Policy Options for Enhancing Sustainable Urban Transport, Fuel Efficiency and Climate Change Mitigation

International Experiences Presented at the United Nations Expert Forum in Seoul, Republic of Korea, 16-17 March 2010

Objectives: **To** illustrate recent innovative initiatives and good practices; **To** enhance wider information and experience sharing on fuel efficiency promotion policies, climate change mitigation efforts and sustainable urban transport concepts; **To** support collaborative action on implementing affordable, economically viable, socially acceptable and environmentally sound transport systems.

Participants: 170 attendees from 24 countries participated in the Forum, including senior officials, experts and policy makers of national and local Governments, representatives of the United Nations and other international organizations, including international financing organizations, executives from the public and private sectors, business associations, academia and non-governmental organizations.

Co-organizers:

United Nations
Department of Economic and Social Affairs

에너지경제연구원
KOREA ENERGY ECONOMICS INSTITUTE

Supporters & collaborators:

Ministry of Knowledge Economy

국토해양부

THE KOREA TRANSPORT INSTITUTE

KEMCO KOREA ENERGY MANAGEMENT CORPORATION

United Nations
Centre for Regional Development
Sustainable Low Carbon Transport Partnership Council

Promoting public transport:

Urban population, especially in the developing countries, is growing rapidly. With increasing income and prosperity, many city dwellers aspire to own their own motor vehicles. Thus rapidly growing use of private motor vehicles and of freight transport, limited space and inadequate infrastructure result in urban traffic congestion, lost time, wasted resources, polluted air and negative health impacts. Still, many being energy importers, developing countries might also be affected by unnecessary costs generated by inefficient use of motor fuel in congested urban transport.

Low-Carbon, Green Growth

In his presentation titled *Reshaping Transport System for Green Growth in Korea*, Mr. Sangjin Han, from Centre for Green Growth Research of Korea Transport Institute, systematically elaborates the main objectives of *National Green Growth Strategy* and *The Law for Sustainable Transport and Logistics Development*.

Specific goals to reduce car use and to promote efficient cars and maintain safe, fast, and convenient transport service include:

- √ Introduction of Light Rail Transit
- √ More Bus Rapid Transit Routes
- √ One Card All Pass
- √ PT Passenger: 55% by 2012
- √ Promotion of PT Only Zone
- √ Bicycle rack within trains and buses...

Studies have estimated and monetized system costs and system benefits of well designed integrated public transport networks, especially BRT systems, concluding that the sum of public benefits, including economic time saved and avoided health and fuel costs, by far exceed the operational costs of public transport systems.

Several thought provoking questions on Green Growth in transport were also raised in the presentation. For more information, refer to the website below.

Policy options in China

The conception of Public Transport is well accepted in theory, but not fully implemented in practice.

By analyzing several problems of PT in China, Mr. Guo Jinyi, Ministry of Transport of China, puts forward policy options regarding regulatory, operational, financial and institutional aspects such as:

—Make *Regulation of Urban Public Transport* to provide policy guarantee nation wide;

—Reform institutional system and integrate administration bodies for better management of transport system;

—Promote orderly competition among operators and set up management and supervision;

—Besides public financial sources and special fund, invite social funds from individual/enterprises/foreign capital;

—Travel demand management: to control car use and to encourage people to take public transport modes.

Click here for more information: http://www.un.org/esa/dsd/susdevtopics/sdt_tran_egm0310.shtml

BRT

On average, BRT systems can be built in a fraction of the time of light rail, and BRT can cost 30 times less to construct and 3 times less to operate. Also, compared with Metro solution, BRT is more economically viable, which could make maximum use of existing facilities and infrastructures.

Bogota TransMilenio BRT

BRT in Bogota, Colombia

As the world's first large scale BRT project inaugurated at the end of 2000, TransMilenio has become a successful model in BRT development around the world and continues to pioneer in operational improvements and network extension. Its main characteristics are:

- √ Trunk and feeder system with segregated lanes;
- √ Articulated buses with high floors at the same level of platforms;
- √ The elevated stations built running-way parallel with overpass access;
- √ Automatic sliding doors in main stations for safety;
- √ Pre-boarding fare payment and automatic real-time passenger information

BRT in Guangzhou, China

On average 800,000 passengers are moved around by Guangzhou's new BRT system per day, which makes more than 90% of the existing metro lines in the world. Some of its new characteristics include:

- √ Connecting tunnels from the BRT platform to the Guangzhou metro at three stations;
- √ Bike lanes along the trunk line;
- √ Bike parking at and bike sharing vicinity of BRT stations (5,500 spaces/5,000 rental);
- √ Seven operating companies in three large corporate groups;
- √ Quality control oversight from an independent entity/agency;

Guangzhou new BRT

Refer to this web for more information on BRT: http://www.itdp.org/index.php/our_work/detail/public_transport/

Funding of public transport may take many forms, which needs multi-stakeholder partnerships among the banks, donors, international organizations and professional NGOs, and most importantly, with national and local governments. International financial institutions may consider significantly increasing the relative share of funding for public transport services and for non-motorized transport in their lending for infrastructure and transport sector development. It is proved that transparent governance and effectiveness of funds is crucial for success, and private sector participation is essential. It is also noteworthy that the implementation of financial austerity measures should not result in a decrease of public transport services.

Financing

Refer to Peter O'Neill's presentation to learn ***How the World Bank can help developing cities on urban transport***;

Osamu Mizuno shares the experiences of Global Environmental Facility (GEF) in investing in sustainable urban transport;

Graham Smith from HSBC draws a **"risk assessment tree chart"** to elaborate on ***How banks consider and assess the multi level risks before investments***, by taking BRT system as example**;**

Sustainable

Daniel Bongardt from German Technical Cooperation Agency (GTZ) explores various **options for promoting investment in sustainable urban transport through funds and carbon market**, by analyzing the evolving of **climate-based finance mechanisms and opportunities**.

Holly Krambeck from World Bank explains **climate-based financing mechanisms in practice in terms of urban transport GHG mitigation**, using examples such as:

- √ Mexico Low Carbon Transport Corridors Program;
- √ Egypt Vehicle Scrapping and Recycling Program and Urban Transport Development Program.

Public

Based on Barcelona experience, Michael Pellot explains the importance of **coordinating responsibilities in public transport between authorities and operators**;

By researching into hidden public subsidies for private transport among 15 cities in Germany, Austria, Switzerland and Italy, Local Government for Sustainability (ICLEI) sets forth several recommendations for **balancing subsidies between public and private transport**:

- √ Analyze hidden subsidies for private motorized transport in cities;
- √ Increase **cost coverage**: Private transport-users pay for a greater share of costs.

Transport

Funding:
Loans, grants and blends;
National programs/subsidies;
Global Funds, GEF;
Public Private Partnership (PPP),
Private finance,
Design-Build-Operate-Maintain (DBOM)

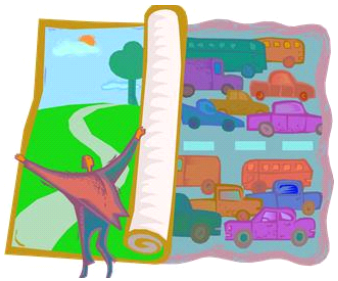
Revenue:
Road space charging;
Taxing convenience;
Partnerships;
Commercial opportunities, advertising;

Costs:
Construction and maintenance;
(of traffic infrastructure)
Traffic signals and lighting;
Traffic police;
Parking management…

Cost coverage=revenue/costs

Find the complete presentations in Session III of *Presentations*, and refer to the official websites of organizations mentioned above.

Urban planning and measures for sustainable urban transport



It is increasingly recognized that land-use patterns and built environment could shape the demand for travel. Sustainable urban transport calls for the integration and coordination of urban development and transportation. Integrated land-use planning can make effective use of public transport, reduce the need for motorized trip making, and promote non-motorized urban transport.

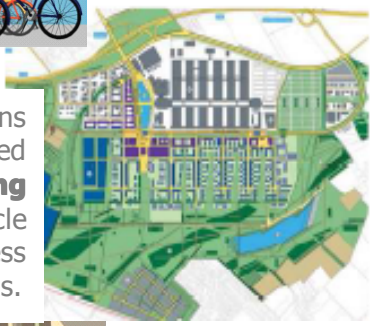
Non-motorized transport

Namely, walking, bicycling and bicycle-derived modes which used to be the essential transit in most low/middle income countries and still serve people in the lower rung of the income ladder today are advocated as being environment sustainable and fitness conducive modes.

Besides the necessary law and regulations to set the rights and responsibilities of pedestrians and bicyclists, polices to make walking and cycling more attractive, as well as funds for rental bicycles, the construction and maintenance of pedestrian and cyclists friendly environment is the real mover:

- √ Safe walkways, **pedestrian oriented locations** and **non-motorized inner city zones**;
- √ Safe routes for cycles and parking facilities, including parking places near bus/subway stations, etc. and lanes connected with public transport stations;
- √ Bicycle rental services and stations;

Refer to the web link below to see Peter Midgley ' s paper: Bicycle-sharing Schemes http://www.un.org/esa/dsd/resources/res_pdfs/csd-19/Background-Paper8-P.Midgley-Bicycle.pdf



Many European cities and towns have successfully introduced **pedestrian-only shopping zones** to restrict motor vehicle use and improve business activities in commercial centres.

5 D's in Compact Development

Density: of population/employment by geographic unit;
Diversity: mix and balance of land uses;
Design: neighborhood/street layout: connectivity, presence of sidewalks;
Destination accessibility: ease/convenience of trip destinations from point of origin;
Distance to transit: ease of access to transit from home or work.

Refer to the presentation of Christian Schlosser from UN-HABITAT for more information on Compact Development: http://www.un.org/esa/dsd/susdevtopics/sdt_pdfs/meetings2010/egm0310/presentation_Schlosser.pdf

Car Sharing

Car sharing is a distinctive model of short-term car rental, which can help reduce the number of cars needed, reduce congestion and pollution.

Car sharing has evolved into an increasingly attractive and sustainable transit mode, offering organizational diversity, operational flexibility, and multi-benefits.

For those who rent cars in short period for occasional use and occasional needs to access a different type of vehicles;

Today there are more than 1,000 cities in the world where people can car share.

It is redefining people's perception of and access to transportation.

Diverse organizing:

Based on the objectives of the organizers and users, a car share organization could take the form:

- √ A commercial business;
- √ A company democratically organized among users;
- √ A public agency;
- √ A cooperative;
- √ Ad hoc grouping…

Operational Flexibility:

While car share could be organized differently, most of them share several flexibilities in operation:

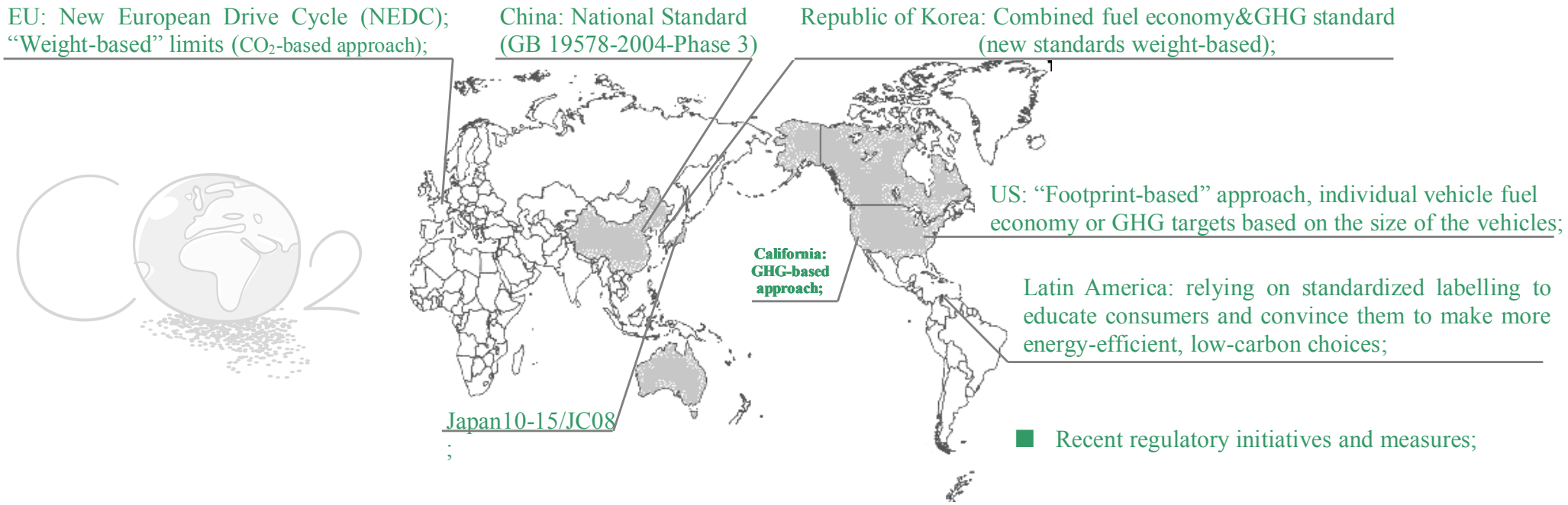
- √ 24/7 access, not limited to office hours;
- √ Self-served reservation, pickup and return;
- √ Service locations accessed by public transport;
- √ Charged by the minute, by the hour or by the day;
- √ Membership with pre-approved driver check;
- √ Established payment mechanism;
- √ Insurance and fuel costs included in the rates…

Multi-benefits: Empirical studies have indicated that car sharing could provide benefits in terms of transportation, environment, land use and social benefits. It provides an alternative to car ownership, when a car is needed only occasionally for moving large items, short trips and the like. A different case is sharing a car within a household with two or more drivers.

By limiting the number of vehicles running on road at a given time, car sharings can significantly mitigate congestion and pollution, and also reduce the parking demand. For low-income households or individuals who could not afford car ownership, car share makes automobile use more accessible. Ms. Robin Chase, Founder-Owner of Zipcar, one of the biggest car share companies, talks about social benefits brought about through car sharing.
Please see: http://www.ted.com/talks/lang/eng/robin_chase_on_zipcar_and_her_next_big_idea.html

Enhancing vehicle fuel economy and GHG emission standards:

Where as most motor vehicle producing countries have registered vehicle fuel economy standards for some time, the impact of their approaches has often fallen short of expectations. The continuous growth of motor vehicle fleets fuel consumption and emissions requires a periodical review and up-dating of policies and measures. Rational policy interventions should best be based on a comprehensive assessment of transport emissions.



Refer to paper by Feng An, Robert Earley and Lucia Green-Weiskel for more complete analysis and information:
http://www.un.org/esa/dsd/resources/res_pdfs/csd-19/Background-paper3-transport.pdf

Fiscal policy instruments, has been effective in improving fuel economy and reducing fuel use, especially when it's jointly implemented with regulations (including standards and laws) and educations (labeling and advertising). Adrian Bradbrook lists series of options in terms of fiscal instruments and incentives like taxes, registration fees, tolls, etc.) in his presentation, refer to http://www.un.org/esa/dsd/susdevtopics/sdt_pdfs/meetings2010/egm0310/presentation_Bradbrook.pdf

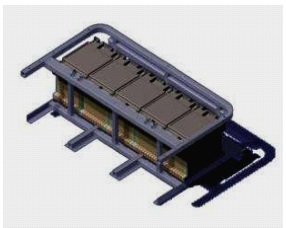
Bill Ford talks about smart cars and smart roads, the video of his talk is available through this link: http://www.ted.com/talks/bill_ford_a_future_beyond_traffic_gridlock.html

Electric Mobility

Growing urban air pollutions, continuing reliance on (imported) fossil fuels and a high volatility in global oil prices are all important factors which motivate modern societies to explore opportunities for diversification in transport fuels and infrastructure. Emerging electric mobility technologies could offer some opportunities for de-carbonization of transport systems.

EV battery technology and cost

2.15 kWh, 20 kg



10 kWh

Technical parameters	
Storage capacity	Efficiency
Safety	Charging time
Weight	Longevity…

For electric vehicles (EV) that use on board stored electricity, battery technology is the key to operational performance and cost. Nickel-metal hydride (NiMH) batteries are used for hybrid electric vehicles (HEV). Lithium battery technology is gaining market share for plug-in hybrid electric vehicles (PHEV).

The reduction of battery cost will remain crucial for EV commercial success and promotion among both the public and private transportation.

In his presentation, Mr. Jeon-Keun Oh gives an overview of battery technology and provides five-year estimated Total Cost of Ownership (TCO) for four types of cars (advanced gasoline, diesel, HEV and EV) bought in 2020 and driven Germany.

Charging stations

A well deployed grid supported by storage power stations with smart chargers is the backbone to ensure the accessibility and efficiency of electric mobility. Quick charge and wireless communication will also be essential for greater use of electric mobility.

A growing EV/PHEV population will need a widely distributed publicly accessible on-street or parking charging system.

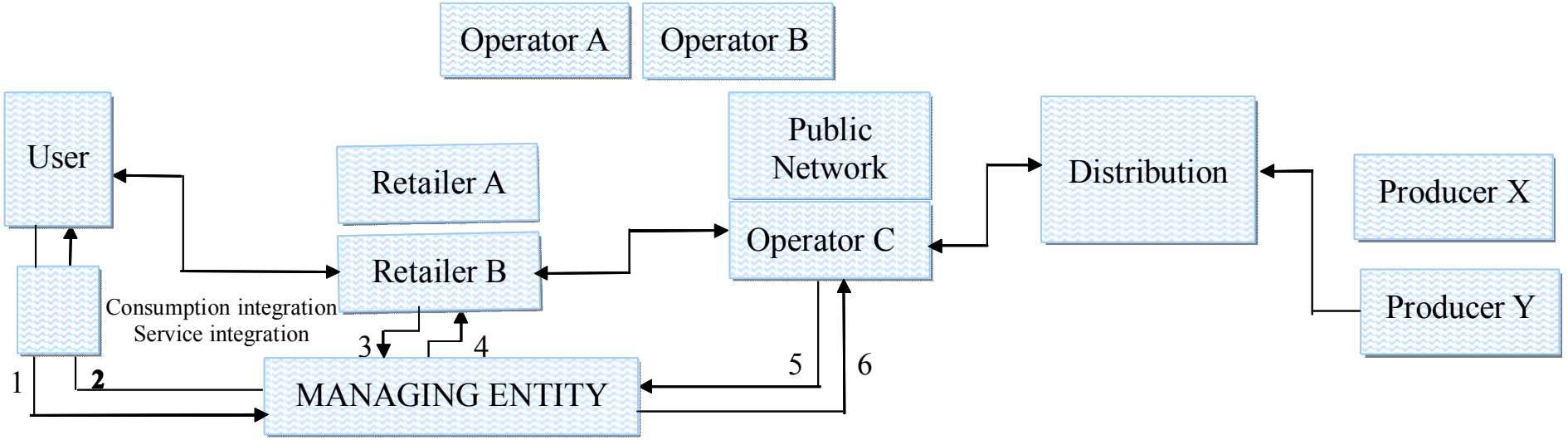
For more information on EV battery, please refer to Mr. Jeon-Keun Oh's presentation:
http://www.un.org/esa/dsd/susdevtopics/sdt_pdfs/meetings2010/egm0310/presentation_Jeon-Keun.pdf

Payment machine

Charging spot

Integrated strategy and electric mobility model

Ms. Francisca Duarte Pacheco's presentation shows newly planned and integrated systems in Portugal, hilighting complementary relations between renewables and electric cars, and illustrating further through an electric mobility model integrating multiple stakeholders (electricity/vehicle retail, energy services, parking, financial services):



1. Prepaid packages subscription; authentification; 2. Sercied invoicing (postpaid); Electricity (to be integrated in the final invoice); 4. MANEGEMENT ENTITY system access fee;
5. Consumption Metering for operators and retailers; Related services accounting; EGMOBI.E system access fee; 6. Charging Service payment (to be integrated in the final invoice).

For more information, please see: http://www.un.org/esa/dsd/susdevtopics/sdt_pdfs/meetings2010/egm0310/presentation_Pacheco.pdf

EV adoption in public transportation

The introduction of hybrid and full electric buses and taxis can offer incremental value and sustainable solutions to address fuel efficiency and climate change issues. The number of countries that manufacture electric vehicles and the number of municipalities that promote EV adoption in public transportation is growing. There is an expanding scope for the international experience sharing.

The Chinese city of Shenzhen is electric buses and electric taxis and is expanding charging facilities. To serve the coming UNIVERSIADE 2011 in middle August, 2011 vehicles powered by new energies would be gradually put into use.

EVs are only "zero emission vehicles" if the electricity is obtained from renewable sources of energy or from energy saving projects.

Carbon offsets of GHG emissions

Carbon offsets can be measured in metric tones of carbon dioxide-equivalent (CO_2e).

Carbon Dioxide (CO_2)
Methane (CH_4)
Nitrous Oxide (N_2O)
Sulfur Hexaflouride (SF_6)
Hydroflourocarbons (HFCs)
Perfluorocarbons (PFCs)

Projects and activities in developing countries which avoid, reduce, or sequester GHG emissions can obtain financial benefits from sale of certified emission credits. Developing countries could therefore play a greater role in promoting climate change mitigation and sustainable transport.

Who would buy it?
In the larger compliance market: companies, governments and other entities which are otherwise unable to meet their emission reduction targets, mainly the global market, the E.U. market and the U.S. market;
In the smaller voluntary market: individuals, companies or governments aware or concerned of the negative environmental impact caused by their energy-intensive life styles or economies.

Who certify? Different protocols and industry standards exist to certify and register carbon offsets like Clean Development Mechanism Gold Standard CDM, Voluntary Carbon Standard, etc.

What are the sources? More than 200 types of projects suitable for generating carbon offsets are identified by the Clean Development Mechanism (CDM) including renewable energy, methane collection & combustion, energy efficiency, reforestation or fuel switching.

Mr. Frank Tietze explains how the ARKTIK model offers to integrates CO2 offsets into the daily routines of car drivers in Germany, creating mutual benefits for all stakeholders. For more information, click here: http://www.un.org/esa/dsd/susdevtopics/sdt_pdfs/meetings2010/egm0310/presentation_Tietze.pdf

In California, innovative "green" taxi services provide eco-friendly transportation by using FlexFuel vehicles. Some taxi companies purchase carbon offsets to neutralize their CO_2 emissions.
For an example, please refer to: http://www.mygreentaxi.com/index.html

Conclusions and Recommendations:

After discussion, the experts and participants who attended the UN Forum in Seoul adopted a set of **Conclusions and Recommendations**, pertaining to

- **Trends and issues in urban transport: Increasing challenges**
- **Practical experiences, challenges, opportunities in urban public transport**
- **Financing of public transport in developing countries**
- **Social and safety concerns**
- **The role of city administrations in the development of urban public transport**
- **Curbing growth of emissions form motor vehicles: Technologies**
- **Innovative transport business models and green growth**
- **Curbing growth of emissions form motor vehicles: Policy options**
- **Urban planning and measures to promote sustainable urban transport**
- **Enhancing policy coherence to address the transport challenges**

For a complete set of conclusions and recommendations please see http://www.un.org/esa/dsd/resources/res_pdfs/csd-18/csd18_2010_bp17.pdf
Further information on the UN Forum can also be obtained from: http://www.un.org/esa/dsd/susdevtopics/sdt_tran_egm0310.shtml

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Concept and design of this booklet: Ms. Jia Fu (Public Information Consultant).

Announcement

RIO+20
United Nations Conference on Sustainable Development

Objectives: To secure renewed political commitment for sustainable development, assess the progress to date and the remaining gaps in the implementation of the outcomes of the major summits on sustainable development, and address new and emerging challenge, with two themes: (a) a green economy in the context of sustainable development and poverty eradication; and (b) the institutional framework for sustainable development.

3rd Preparatory Committee Meeting for UN Conference on Sustainable Development
Rio de Janeiro, Brazil 28-30 May 2012

United Nations Conference on Sustainable Development (Rio +20)
Rio de Janeiro, Brazil 04-06 June 2012

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