Railroad, its stations, cadres, and building a new railroad; and linking the local railway network with neighboring countries in order to expand its port services. In June 2011, it was announced that planning had begun for a new high-speed rail line between Baghdad and Basrah.

© Gulf business

KUWAIT CITY
KUWAIT

POPULATION: 2,305,404 (2010)
AREA: 544 KM^2
DENSITY: 4,238 PER KM^2

© Kuwait Government

A major issue for Kuwait City is to transition from cars to public transportation. The existing transport infrastructure is built for the motor vehicle, with journey times severely affected by peak hour traffic.

Other transport modes available are by bus and local taxis. In general, the government recognizes that the inherent inefficiency of car-based living in high-density urban areas is a major constraint to future success. Huge transportation projects are underway in Kuwait, mainly in order to improve the country's connectivity with its neighbors and reduce its congestion and traffic problems. The Kuwait metro project, one of the key pillars of the government's strategy to achieve the shift to public transportation, is a USD25bn railway initiative which begins at Kuwait and runs to Muscat via Saudi Arabia, Bahrain and Qatar.

An important part of this initiative, the Kuwait Metro Rail project, is a 171km long inner city railway system, the first metro rail project and the second public-private partnership project launched by the Government of Kuwait since 2009.

Estimated to cost USD 7bn, the government owns 10% of the project, raised about 50% of the funds through an initial public offer, and gave the right for private developers to hold the remaining 40%.

RABAT
MOROCCO

POPULATION: 1,802,331 (2010)
AREA: 142 KM^2
DENSITY: 12,692 PER KM^2

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The Rabat-Salé urban area in Morocco is implementing an ambitious urban transformation programme, and will soon have one of the very first multimodal, interoperable public transport networks in Africa. As part of this program, 600 urban buses and a brand new tramway became operational in 2011. Rabat is the first urban area in Morocco to operate a state-of-the-art tramway network. The trams now run on a network of two lines that connect 31 stations and extend over a total of 12 miles.

Morocco's first tramway is notable for its accessibility, high capacity and the comfort it provides.
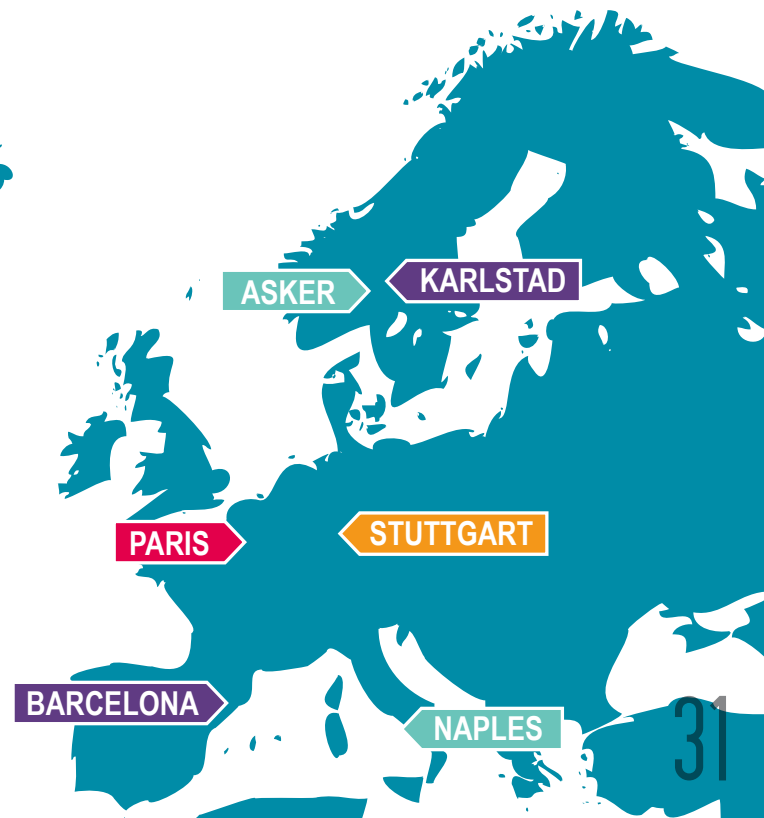
The double tramsets' integral low floor, which is level with the platform, and 12 side doors ensure easy access, especially for people with reduced mobility.

5 PRINCIPLES
FOR SUSTAINABLE URBAN MOBILITY

EUROPE

ASKER

KARLSTAD

PARIS

STUTTGART

BARCELONA

NAPLES

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ASKER

NORWAY

Asker is a suburban municipality situated two kilometers west of Oslo, the Norwegian capital. Six out of 10 working citizens are employed outside of Asker and the commute rates are high, both in and out of the municipality. During the last decades Asker has evolved from being a rural district with scattered villa areas, into an urban community with concentrated housing areas, business clusters and a vibrant municipal centre. More people and more jobs put pressure on the transportation system. Asker must meet these challenges with improved public transport services, and land use that support the public transportation system. In Norway, the state and county are primarily responsible for the transportation system, and local authorities for urban planning and land use. Good cooperation between state, county and municipality is an absolute necessity in planning urban mobility.

The municipality of Asker has based its development on integrated land use and transport planning, and facilitates urban residential and commercial development in areas within walking distance of a railway station. Growth and development generate more traffic, both regionally and locally. A substantial portion of this transportation need shall be met with public transport services. As many of Asker's residents live far from a railway station, the bus services are also being improved.

In 1993, the Norwegian government decided that urban development throughout the country should be based on the principle of integrated land use and transport development. However, as urban development is by nature a long process, it takes several years before the results of the strategic choices are visible. This is also the case in Asker, but still, during the last 20 years Asker centre has tripled its size. There has been a doubling of trade and other business activities, a significant increase of cultural venues, and almost a quadrupling of the number of apartments. This growth has an effect on the system of transportation. During the same period the traffic into the city of Oslo has increased by 14.3 per cent, but the growth in public transport has been 23.9 per cent. The train accounts for 54 per cent of the public transport in the region. Asker railway station is today the 5th largest in Norway, with 3.2 million people getting on and off yearly.

BARCELONA SPAIN

Barcelona, one of the most densely populated cities in Europe, is served by a comprehensive public transport network that includes a metro, a bus network, two separate modern tram networks, a separate historic tramline, and several funiculars and aerial cable cars. The year 2012 closes the period of the Barcelona Urban Mobility Plan 2006-2012, and starts a process of renewal of the mobility strategy of the city. Following the preceding plan, Barcelona's Urban Mobility Plan 2013-2018 aims at the implementation of economically sustainable, environmentally friendly and safe mobility modes, expansion of public and nonmotorized transport, and the provision of efficient and accessible services for all citizens. Barcelona is recognized for the successful initiative, Bicing, a community bicycle program inaugurated 2007.

Its purpose is to cover the small and medium daily routes within the city in a climate-friendly, non-polluting way. The system has efficient street parking control points distributed throughout a large part of the densely populated inner city.

The yearly user fee of 35€ (including tax) makes Bicing the city's cheapest public transport service. This bike sharing system has been received by residents with great enthusiasm, particularly since it services approximately 70% of the city area.

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NAPLES ITALY

Naples is a city in southern Italy, situated on the country's west coast by the Gulf of Naples. Lying between two notable volcanic regions, Mount Vesuvius and the Phlegraean Fields, it is the capital of the region of Campania and of the province of Naples. Naples has an extensive public transport network, including trams, buses, funiculars and trolleybuses, most of which are operated by the municipally-owned company Azienda Napoletana Mobilità (ANM). Three public elevators are in operation in the city. The city furthermore operates the Naples Metro, an underground rapid transit railway system which integrates both surface railway lines and the city's metro stations. Despite its relatively good public transportation systems, Naples suffers from traffic and congestion problems. A major project is therefore underway to restructure the city's transport system and to connect the railway lines into one integrated network. It aims at a system with a total of ten lines, new interchange stations and enhanced parking areas.

KARLSTAD
SWEDEN

POPULATION: 101,255
AREA: 1,165 KM^2
DENSITY: 74.2 PER KM^2

Karlstad, the largest city in the province of Värmland in Sweden, is built on the river delta where Sweden's longest river, Klarälven, runs into Sweden's largest lake, Vänern. The river and its location in a delta landscape constitute a natural barrier that impairs accessibility and increases the vulnerability of bridge connections that link together the central parts of the city with its surrounding areas. To deal with such limitations, the city promotes travel on foot, by cycle or by public transport.

In order to change residents' travel habits, the city has put efforts to reduce travel times for city buses. Through higher service frequency, better bus stops and interchange options, active marketing and user oriented technical solutions, the city's Karlstadbuss has managed to increase the number of passengers by 50% between 2006 and 2011.

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Discount rates for students and seniors, and free travel for those with child trolleys are offered. By 2013, all buses will run on biogas made from household waste. Karlstadbuss is an integrated unit in the city planning department, thus guaranteeing that public transport remains integrated in all city plans. Cycle networks have also been stretched over 250 kilometers and integrated into other modes of transport. The city provides public air filling stations, bicycle counters and improved street signs, and prioritizes bicycle routes for snow clearing during winter. The city master plan has information about travel time quota to show the competitive relationship between travel with public transport or bicycle. When planning for new living areas, attention is given to how these areas can access public transportation and the cycle network.

The city credits part of its success in changing travel behavior to mobility campaigns that focus on groups rather than trying to reach the whole population with one campaign. The city has also made it a practice to continuously measure and follow-up on the development of its mobility plans, and to inform the community accordingly.

PARIS FRANCE

POPULATION: 10,485,263 (2010)
AREA: 3,043 KM^2
DENSITY: 3,446 PER KM^2

Paris, the capital and largest city in France, is also one of the most densely populated cities in the world. The Paris transportation network is very diverse and exists literally over many levels. The city's buses, trams, Métro, Autoroutes, trains and planes together all serve to maintain a high level of connectivity between Paris's many different districts and beyond.

Paris Respire (literally "Paris breathe") is a car-free scheme where certain roads are closed to vehicular traffic on Sundays and public holidays between 9am and 5pm. The roads closed include those by the River Seine, in the Marais, the Canal Saint Martin, Montmartre as well as roads elsewhere in the city. Cycling and walking are the main forms of getting around on these roads on these days. Paris has steadily increased its network of bicycle paths since the late 1990s. As of 2010, there were 440 km of cycling routes in Paris, including bike paths and bus lanes that had been widened for use by bike riders. These include piste cyclable (bike lanes separated from other traffic by physical barriers such as a kerb) and bande cyclable (a bicycle lane denoted by a painted path on the road). Also since 2008, 29 km of specially marked bus lanes are free to use by cyclists. Cyclists have also been given the right to ride in both directions on certain one-way streets. As announced in June 2010, Paris will increase the size of its bike path network to 700 km by 2014. Also, the city has pledged to create 1,000 new bike parking places per year and is setting up a maison du velo in the Bastille district that will provide rental, repair and other services to cyclists. In December 2011, Paris launched "Autolib", an electronic car rental service.

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STUTTGART GERMANY

POPULATION: 613,392 (2011)
AREA: 207.4 KM^2
DENSITY: 2,958 PER KM^2

Stuttgart, the sixth-largest city in Germany, is where the automobile and motorcycle were invented. As a result, it is considered by many to be the starting point of the worldwide automotive industry. Famous automotive brands such as Mercedes-Benz, Porsche, Maybach, Bosch and Mahle all trace their roots to Stuttgart and nearby towns. Stuttgart's public transport is comprised of a light rail system (Stadtbahn), a large bus network, and a suburban railway system (S-Bahn). A special feature is the Zahnradbahn, a rack railway that is powered by electricity, the only one of its kind in Germany. Stuttgart also has a funicular railway (Standseilbahn) and a miniature railway run by diesel (and on weekends bysteam) – both servicing special areas of the city.

Stuttgart's topographic conditions limit the expansion of the existing transport infrastructure, resulting in congestion on main arterial routes, delays on the railways and oversubscribed car parks. Stuttgart's Integrated Traffic Management Centre Stuttgart (IVLZ) seeks to address these problem issues by implementing an innovative system of traffic management covering all modes of transport.

Comprehensive data about the traffic situation is gathered by four different partner organizations, collated and evaluated at the IVLZ, and then used to manage traffic through the use of information displays parking direction systems and flexible traffic light programming. The IVLZ is housed in the same place as the city Fire Department and Emergency Services, and the operational and administrative Headquarters of the state capital, thus enabling joint and fast utilization of technical infrastructure for mobility and safety.

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AGUASCALIENTES

MEXICO CITY

QUITO

LATIN AMERICA AND THE CARIBBEAN

COCHABAMBA

RIO DE JANEIRO

SANTIAGO

BUENOS AIRES

5 PRINCIPLES
FOR SUSTAINABLE URBAN MOBILITY

AGUASCALIENTES

MEXICO

POPULATION: 1,184,996 (2010)
AREA: 385 KM^2
DENSITY: 220 PER KM^2

Aguascalientes is the capital of the state of Aguascalientes, which is located in North-Central Mexico. The municipality is working hard to maintain its reputation as a business and economic hub and investment center in Mexico. It instituted urban development regulation as early as 1936, one of the first municipalities in the region to do so.

Aguascalientes is known as one of the most bicycle-friendly cities in the Mexico. The municipality is also developing a system of interconnected green bicycle routes, greenways, the aim being to facilitate fast, safe, and pleasant bicycle transport from one end of the city to the other. Launched in 2012, Aguascalientes' cycling initiative aims to make cycling a prime mode of transport. The municipality is cooperating with experts and advisors of the Ecobici project, implemented in Mexico City, in preparing a diagnosis and to delineate routes which will increase the demand for this means of urban mobility more quickly, comfortably and environmentally friendly.

BUENOS AIRES

ARGENTINA

POPULATION: 13,074,389 (2010)
AREA: 2,681 KM^2
DENSITY: 4,877 PER KM^2

© Mayor Mauricio Macri

Road transportation accounts for 90% of all transportation emissions in Latin America, half of which are produced by passenger traffic.

Bus rapid transit systems play an important role in addressing those emissions as they create dedicated bus lanes across cities, providing millions of people with a more cost and time efficient solution to using cars resulting in fewer emissions and improved air quality.

Buenos Aires, a member of the C40 Cities Climate Leadership Group. The Bus Rapid Transit (BRT) system includes 12.5 kilometers of bus lanes that are estimated to increase public transportation use by up to 15% in the areas it serves. The BRT system will reduce fuel use by buses in the city by 30% and related CO2 emissions, thereby improving air quality. It will also reduce peak hour travel time by 40% for over two million passengers each month, once complete.

COCHABAMBA

BOLIVIA

POPULATION: 625,000 (2001)
AREA: 111 KM^2
DENSITY: 5,631 PER KM^2

Air contamination is a problem in Bolivia and this is mostly due to the amount of automobiles located in this high altitude city. On the first Monday of September each year, Cochabamba celebrates Dia Del Peaton (Day of the Pedestrian). A special day in which no cars are allowed in the city and the only means of transportation is on foot or bicycle.

This is an annual event to help raise awareness and demonstrate to the people that a city can still function without reliance on the heavily used automobiles. Other benefits arise out of this project such as a reduction in noise pollution, socially bustling neighborhoods and reduction in air pollutants. The city is considering plans to implement Dia Del Peaton as a monthly activity in the near future.

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QUITO

EQUADOR

POPULATION: 1,845,804 (2010)
AREA: 479 KM^2
DENSITY: 3,853 PER KM^2

During the last decade, Quito, the capital city of Ecuador, has experienced a high population growth and along with it, increased demand for transportation. As a consequence of the inability of the public transport system to meet the increasing demand, the number of private cars increased considerably. This, together with the existence of an already old and poorly maintained bus fleet, gave rise to a significant increase in congestion and air pollution, which considerably deteriorated the environment of Quito.

Quito's Trolleybus System is considered to be one of the world's most successful urban transport solutions. According to recent polls conducted in Quito, 90% of the population is satisfied with the services the system provides. One of the main reasons for the success is the appropriate combination and interplay among the various instruments such as (1) design, planning and management; (2) the right economic instruments to ensure low rate fares; (3) the organisational arrangements in the hands of the municipality of Quito, whose main goal is to provide good services for its citizens; and (4) sound technologies that allow the implementation of an efficient and low-cost electric transport system.

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MEXICO CITY

MEXICO

POPULATION: 13,851,000
AREA: 1,485 KM^2
DENSITY: 5,960.3 PER KM^2

Mexico City has developed "The Green Plan (Plan Verde)" which has seven pillars: land conservation, public spaces, air pollution, waste management and recycling, water supply and sanitation, climate action program, transportation and mobility. 4,500,000 cars, 23,000 minibuses, 5,000 buses and 130,000 taxis operate daily within the megacity of 20,000,000, generating road saturation, slow and uncomfortable transportation alternatives, and poor air quality. Facilitated in large part through the assignment of multiannual budgets, the Green Plan and the Integrated Urban Transportation Program have succeeded in changing a decades old paradigm about the transportation problems of the city and its possible solutions. The Mexico City government's sustainable mobility strategy focuses on the development of mass and non-motorized transport systems, most involving inter-institutional partnerships with a medium term horizon. Mexico City has succeeded in increasing the coverage of the Metro and the Metrobus BRT system; in replacing 5,784 buses and 80,000 taxis with new, more efficient vehicles; and in introducing a compulsory School Transportation Program covering private schools.

© Mexico City

ECOBICI was introduced and has since become the first third-generation public bicycle system in Latin America, with less than 3% vandalism and practically zero thefts during its first year. It currently serves at least 40,000 users, with more than 4,000,000 trips to date covering 4.2 km2 of high-density, central neighborhoods.

The "Muévete en Bici" Program (Bicycles Move You) has also been a success, attracting more than 20,000 cyclists per week in some of the city centre's main avenues. Furthermore, to promote multimodal transportation, parking spaces for bicycles have been installed on streets and near metro stations. Mexico City's experience has taught that to implement a successful bike-sharing program, one should adopt a strategy that promotes a new social culture on bicycle use. It is also important to work with multiple stakeholders, and to employ transparent and efficient communication strategies with citizens in order to secure that public opinion is heard and considered.

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RIO DE JANEIRO
BRAZIL

POPULATION: 11,949,619 (2010)
AREA: 2,020 KM^2
DENSITY: 5,916 PER KM^2

Linking the mountainous favelas with the rest of the city and ensuring their participation in Rio de Janeiro's fast-growing economy is a serious challenge. Mobility services are straining to keep pace with rampant urbanization, especially when it comes to the favelas. These informal settlements are constructed on steep areas where conventional modes of public transportation cannot be considered.

As 20% of Rio's population lives in a favela, a large part of the population has to do without any public transport. In anticipation of the 2014 World Cup and the 2016 Summer Olympics, Rio De Janeiro is undertaking massive construction projects, including a 3.5 Kilometer Gondola called the 'Teleferico de Alemao' linking the complex of Alemao to the rest of the city. The gondolas provide the impacted favela communities with a real mobility and transit solution. Providing better access to the city, the gondola systems ensure social mix but also an easier and faster access to leisure and job opportunities for the poor populations from the North of the city.

As the new system connects to the conventional mass transit systems (suburban train) at the Bonsuccesso station, they make the rest of the city far more accessible than before, cutting the journey time from the previous 50 minutes by foot to 16 minutes. In order to make this new facility more affordable, the 120,000 residents of Alemao are offered a free daily round trip during the first months. Additional rides will cost R$1 (US$ 0.60). A solar panel is installed on each of the cabins, making them self-sufficient in terms of lighting, sound and video surveillance systems. This sustainable transit solution for Rio's hillside communities could be replicated in other parts of the city, and studies are already underway for the construction of at least three more lines.

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SANTIAGO
CHILE

POPULATION: 5,951,554 (2010)
AREA: 919 KM^2
DENSITY: 6,476 PER KM^2

Over the past 20 years, Santiago has grown into one of Latin America's most important economic hubs, experiencing rapid suburban development and advancements in modern transportation infrastructure. Typical of fast-growing urban areas, Santiago became notorious for stop-and-go traffic and air pollution. The city attempted to resolve the problems through projects like the expansion of the 40-year-old Santiago Metro subway system and the new Costanera Norte, an electronic toll-way that integrates other major highways into a seamless east-west artery.

A system known as Transantiago, established in 2006, involved the creation of 200 kilometers of dedicated bus lanes, a sweeping reorganization of the city's bus schedules and routes, and the introduction of a citywide integrated fare collection system.

5 PRINCIPLES
FOR SUSTAINABLE URBAN MOBILITY

RUSSIA AND CENTRAL ASIA

YAROSLAVL

KAZAN

ASTANA

BISHKEK

41
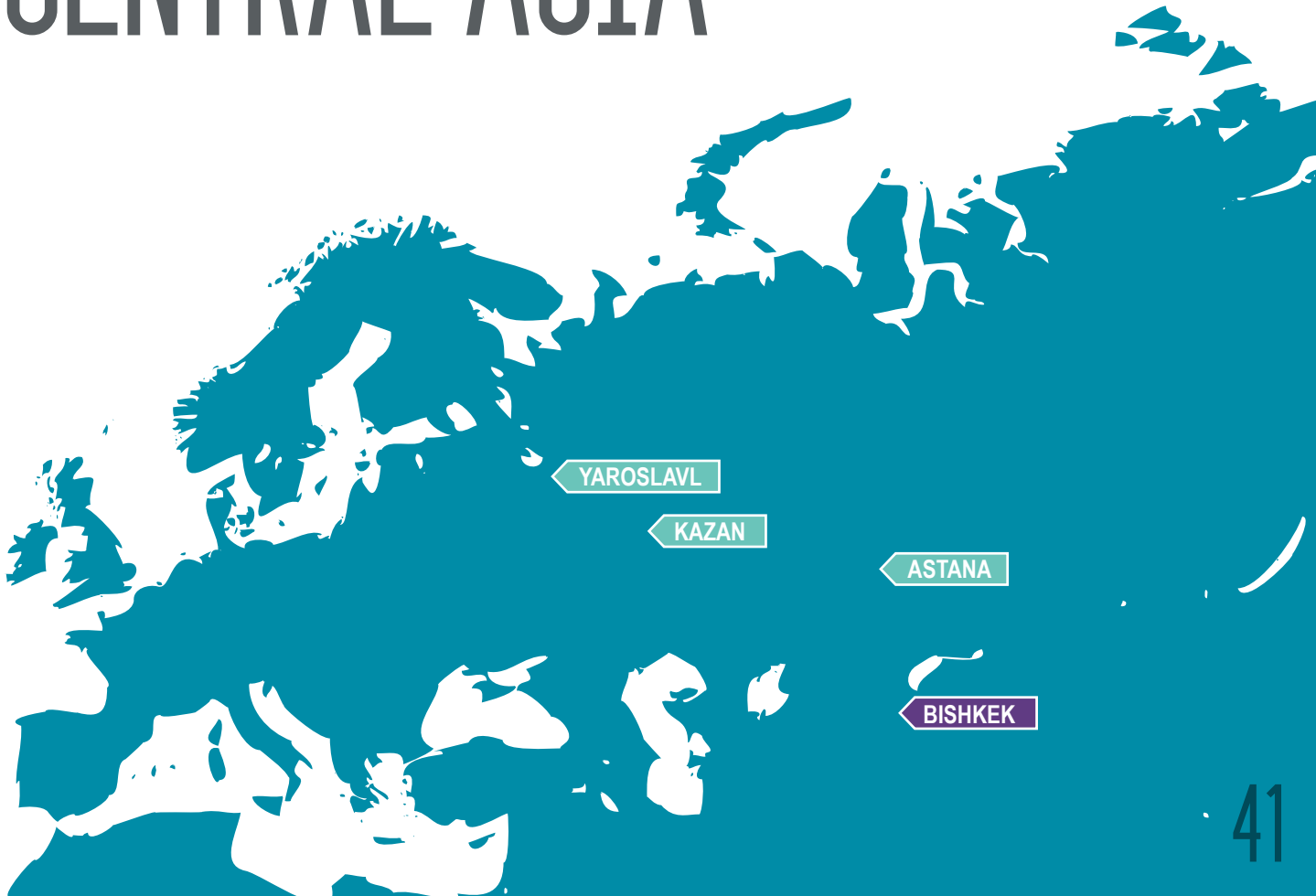
ASTANA
KAZAKHSTAN

POPULATION: 525,000 (2006)
AREA: 155 KM^2
DENSITY: 3,387 PER KM^2

For Astana, the capital city of Kazakhstan, public transport consists of buses and minibus taxis. There are over 40 bus lines served by more than 1,000 vehicles, with over 3,000 people working in the public transport sector. The minibus taxis have their own predefined routes (currently 9 in total) and work on a shared basis. Public transport vehicles are in relatively good operational condition and reliable, primarily since these are managed by private companies. Through regulation, the government succeeds in keeping ticket prices the same for all public transport.

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BISHKEK
KYRGYZSTAN

POPULATION: 863,650 (2010)
AREA: 181 KM^2
DENSITY: 4,772 PER KM^2

© EBRD

Roads play a crucial role for the landlocked Kyrgyz Republic by ensuring cost-effective access to regional and domestic markets, generating employment, and providing services. Bishkek, the capital of Kyrgyzstan, has a functioning public transportation system that includes buses, electric trolley buses, and public vans (known in Russian as marshrutka). The city's transport master plan provides for a light rail system. The Bishkek Trolleybus Company ("BTC"), a municipally-owned company providing trolleybus transportation services in the city of Bishkek, is absorbing the bulk of public transport investments from development partners such as the European Bank for Reconstruction and Development (EBRD). The recently-initiated upgrade of the trolleybus network involves purchase of new trolleybuses, partial rehabilitation of the related infrastructure, and introduction of e-ticketing.

KAZAN RUSSIA

POPULATION: 1,139,571 (2010)
AREA: 492 KM^2
DENSITY: 2,316 PER KM^2

The city of Kazan is situated on two banks of the Kazanka river, and is connected by 3 bridges. Traffic is organized so that nearly all remote districts are connected by these bridges leading towards the center of the city. Kazan's public transport sector is comprised of buses, trolley buses, trams, and the metro. The tram system is more than a century old, and remains a popular mode of travel in the city. The system has since been upgraded with locally-produced modern tram units. The trolley bus utilizes environmentally-clean technology and is operated practically round-the-clock. The metro is the newest and most modern type of transport in Kazan, beginning operations in 2005.

A comprehensive transport reform program was introduced in Kazan in 2007, and is intended to reduce traffic congestion in the central part of the city through street-road network development, improved traffic management, and provision of more organized parking spaces.

Kazan has won the right to host major international sporting events such as the 2013 Universiade, the 2015 World Aquatic Championship and to be one of the venues to be used during the 2018 FIFA World Cup. Efforts to improve the current mobility and transport systems is therefore an integral part of a comprehensive plan to boost Kazan as a premier tourist and investment destination.

Priority investments include the expansion of the current metro lines and construction of three additional metro stations, enabling the system to serve 200,000 commuters per day from the current capacity of 80,000. The city's Road Network Development Program is facilitating the reconstruction and repair of old roads, opening of 5 new transport interchanges and 8-9 pedestrian crossings.

© Yuri Maller

YAROSLAVL RUSSIA

POPULATION: 591,486 (2010)
AREA: 205 KM^2
DENSITY: 2,855 PER KM^2

© Russiatrek

Yaroslavl city center was granted world heritage status by UNESCO in 2005, and contains dozens of beautiful churches from the 16th and 17th centuries. The city is a large transport node and a substantial number of important national and regional roads, railways and waterways pass through the city. The city has a well-developed network of public transportation, including buses, trolleybuses and tram lines. Bus transport is by far the most popular means of urban transportation for residents of Yaroslavl. The Yaroslavl tram system is one of the oldest in Russia and has been in existence since 1900. This system is currently made up of four routes which run through various parts of the city. The city's urban transport network also runs a fleet of trolleybuses which run along nine different routes, and have done so since the year 1949.

CHALLENGES AND RESPONSES

Responding to a city's growing mobility demand and making the city accessible to its citizens are part of management responsibilities of local authorities. Since the reason people travel is not to move but rather to access places, numerous environmental, social and economic conditions come to play. There are no cut-and-dry mobility formulas and solutions, and the range of local authority action can either be long-term or short-term, small-scale or large-scale.

MAJOR CHALLENGES FOR URBAN MOBILITY

RESPONSES AT CITY LEVEL

BETTER COORDINATION THROUGH INTEGRATED PLANNING

Utilize an integrated, holistic approach to transport planning and service provision for all urban modes. This will enable cities to coordinate mobility-related demands with the use of urban land and other major systems and infrastructure in the city. This approach enables solutions to increase opportunities for more sustainable mobility patterns and higher levels of urban transport services.

ACCESS BY ALL

Mobility has to enable people to meet their social and economic needs and concerns, such as having access to jobs, schools, health clinics, and other services. Many citizens have neither access to transportation nor the opportunity to escape the negative effects of congestion and pollution.

IMPLEMENT LEGISLATION AND MOBILITY MANAGEMENT MEASURES

Well thought-out and crafted mobility management systems and legislations reduce the need for physical travel by creating incentives for mobility substitutes and regulations for efficient land use and policy reforms to correct current distortions in transportation planning practices.

AFFORDABILITY

Cities are developing more and more into metropolitan regions within which the distances between homes, workplaces and recreational facilities increase. In many cases, transportation has become unaffordable, time-consuming, inconvenient and unsafe, thereby impacting on the social and economic well-being of citizens.

ENCOURAGE NON-MOTORIZED AND PUBLIC TRANSPORT

Expanding non-motorized transportation infrastructure will have direct and positive impacts on the urban economy, environment and public health. Non-motorized transport increases safety for non-motorized commuters, is equitable and inclusive, and increases the mobility options for all income groups in the city.
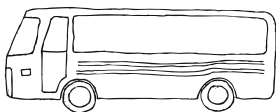
SAFETY

Estimates show that one million people die on the roads and more than fifty million are injured. The human costs are profound and even the economic cost is staggering - more than USD100 billion in developing countries.

ENHANCE ROAD SAFETY

Road deaths are preventable. Many measures that are low cost have huge impact in saving lives, such as improving road markings, delineation of junctions and barrier conditions, improving pedestrian crossings, and properly enforcing traffic rules and regulations.

ENVIRONMENTAL IMPACTS

Transportation systems in many cities which rely on private cars and outdated public transport systems are not sustainable owing to their high consumption of non-renewable resources and high levels of emissions. Many cities still believe that the shift to new cleaner technologies will require a change in existing mobility patterns and new infrastructure, and are therefore too costly to adopt.

ENCOURAGE E-MOBILITY AND NEW TECHNOLOGY

Electric vehicles are indisputably the vehicles of the future and will contribute significantly to the drive for better, cleaner air in high density, congested cities. How quickly and how widespread their adoption will be is going to depend on price, and when limitations with charging times and battery life can be overcome. In general, new solutions involving new sources of energy have to be developed in agreement with social, ecological and economic requirements.

INSTITUTIONAL CAPACITY

Political structures, legal obstacles, lack of resources, and lack of knowledge and expertise are limiting the capacity of local authorities to respond to the growing mobility in cities, and to operate and deliver transport services in more efficient and effective ways.

ENABLE TECHNICAL COOPERATION

The challenges of urban mobility are basically similar in all cities. Cooperation among and between cities can lead to a more rapid spread of exemplary solutions, and learning to exchanges of experience. Improved transport institutions will be able to provide more sustainable urban transportation systems.

SUSTAINABLE MOBILITY CULTURE

The traditional response of building more roads and adding more vehicles in response to growth of cities has proven unsustainable and limited. Shifting the paradigm from transport to mobility means offering a broad menu of options to citizens.

STRENGTHEN PUBLIC AWARENESS AND CITIZEN PARTICIPATION

Citizens need to be involved, their questions answered, their worries taken seriously. With good planning and communication, the public will accept measures in public interest.

RECOMMENDATIONS FROM UNACLA ON SUSTAINABLE URBAN MOBILITY

Enormous responsibilities are involved in the management of cities. These include planning for the future, providing adequate urban services, establishing systems of governance and law enforcement, alleviating urban poverty, creating opportunities for business and employment, designing and delivering new infrastructure, and revitalizing deteriorating or under-serviced neighborhoods such as slums. These immense responsibilities of city management are aggravated when urban growth is rapid and continuous, where there are critical shortages of capital, skills, and information, where coordination with central government is inadequate, and where levels of poverty and inequality are extreme.

Responding to a city's growing mobility demand and making the city accessible to its citizens is an integral part of city management, and a major responsibility of local governments. People travel not just to move, but rather to access places and services. Therefore, numerous environmental, social and economic conditions come to play, including people's needs and expectations for basic levels of affordability, convenience and safety.

The United Nations recognizes the integral role of local governments in ensuring sustainable cities, and in contributing to overall development. A number of mechanisms have been established in order to channel support from the UN and foster the partnership with local governments. One such means is the United Nations Advisory Committee of Local Authorities (UNACLA), which was established in 2000 through the UN city agency, UN-Habitat (the United Nations Human Settlements Programme). UNACLA is a body of local government representatives whose aim is to advise the UN on the effective implementation of the Habitat Agenda, in general, and on thematic issues that are core to city management.

UNACLA focused on the issue of sustainable urban mobility during 2011-2012. At their regular meeting in Naples last September 2012, the members of UNACLA reflected on the experiences they have in delivering sustainable urban mobility to their respective constituencies. The members also discussed the fact that, no matter what the conditions are, the main challenges and priorities on mobility are similar across cities. The UNACLA members concluded with a set of recommendations to fellow city managers on where the efforts for the design and delivery of sustainable urban mobility plans, infrastructure and services could be directed and emphasized.

1. City planning and mobility are linked. Therefore, city managers need to integrate the urban mobility plan with the city development plan.

Planning enables city managers to imagine what they want their city to look like in the next 10, 15, 20 years. Planning is the tool for city managers to direct how their city can and should grow and expand spatially and functionally. Planning enables city managers to factor in the comparative strengths of the city, to project the vision and priorities of the city, as well as to anticipate the challenges and risks associated with future growth of the city and changes in the environment affecting the city.

City managers have the option to address mobility through citywide spatial and development plans, or to create dedicated city transport plans that address linkages at many levels. Often the function and responsibility for developing plans for the city are assigned to different sector departments within a city management, or distributed between different levels of government.

Whichever the condition may be, the integration of the urban mobility plan with the city development plan is effectively realized when the following elements are in place:

▶ The citizenry is engaged in developing the mobility plan, ensuring that the plan considers the different social and physical needs of the people, and maximizes all modes and forms of transport in the city and the surrounding area;

▶ The practices and policies between policy sectors (e.g. transport, land-use, environment, economic development, social inclusion, gender equity, health, safety) are addressed in the mobility plan;

▶ The functions between authority levels (e.g. district, municipal, regional, national), and between neighboring authorities (inter-municipal, inter-regional, trans- national, etc.) are responded to in the mobility plan; and

▶ The institutional arrangements are in place to ensure that within the city management, the departments responsible for delivering and implementing the different sectoral plans are able to efficiently communicate and coordinate with each other.

2. We have to manage mobility in the city in terms of demands and space.

In many cities, urban sprawl and congestion curtail mobility. Other cities are also developing more and more into metropolitan regions within which the distances between homes, workplaces and other service facilities increase. In response, city managers are learning to prioritize proximity by choosing among options that will bring housing, services and jobs closer together, thus creating what is known as "cities of short distances". Reducing the need for movement in cities is being done by raising the density, changing the mix and diversity of the urban fabric, and utilizing technology. Bordering or marginalized settlements need to be integrated as well into the rest of the city by providing a wider variety of transport alternatives and improving connectivity and communications.

Local authorities, especially those responsible for large or rapidly growing areas, are learning to focus on mobility instead of just transport, because the concerns of mobility are much larger than simply providing transport. Transport development is no longer simply about delivering a complex highway system or tram or building an underground train line built. Now it is about putting a full array of instruments into place and deploying them in concert: from transport demand management via better land-use planning to tailor-made fiscal instruments. Shifting the paradigm from transport to mobility means offering a broad menu of options to citizens.

The choices made in the way new urban areas grow in the coming decades will determine to a large extent their quality of life, environmental and social sustainability, and overall competitiveness for centuries. If, for example, land is not reserved now for parks and public spaces, succeeding generations will experience diminished quality of life and poorer health. Highly qualified and creative people have become the most crucial resource for economic development in post-industrial times. To attract and retain such people, cities must offer a high quality of life. This includes comfortable, fast and accessible public transportation, spaces for walking, cycling and recreation, and facilities to nurture the creative and cultural life.

3. Mobility means providing access to all and building inclusive cities.

Inclusive cities are cities that can integrate the most disadvantaged, excluded or vulnerable groups of people into society. Such cities use mobility systems to enable access to economic possibilities and the labor market, and to enable access to vital services such as healthcare and education.

In many cities in developing countries, the conflict of interest between the car-owning middle and upper classes and the car-less lower income groups forming the majority of the population is complex and usually unacknowledged or underestimated. The industrial age saw cities prioritizing the construction of road networks, creating a type of car-centered and –dependent urban development. This has resulted in conditions where only those with cars are able to access housing, jobs and basic services. Like fences, new roads also divide long-standing neighborhoods and, when built as overhead highways, darken city streets, lower real estate values, and often promote crime. They also encourage further development of far-flung low-density suburban gated communities, which draw upper-income residents away from the hearts of cities and increase their dependence on cars and roads.

The aim is not to ban cars from the streets but to offer other alternatives for citizens, and to ensure that mobility services are of the same standard in all parts of the city. To help link poorer residents with jobs, schools, and other urban benefits, any large, new urban roads should be extended closer to homes and jobs by incorporating exclusive mass transit bus lanes, protected bicycle paths, and broad sidewalks for pedestrians. Public transportation that is safe, accessible even to the mobility-restricted, and made affordable through a group oriented fare system, is an important means in ensuring integration and inclusion, especially of the poor and of the vulnerable citizens such as children, youth, women, the disabled and the elderly. Non-motorized transport such as cycling has been shown to save up to 20 percent of poorer citizens' income in developing countries, where it is the only form of transport for many.

People-friendly, reliable, inclusive mobility systems that integrate different transport systems and allow people the option of taking the bus or train, or to cycle or walk, will give people a reason to leave their cars at home, will decrease congestion and pollution, will reduce travel time, and will increase productivity of rich and poor alike.

4. Road safety must be a priority for city leaders.

An FIA Foundation report, The Missing Link: Road traffic injuries and the Millennium Development Goals, reveals that more young people are killed every day from road accidents than diseases such as HIV/AIDS, tuberculosis and malaria. When launching the United Nations Decade of Action for Road Safety for 2011-2020, the UN Secretary-General Ban Ki-moon stressed what is at stake. He stated, "It is totally unacceptable that more than one million people die on the roads and more than fifty million are injured. The human costs are profound and even the economic cost is staggering, more than USD100 billion in developing countries."

Road deaths are preventable, and safety for both motorized and non-motorized road users can be achieved through political will, improved road infrastructure, quality of vehicles, technological innovations and the behaviors of people. Even cities in developing countries have been successful in tackling the road safety crisis through stricter enforcement of traffic rules and regulations, vehicle standards and speed limits; enforcing laws that require motorists to use safety gear (i.e., seat belts and helmets); providing security in mass transit systems; and implementing infrastructure that make it safe for people to walk. Many measures that are low-cost have had huge impact in saving lives, such as improving road markings, clear delineation of junctions and barrier conditions, improving pedestrian crossings, and offering traffic education to young people in schools.

5. Embrace innovations in the transport sector.

Buildings and motorized vehicles are responsible for the majority of CO_2 emissions in cities. In the battle against climate change, probably the biggest innovation for mobility to-date is the use of E-mobility. E-cars come with almost all the advantages of common carts, but as they run on electricity, they emit no CO_2, dust or noise. Electric vehicles are indisputably the vehicles of the future: they have no exhaust emissions like motor vehicles and produce little noise. Electric vehicles will contribute significantly to the drive for better, cleaner air in high density, congested cities. But most cities cannot afford to promote electric vehicles without a return on the money spent. How quickly and how widespread the adoption of e-mobility will be is going to depend on price, and when limitations with charging times and battery life of electric cars and buses can be overcome.

Intelligent transportation systems (ITS) include state-of-the-art wireless, electronic, and automated technologies. Collectively, these technologies have the potential to integrate vehicles (transit, trucks, and personal vehicles), system users, and infrastructure (roads and transit). ITS technologies are still in the early phase of deployment in many cities. However, these technologies have shown the potential to significantly reduce energy use and increase overall efficiency of a city's transport system.

In many cities in both developing and developed countries, innovations around non-motorized transport, such as bike-sharing schemes, are gaining prominence and wider acceptance. New technologies to improve networking of the different modes of transport, to expand capacities for integrated mobility management, to utilize alternative fuels and drive system technologies, and to promote fuel savings and lower emissions are becoming important investment areas for cities.

6. Cities should consider a system where they can pool together their purchasing power in the area of public procurement.

Public procurement is an important function of government. The sheer magnitude of public procurement as a subset of public expenditure, and the fact that it involves capital outlays for the future, has a great impact on the economy and needs to be well managed and governed. Public procurement is also being utilized as an important tool for delivering economic, social and other objectives. As countries move to a regional and global economy, the interests and practices of local and national governments in terms of public procurement have to be aligned to regional and/or international agreements and standards.

Part of the mandate of delivering mobility to cities is for local governments to manage the procurement of transport-related goods and services. Procurement in the transport sector is often a substantial part of overall procurement outlays for both local and national governments. Governments have to concern themselves with both management and policy requirements of procurement. The management requirements include quality, timeliness, cost (more than just the price), minimizing business, financial and technical risks, maximizing competition, and maintaining integrity. The policy requirements normally include economic goals (preferring domestic or local firms), environment protection or green procurement (promoting the use of recycled goods), social goals (assisting minority and woman owned business concerns), and international trade agreements.

The full procurement process is complex and there are tradeoffs or compromises among the goals. For these reasons, the idea of pulling together the purchasing power of cities is becoming even more imminent. This approach has the potential to minimize the business transaction costs, to reduce financial and technical risks, and to better leverage on the cost and achieve value for money (to have the best possible outcome for the total cost of ownership or whole-of-life cost). With two or more cities banding together to procure the same set of goods and services, there is stronger likelihood for greater transparency, accountability, fairness and integrity in the procurement process, as well as increased capacity for the local governments concerned. This issue has now gained greater prominence in the agenda of national and international associations of local governments, and is supported by development partners as part of achieving greater efficiency in such a critical area of city management.

7. A good public transport system particularly benefits industry and businesses. Mobility should therefore be linked to land-use and real estate.

Transportation is the lifeline of cities. Cities must therefore be accessible from the outside through modes of transport by road, rail, air and sea or water. In the same way, districts, service, industrial and residential areas within a city must be easily accessible from one point to another, allowing for efficient mobility for people and goods. City managers are aware that traffic, congestion and poor connectivity are impediments to economic activity and development. To ensure that the city's transportation system is benefitting business and industry, there has to be integrated planning and coordination of transportation with other forms of land use. Traffic planning has to also be well integrated into urban planning and land use to get the maximum combination, benefits and effect of transport infrastructure on land use, and vice versa. This means ensuring that the mobility-related demands on the use of urban land are compatible with other functions of a big city in order to maintain the attractiveness of the city to a wide range of business activities, industry operations and additional investments from this sector. Knowing about the interdependency between cities, companies and work forces is crucial to have a stable and reliable framework to attract companies that offer business opportunities and jobs to citizens.

In general, the private sector relies on government to create the conditions and environment for the city to function optimally. The government has to decide where the roads are to be built; what the width of roads should be; whether the city should have sidewalks or bicycle lanes; how much land should be allocated to housing, business and public spaces; or whether commercial and residential infrastructure should be combined in certain areas of the city. Setting an acceptable pricing system for users of transportation is also an important challenge. City managers have the option to select or combine various solutions to achieve rational land use, higher urban density, and a mix of integrated multimodal transportation systems in order to make the city a place for attracting new business operations as well as for nurturing traditional and essential types of industries.

8. A local authority, through the mayor, should be able to demonstrate strong leadership in changing the mobility culture towards cycling, walking and other forms of non-motorized transport.

City managers know that the issue of implementation is usually the major hurdle in all development initiatives. An integrated approach is key, but also vital are political leadership and public support. Citizens need to be involved by having their voices heard, their questions answered, and their worries taken seriously. Implementation of new mobility initiatives can become a political liability if citizens are not on board and do not support such projects. But with good planning, communication, and other participatory processes, city managers can make the public eventually accept measures in the public interest. The earlier in the process the citizens are engaged, the greater the chances for public acceptance and success in implementation.

While city managers work hard to improve the quality of public transport systems and optimize the conditions for cyclists and pedestrians, equal effort has to be given to changing the behavior and mind-set of citizens to favor non-motorized transport. In general, city managers need to strengthen public awareness of sustainable mobility in order to be able to transform the citizenry's behavior from the prevailing private transport culture towards favoring public transport, cycling, walking and other forms of non-motorized transport. This involves promoting information, awareness and education on the ecological impacts of traffic and congestion; targeting specific user groups and community areas; engaging existing community groups in campaigns; introducing positive incentives; and initiating mobility education especially towards children and youth. Local governments may also need to combine the above approach with enforcement of regulations that will discourage private vehicle use. This include imposing restrictions and surcharges on car use, such as parking limitations, congestion pricing, fuel taxes, and other charges whose proceeds should go to subsidize better and cheaper public transportation.

UCLG Secretary-General Joseph Roig, UN-Habitat Executive Director Joan Clos, Stuttgart Mayor Wolfgang Schuster and Naples Mayor Luigi de Magistris visit a new initiative to promote Non Motorized Transport in Naples.

9. Networking and cooperation of cities is a good way to show good examples, spread good practices and strengthen capacity.

There are at least three levels where networking and cooperation on and of cities can be facilitated in order to show good examples and spread good practices. These are:

▶ Networks within our cities: Many groups must be involved in the development of mobility plans in order to bring the diverse interests of the various groups into the political and decision-making process. This includes transport companies, cyclist clubs, schools, the police and law enforcement authorities, academic and scientific institutes working with mobility, and civic associations and the general public. These groups are a rich source of experiences, ideas and practical knowledge that can contribute to the formulation and implementation of the city mobility plan. Opportunities to network these groups will develop cooperation, improve communication, and strengthen public support for decisions that have to be promulgated by the city's management.

▶ Networks of cities: There are many similarities among cities in terms of the priorities they make and the challenges they face in the area of urban mobility. It is important to have the venue and opportunity to exchange experiences and good practices. Cities jointly search for innovative solutions and at the same time form a lobby group on the national or international levels. The national association of local governments is a major means for such networking. The association can also focus on justifying the need for expanding the mandate and accessing resources required to deliver mobility tasks.

▶ Network with national and international partners: Cooperation with international organizations is actively being facilitated and fostered through the United Cities and Local Governments (UCLG) and its regional and national representatives. UCLG enables cities to engage with the global body of development partners such as the various UN agencies, the European Union, and bilateral and multilateral financing institutions. UCLG also nominates cities to become members of UNACLA, which puts local governments in an even better position of influence and interaction with the UN. Such cooperation facilitates more effective advocacy and lobbying on behalf of local governments, and enables cities to draw from a wider network of potential resources through technical exchanges and collaboration.

10. We have to make clear that the MDGs and Rio+20 outcomes are not possible without a sustainable mobility system.

All people are entitled to mobility because it is a basis for the realization of most other basic rights. Mobility is the key to maintaining self sufficiency and autonomy of all citizens. Countries that are supporting the Millennium Development Goals (MDGs) of the United Nations have recognized that a number of the MDG targets can be achieved if people have adequate and affordable mobility services. Mobility directly relates to access to better health care, education and economic opportunities, provision of adequate water and sanitation services, and achieving the targets on reduced greenhouse gas emissions. On the other hand, the absence or poor state of urban transportation systems which prevails in many cities especially in the developing world has been identified as a major obstacle to local and national development.

At the United Nations Conference on Sustainable Development (Rio+20), the outcome document, The Future We Want, reaffirmed countries' political commitment to sustainable development and launched a significant number of processes and actions on sustainable development relating to poverty reduction and a better global environment. As we face the advent of an Urban Millennium with more than half of humanity living in urban areas, the needs of cities cannot be ignored when Member States of the United Nations come together to define the next development agenda covering the period 2016-2030. Local governments have to work together, and seek the support of central government, in a campaign for the inclusion of clear targets on mobility, such as on increasing access to transport by all sectors of society, and reducing deaths through improved road safety.

Parallel to efforts that will maximize on the post-Rio+20 processes, the existing and active associations of local governments led by UCLG should also continue to lobby for better national approaches and frameworks whereby societal aims as reflected in agreed national policies are also shared and supported by the cities. This requires better coordination between national and local policies – and hence an improved strategic dialogue between cities and national governments. Such improved dialogue and coordination will eventually serve to improve the planning, implementation and delivery of more sustainable mobility and services to the citizenry.

UNACLA AT WORK

UNACLA Members in Nairobi 2011

UNACLA Member Mayor Marcelo Ebrard of Mexico City

UNACLA Member Mayor Lena Conradi, Asker

UNACLA Member Lord Mayor Robert Doyle of Melbourne

UNACLA Member Mayor Xavier Trias of Barcelona

UNACLA at work in Mexico City 2010

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Kadir Topbas and Joan Clos

UNACLA Meeting and conclusion of the urban mobility thematic program, Naples, Italy, 2012

Exec Dir Clos, UNACLA Chairman Knape and UCLG Sec-Gen Gateau

UNACLA Members at work in Naples 2012

UNACLA Member Chairman Anders Knape of the Swedish Association of Local Authorities

UNACLA Member Mayor Yasutomo Suzuki of Hamamatsu

TRANSPORT
AND MOBILITY
SNAPSHOTS

"Functioning transport networks are a key element for cities and towns across the globe and a precondition for economic activity and access to basic services.... Against the background of the related challenges worldwide, this year's thematic emphasis for UNACLA is placed on urban mobility and an exchange of experiences for establishing effective public transport systems as a key element for sustainable urban development. "

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