



*Integrated Conference of Better Air Quality (BAQ) 2014 &
Intergovernmental Eighth Regional Environmentally Sustainable Transport (EST) Forum in Asia
19-21 November, 2014
Venue: Bandaranaike Memorial International Conference Hall (BMICH), Colombo, Sri Lanka*

Sustainable Transportation and Climate Change Co-benefits - Activities of JICA -

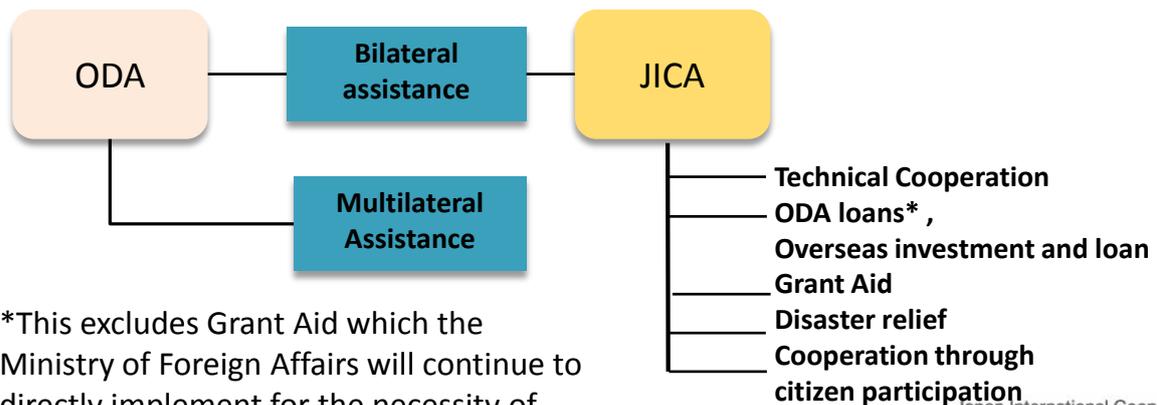
Plenary Session 5
“National and International Effort on Low Carbon Technology Transfer
and Infrastructure Development in Transport Sector”
November 20th, 2014

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Japan International Cooperation Agency

◆ JICA and Japan's ODA

- Since 1954, Japan has been providing financial and technical assistance to developing countries through **ODA (Official Development Assistance)**. **JICA (Japan International Cooperation Agency)** is in charge of administering all ODA except contributions to international organizations.
- JICA, taking advantage of accumulated experiences, the results of assisting of developing countries and Japan's technology, conducts **multi-benefit assistance**, which contributes to sustainable developments in developing countries and simultaneously contributes to resolve various development subjects. JICA assists by mixing organically financial and technical assistance for **mitigation measures**, which contribute to reduce greenhouse gas (GHG) emission and for **adaptation measures** to the negative effects caused by climate change in various sectors .

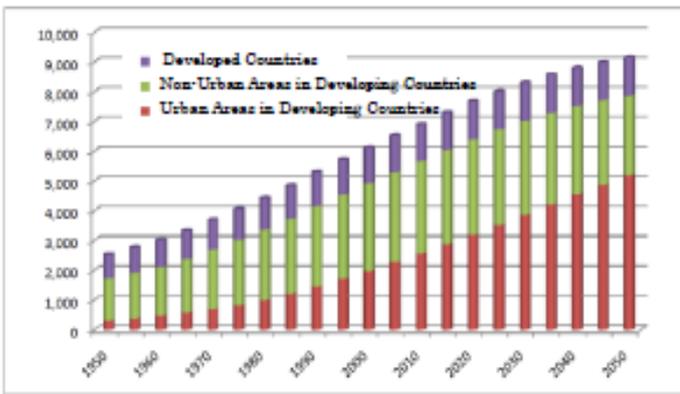


*This excludes Grant Aid which the Ministry of Foreign Affairs will continue to directly implement for the necessity of diplomatic policy.



Toward Sustainable Urban Growth -Background Contexts (1)

Fig. 1: Growing urban population in developing countries



Source: Prepared by JICA based on "World Population Prospects: The 2008 Revision" and "World Urbanization Prospects: The 2009 Revision", United Nations Population Division

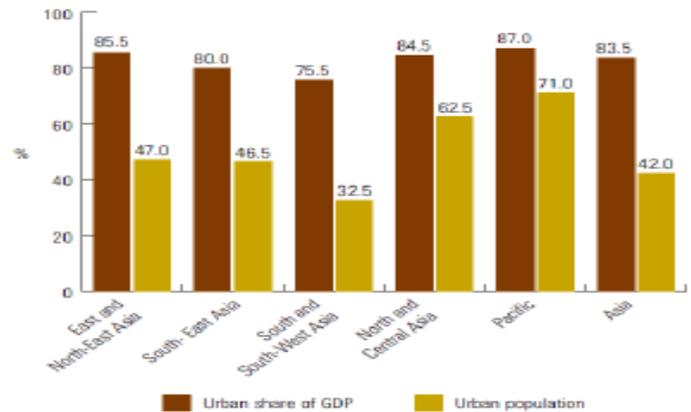
Cities play a leading role in economic development.

Future sustainable development depends on sound urban growth and maximization of the benefits of urbanization.

Nearly 40% of the world's population lives in cities in developing countries.

In 1970, 18.4% of world's population lived in urban areas of developing countries. Now the figure is 37.0%.

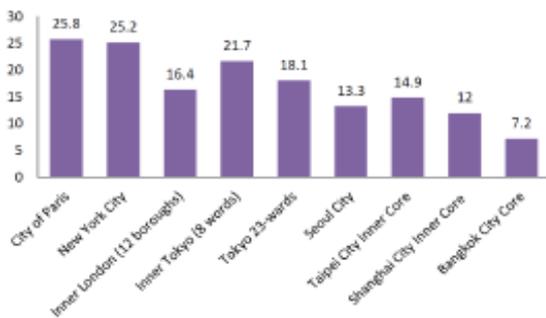
Fig. 2: GDP share of urban areas exceeding population share (Asia and Pacific region, 2008)



Source: "The State of Asian Cities 2010/11", UN-Habitat (2010)

Toward Sustainable Urban Growth -Background Contexts (2)

Fig. 3: Low road ratio in cities of developing countries compared to cities in developed countries (as % of administrative district area; 2004)



Source: Prepared by JICA based on "Developing Sustainable Transport System in Asian Megacities: Challenges and Prospects" (Asia Pacific Weeks in Berlin: Urban Transport and Mobility Conference Workshop I, September 12-14), Raj Acharya, S.R. (2007).

Climate change increases disaster risks

Enormous damage may occur when the scope and intensity of abnormal weather conditions exceed the capacity of urban infrastructure (e.g., rainwater drainage channels to prevent flood)

Shortages of urban infrastructure hindering sustainable development.

In many developing countries, the speed of rapid urban population growth often overtakes urban infrastructure development. Numerous problems associated with shortage in urban infrastructure have emerged (e.g., severe traffic congestion, flood during rains, public spaces piled with garbage, etc.)

Fig. 5: Growing risk of natural disasters* (1950-2009)



Source: Prepared by JICA based on "Disasters in Numbers 2009 and the Decade" (CRED - UNISDR Press Conference, 28 January, Geneva), Guha-Sapir, D. (2010)

Toward Sustainable Urban Transportation –Objectives of JICA’s Cooperation

1. Improvement and Development of Urban Transportation Infrastructures
2. Improvement and Development of **Urban Public Transportation Services**
3. **Transportation Demand Management (TDM)**
4. Enhancement of Transportation Safety
5. **Prevention/Improvement of Environmental Deterioration** due to Urban Transportation





Toward Sustainable Urban Transportation –Environment and Climate Change Co-benefits

Urban Public Transportation Services

- ✓ Improvement of Bus Services including introduction of BRT
- ✓ Introduction of Rail-based Public Transportation Services, including MRT, LRT, Monorail and AGT
- ✓ Management Improvement of Public Transportation Service Providers

Reduction of
GHG Emission
(from automobiles)

Transportation Demand Management (TDM)

- ✓ Promotion of **Modal Shift** from Private Cars to Public Transportation Services
- ✓ Optimization of Urban Transportation Demand
- ✓ Improvement of Urban Transportation Operation and Management

Prevention of
Air Pollution

Prevention/Improvement of Environmental Deterioration

- ✓ Exhaust Gas Emission Control
- ✓ Improvement of Road Infrastructure and Facilities in view of **Preventing Environmental Degradation**
- ✓ Introduction of Policy Measures to Mitigate Urban Environmental Degradation

Resilient
Infrastructure
(Ex. Flood Measures)

【Case Studies】



<ODA Yen Loan + Technical Cooperation> Hanoi Urban Railway Project (Line 1,2)



Background

- Rapid increase in traffic amount due to economic and population growth in the city of Hanoi, and Increase in traffic jam, traffic accidents and air pollution

Project Plans

Line 1: Approx. 15 km from eastern Gia Lam to southern Ngoc Hoi
(12 elevated stations)

Line 2: Approx. 11.5 km from Nam Thang Long to Tran Hung Dao
(3 underground stations and 7 elevated stations)

Financing of ODA Yen Loans

Approx. 345 billion yen (about \$ 3.92 billion) in total project expenses

Schedule Year of Completion

Line 1: 2019, Line 2: 2018

Features and Impacts

● Contribution to sustainable urban development

Expansion of the Commutable Area, Alleviation of Congestion, prevention of air pollution, etc.

● Utilization of O & M know-how and technology of Japan

-Tokyo Metro Co., Ltd. joined JICA Technical Cooperation Project in Hanoi for providing know-how of railroad managements in Japan

-Possibility is considered about introduction of the "Suica System" (a rechargeable contactless smart card used as a fare card) in Hanoi

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“Delhi Mass Rapid Transport System Project Phase 3” (ODA Yen Loan)

- Loan Agreement: March 29, 2012
- Loan Amount: 127,917 million yen
- Executing Agency: Delhi Metro Rail Cooperation Limited (DMRC)

■ Project Background

Rapid urbanization and surging number of automobiles and motorcycles (with annual average growth of 11% since 1997), resulting in heavy traffic congestion and air pollution

◆ Project Objective

Extending the mass rapid transport system totaling approximately 103 km (total 245km throughout phase 1-3) in length, thereby contributing to regional economic development and improvement of the urban environment

◆ Project Components

Civil works, Electrical and Signaling & Telecommunication System, Procurement of Rolling Stocks, Consulting services, and introduction of regenerative braking systems

◆ Schedule

March 2012 – October 2020

◆ Estimated GHG emission reduction as “Project Impact”

-About 22 million tons (in terms of CO2 equivalent: total amount of the reduction between 2008 and 2032 achieved by Phases 1 to 3) , due to both of below:

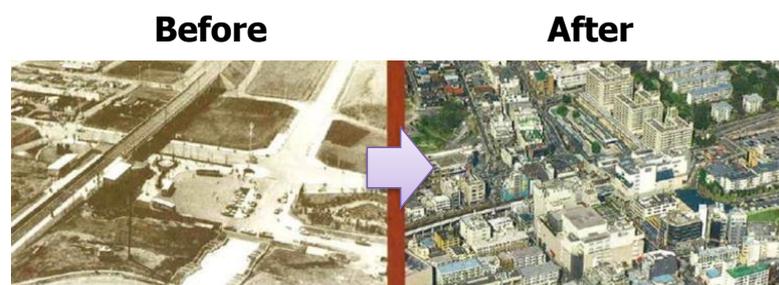
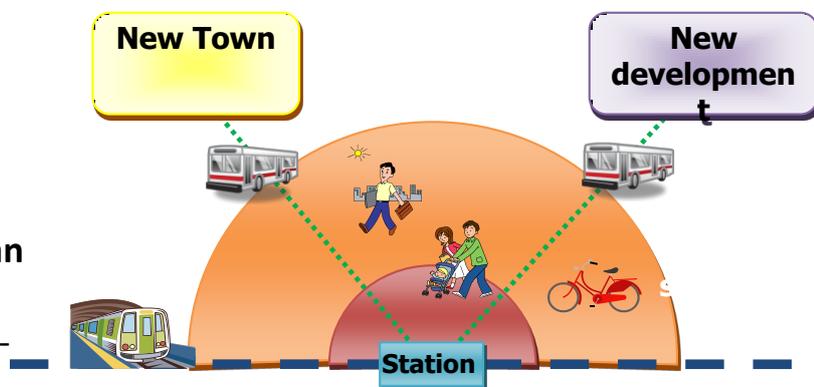
- Introduction of regenerative braking systems for electricity powered vehicles, and
- Development of a modal shift (cf. JICA Climate-FIT)

◆ Introduction of regenerative braking systems has been registered as a CDM project.

Concept of Transit Oriented Development (TOD)

Basic Principles of Transit Oriented Development (TOD)

- ◆ **Maximization of the use of public transport**
 - Less dependence on private vehicles
- ◆ **Promotion of sustainable and smart urban growth**
 - Highly efficient land use (compact and mass-transit based)
 - Connection of urban centers each other
- ◆ **Reduction of road traffic congestions and improvement in public transport service**
 - High capacity and high quality public transport service along main transport corridor
 - High accessibility to UMRT
 - Ex.) Station area development of walking distance ($r \approx 500\text{m}$)

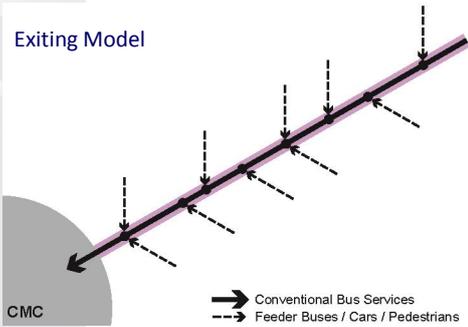


⇒ High density and complex landuse

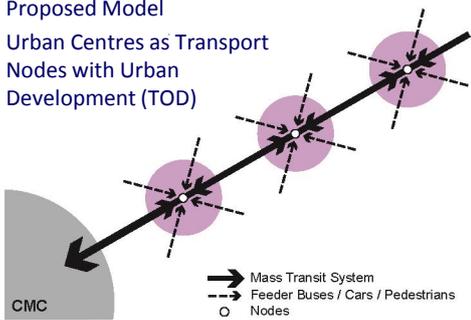
TOD also in Colombo Urban Transport Master Plan

Urban Development Structure will be realized together with "TOD" development and integrated urban transport system.

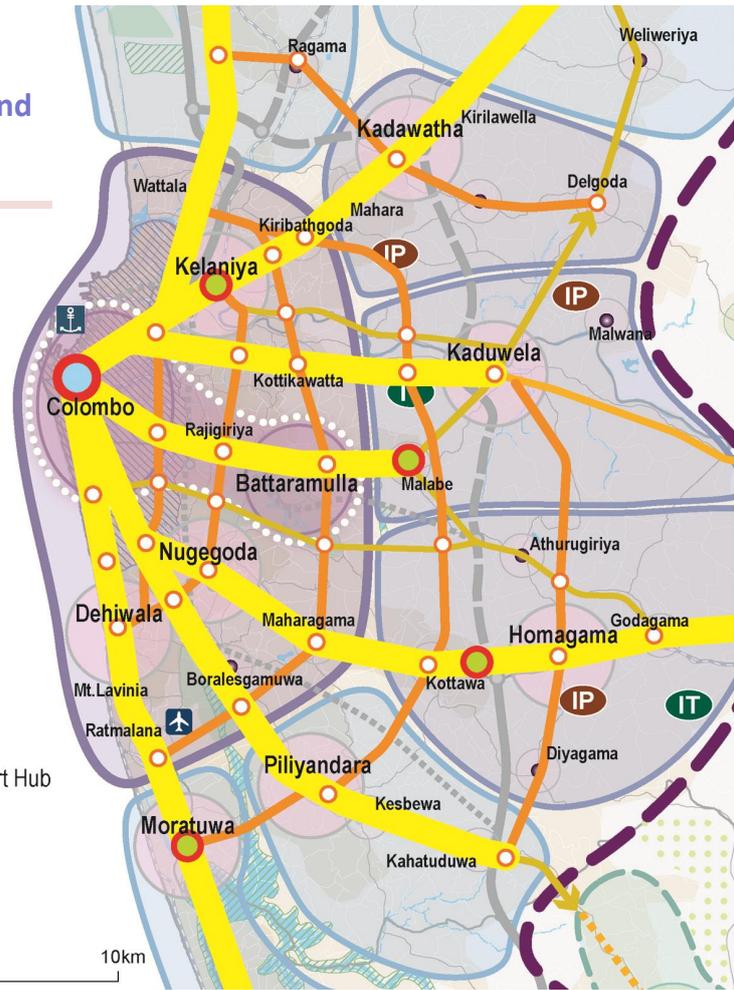
Exiting Model



Proposed Model
Urban Centres as Transport Nodes with Urban Development (TOD)

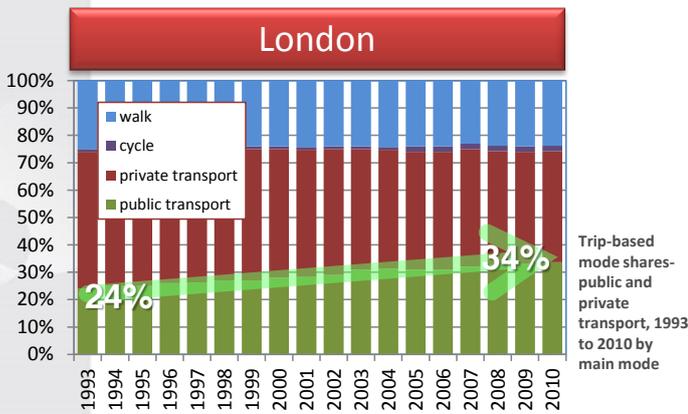


- Multimodal Transport Hub (Pettah)
- Multimodal Centre
- TOD



Public Transport Intensive Cities

TOD cities create more Public Transport User.

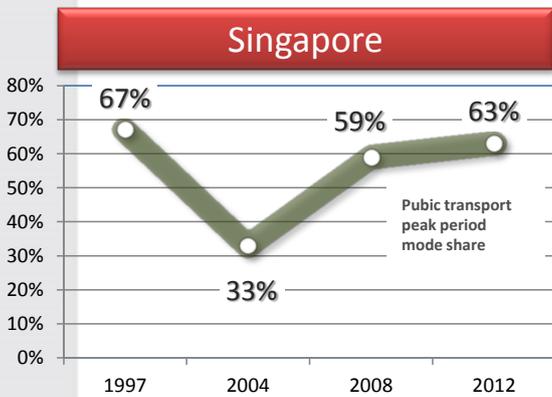


Source: Transport for London (TfL) Strategy and Planning, Travel in London, Report 4, page28

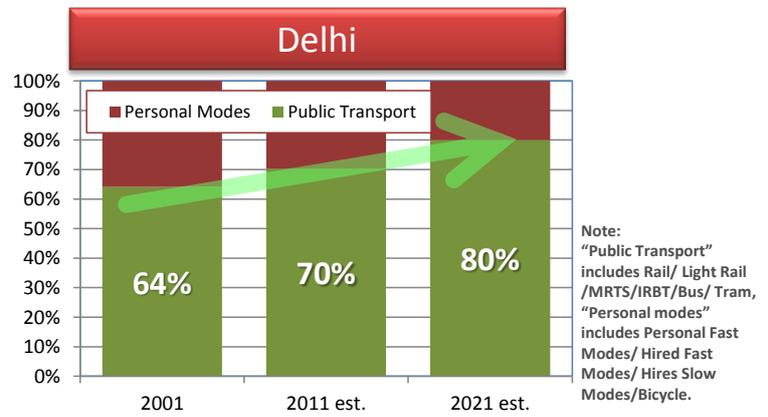


Source: Tokyo Metropolitan Area Travel Survey 2008

Note: “%” means public modal share of rail and bus.



Source: Household Interview Travel Survey (HITS), 2012, Land Transport Authority (LTA)



Source: MPD-2021, transport demand forecast study (2010)

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Note: “Public Transport” includes Rail/ Light Rail /MRTS/IRBT/Bus/ Tram, “Personal modes” includes Personal Fast Modes/ Hired Fast Modes/ Hires Slow Modes/Bicycle.

Conclusion

- ◆ Efficient integration of public transportation systems into urban development plans would lead to convenient lifestyles of urban communities, as well as environmental and climate change co-benefit.
- ◆ Introduction of the concept of TOD (Transit-oriented development) at an early stage of urban development is essential.



JICA Urban Sector Projects – Urban Transport (M/P)

- Development Study / Technical Cooperation for Development Planning
- Technical Cooperation Project

ROMANIA	<ul style="list-style-type: none"> ● The Comprehensive Urban Transport Study of Bucharest City and its Metropolitan Area in Romania
ALBANIA	<ul style="list-style-type: none"> ● Project for Tirana Thematic Urban Planning
SYRIA	<ul style="list-style-type: none"> ● The Study on Urban Transportation Planning of Damascus City in the Syrian Arab Republic
LEBANON	<ul style="list-style-type: none"> ● The Study of Environmental Friendly Integrated Transportation Plan for Greater Tripoli in the Republic of Lebanon
SOUTH SUDAN	<ul style="list-style-type: none"> ● Juba Urban Transport Infrastructure and Capacity Development Study
LIBERIA	<ul style="list-style-type: none"> ● Master Plan Study on Urban Facilities Restoration and Improvement in Monrovia
UGANDA	<ul style="list-style-type: none"> ● The Study on Greater Kampala Road Network and Transport Improvement
COLOMBIA	<ul style="list-style-type: none"> ● Comprehensive Urban Transport Study in Barranquilla Metropolitan Region ● The Urban Transport Study in the City of Cartagena de Indias ● Urban Transportation for Santafe de Bogota City
NICARAGUA	<ul style="list-style-type: none"> ● The Study on Comprehensive Transportation Plan in the Municipality of Managua in the Republic of Nicaragua
HONDURAS	<ul style="list-style-type: none"> ● Maintenance Project of the Vehicle Traffic System in Teguchigajon
GUATEMALA	<ul style="list-style-type: none"> ● Comprehensive Urban Transportation System in Guatemala Metropolitan Area
ECUADOR	<ul style="list-style-type: none"> ● Quasavall City Urban Transportation Plan
PERU	<ul style="list-style-type: none"> ● The Master Plan for Lima and Callao Metropolitan Area Urban Transportation
BRAZIL	<ul style="list-style-type: none"> ● Urban Transport in Belem ● The Local Development Study on Update of Master Plan for Urban Transportation in the Metropolitan Area of Belem in Brasil
PARAGUAY	<ul style="list-style-type: none"> ● The Transportation Facilities Improvement Project of the Asuncion Metropolitan Area ● The Aftercare Study on Urban Transportation Planning in Asuncion Metropolitan Area
DEMOCRATIC REPUBLIC OF THE CONGO	<ul style="list-style-type: none"> ● Survey for the Comprehensive Transport System Development between Kinshasa and Banana
BURUNDI	<ul style="list-style-type: none"> ● Emergency Study on Urban Transportation in Bujumbura
KENYA	<ul style="list-style-type: none"> ● The Master Plan and Feasibility Study to alleviate Traffic Congestion and improve Traffic safety in the Nairobi Metropolitan Area

PAKISTAN	<ul style="list-style-type: none"> ● Comprehensive Study on Transportation System in Lahore ● Project for Lahore Transport Master Plan
YEMEN	<ul style="list-style-type: none"> ● Urban Transport Study
AZERBAIJAN	<ul style="list-style-type: none"> ● Urban Transportation Improvement in The City of Baku in the Republic of Azerbaijan
IRAQ	<ul style="list-style-type: none"> ● Bagdad City Urban Transport Improvement
TURKEY	<ul style="list-style-type: none"> ● The Study on Integrated Urban Transportation Master Plan for the Istanbul Metropolitan Area
EGYPT	<ul style="list-style-type: none"> ● Greater Cairo Region Transportation Masterplan ● Transportation Master Plan and Feasibility Study of Urban Transport Projects in Greater Cairo Region in the Arab Republic of Egypt ● The Study on the Alexandria Comprehensive Urban Transport Plan in the Arab Republic of Egypt
MOZAMBIQUE	<ul style="list-style-type: none"> ● Master Plan and Feasibility Study for the Road Development in the City of Maputo in the Republic of Mozambique ● the Project for the Comprehensive Urban Transport Master Plan for the Greater Maputo
TANZANIA	<ul style="list-style-type: none"> ● Dar es Salaam Road Development Plan ● Urban Transport Policy and System Development Master Plan for the City of Dar es Salaam
SRI LANKA	<ul style="list-style-type: none"> ● The Feasibility Study on Outer Circular Highway to the City of Colombo in the Democratic Socialist Republic of Sri Lanka ● The Study on Urban Transport Development of the Colombo Metropolitan Region

INDIA	<ul style="list-style-type: none"> ● National Highway Bypasses
INDONESIA	<ul style="list-style-type: none"> ● Medan Area Transportation ● Urban/Suburban Railway Transportation in Jabotabek Area ● Arterial Road System Development Study in Jakarta Metropolitan Area ● Ujung Pandang Area Highway Development Study ● Integrated Transportation System Improvement by Railway and Feeder Service in Jabotabek Area ● A Study for Arterial Road System Development in Surabaya Metropolitan Area in the Republic of Indonesia ● The Study for Development of the Greater Surabaya Metropolitan Area in the Republic of Indonesia ● JABODETABEK Urban Transportation Policy Integration ● Project for Master Plan Study on Port Development and Logistics in Greater Jakarta Metropolitan Area ● Project for the Study on JABODETABEK Public Transportation Policy Implementation Strategy

KYRGYZ REPUBLIC	<ul style="list-style-type: none"> ● The Study on Improvement of Urban Transportation in Bishkek City
MONGOLIA	<ul style="list-style-type: none"> ● Master Plan Study on Improvement and Rehabilitation of Road Network in Ulanbaatar, Mongolia
CHINA	<ul style="list-style-type: none"> ● Comprehensive Transportation System in Dalian City ● Study for Road Network Development Plan in Changsha City in the People's Republic of China ● Study for Public Transportation Improvement in Chengdu city in the People's Republic of China
LAOS	<ul style="list-style-type: none"> ● The Study of Master Plan on Comprehensive Urban Transport in Vientiane Capital
VIET NAM	<ul style="list-style-type: none"> ● Urban Transportation for Hanoi City ● the Study on Urban Transport Master Plan and Feasibility Study in HCM Metropolitan Area in the Socialist Republic of Viet Nam (HOUTRANS)
PHILIPPINES	<ul style="list-style-type: none"> ● Davao City Urban Transport and Land Use ● Metro Manila Transportation Planning ● Metro Manila Urban Expressway System Study ● The Study on Metro Manila Urban Transport Integration in the Republic of Philippines ● Feasibility Study on Upgrading Inter-Urban Highway System (Sta. Riza-San. Jose Road Section) in the Republic of Philippines ● The Study on the Standardization for Integrated Railway Network of Metro Manila in the Republic of Philippines ● Study on the Improvement of Existing Bridges along Pasig River and Marikina River ● F/S on Road Network Improvement for Development of Regional Growth Centers ● The Master Plan on High Standard Highway Network Development in the Republic of the Philippines
THAILAND	<ul style="list-style-type: none"> ● Bangkok Suburban Transportation Project ● Medium to Long Term Improvement/Management Plan of Road and Road Transport in Bangkok ● Improvement Plan for Railway Transport around Bangkok Metropolis in Consideration of Urban Development ● The Study on Improvement of Road Traffic Environment
CAMBODIA	<ul style="list-style-type: none"> ● The Transport Master Plan of the Phnom Penh Metropolitan Area in the Kingdom of Cambodia ● The Feasibility Study on the Ring Road Project of Phnom Penh Metropolitan Area
MALAYSIA	<ul style="list-style-type: none"> ● Urban Transport in Greater Metropolitan Areas of George Town, Butterworth and Bukit Mertajam ● JB-Transplan: Road Construction and Improvement Project in Johor Bahru and its Conurbation ● Klang Valley Transportation Study ● A Study on Integrated Urban Transportation Strategies for Environmental Improvement in Kuala Lumpur

Sources: Knowledge Site (information as of 2012/2/1); Thematic Guideline – Urban and Regional Development (published in 2007/3); Follow-up Survey on Completed Development Studies (projects completed by the end of FY 2008); Operations Management Support System (information as of 2012/2/06)

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Thank you for your attention!