

*Cobenefit
of Urban Railway Development
Funded by Japanese ODA Loans*

~ Addressing Climate Change ~

UCHIDA Tsutomu
Deputy Director General
Japan Bank for International Cooperation

18 March 2008

- 1 Toward GHG emissions reduction in the traffic sector**
- 2 Mass Transport Projects with Cobenefit**
- 3 Cobenefit**
- 4 How to assess cobenefit
(Calculation scheme)**

Toward GHG emissions reduction in the traffic sector

Social Problems in major cities in developing countries

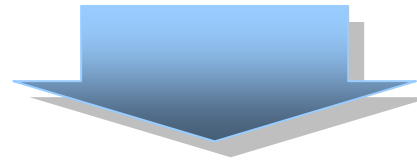
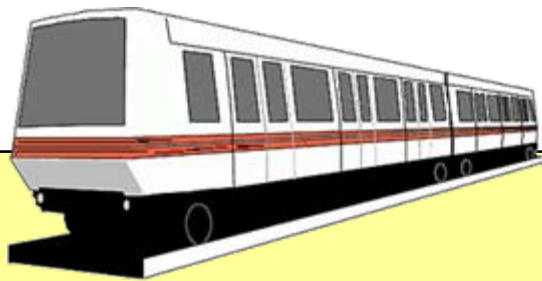
Economic Loss Caused by Traffic Congestion

Worsening Air Pollution / Other Adverse Impacts on Regional Economy

Increasing GHG Emissions from Global Perspective



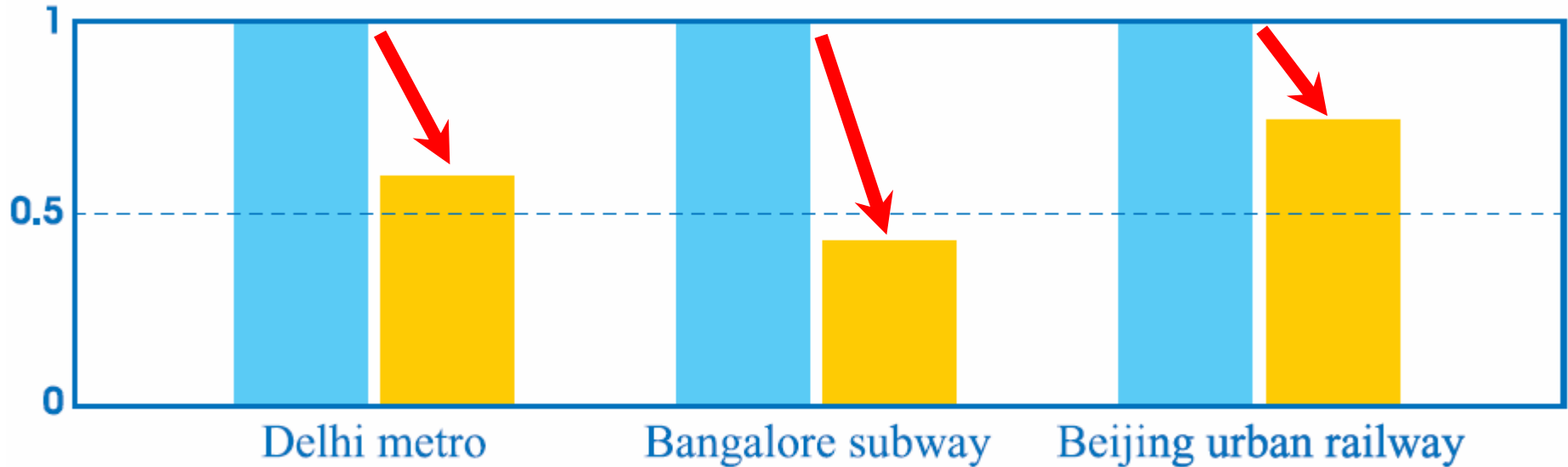
Rapidly Increasing Traffic Volume
(caused by economic growth / concentration of population)



JBIC is focusing on
Development of Urban Railway

Toward GHG emissions reduction in the traffic sector

Urban railway development reducing GHG emissions



Without urban railway

With urban railway

Railway system generates less CO₂ emissions

only 40%~80%



Buses / Automobiles / Motorbikes / Other Means of Transportation

Objectives of the Study

Improve Emission Reduction Effects

Soft Measures
designed to encourage the use of rail service



GHG Reduction Effects

*Learning from
GHG Reduction Effect*



For New Projects

Mass Transport Projects with Cobenefit (1/2)

India

Railway Project	Summary	Date of Approval	Project Cost		Total Length km	Traffic Capacity million man*km/day
			Total	JBIC Loan		
			Billion Yen	Billion Yen		
1 Delhi high-speed railway phase I	Constructing a subway (11.0km), and a surface and elevated rail corridor (44.3km)	1997/2/25	278	163	65.1	5.88
2 Bangalore subway	Constructing the city's first mass rapid transport system	2006/3/31	133	45	33.0	8.25



Delhi high-speed railway (Reference: DELHI METRO RAIL CORPORATION website)

Mass Transport Projects with Cobenefit (2/2)

Thailand

Railway Project	Summary	Date of Approval	Project Cost		Total Length	Traffic Capacity
			Total	JBIC Loan		
			Billion Yen	Billion Yen	km	million man*km/day
3-1 Mass Transport System Project in Bangkok (Red Line)	Construction of a 26.0km urban rail system in Bangkok	-	-	-	26.0	2.00
3-2 Mass Transport System Project in Bangkok (Blue Line)	Construction of a 27.0km urban rail system in Bangkok	-	-	-	27.0	2.54
3-3 Mass Transport System Project in Bangkok (Purple Line)	Construction of a 20.9km urban rail system in Bangkok	-	-	-	20.9	1.70

Vietnam

Railway Project	Summary	Date of Approval	Project Cost		Total Length	Traffic Capacity
			Total	JBIC Loan		
			Billion Yen	Billion Yen	km	million man*km/day
4 Ho Chi Minh City urban railway	Construction of a 19.7km urban rail system in Ho Chi Minh City	-	-	-	19.7	2.20

Note: - means no data.

GHG Reduction by development of railway (1/2)

Railway Project	CO2 emission	CO2 reduction	Reduction rate	Newly planted trees	Number of passengers per vehicle
	million kgCO2/year	million kgCO2/year			
1 Delhi high-speed railway phase I	113	46.2	40.8%	7118ha	65.6man
2 Bangalore subway	159	89.2	56.2%	13750ha	141.5man

GHG Reduction by development of railway (2/2)

Railway Project	CO2 emission	CO2 reduction	Reduction rate	Newly planted trees	Number of passengers per vehicle
	million kgCO2/year	million kgCO2/year			
3-1 Mass Transport System Project in Bangkok (Red Line)	90.4	80.1	88.6%	12343ha	78.0man
3-2 Mass Transport System Project in Bangkok (Blue Line)	115.0	102.0	88.6%	15675ha	78.0man
3-3 Mass Transport System Project in Bangkok (Purple Line)	76.9	68.1	88.6%	10491ha	78.0man
4 Ho Chi Minh City urban railway	78.3	59.7	76.2%	9191ha	75.9man

Forest Area Needed

When CO2 is Absorbed by Newly Planted Trees (1/2)

Railway Project	Comparison with major facilities in individual host countries
1 Delhi high-speed railway phase I	3.0 times the site area of Indira Gandhi International Airport (2400ha)
2 Bangalore subway	5.7 times the site area of Indira Gandhi International Airport (2400ha)

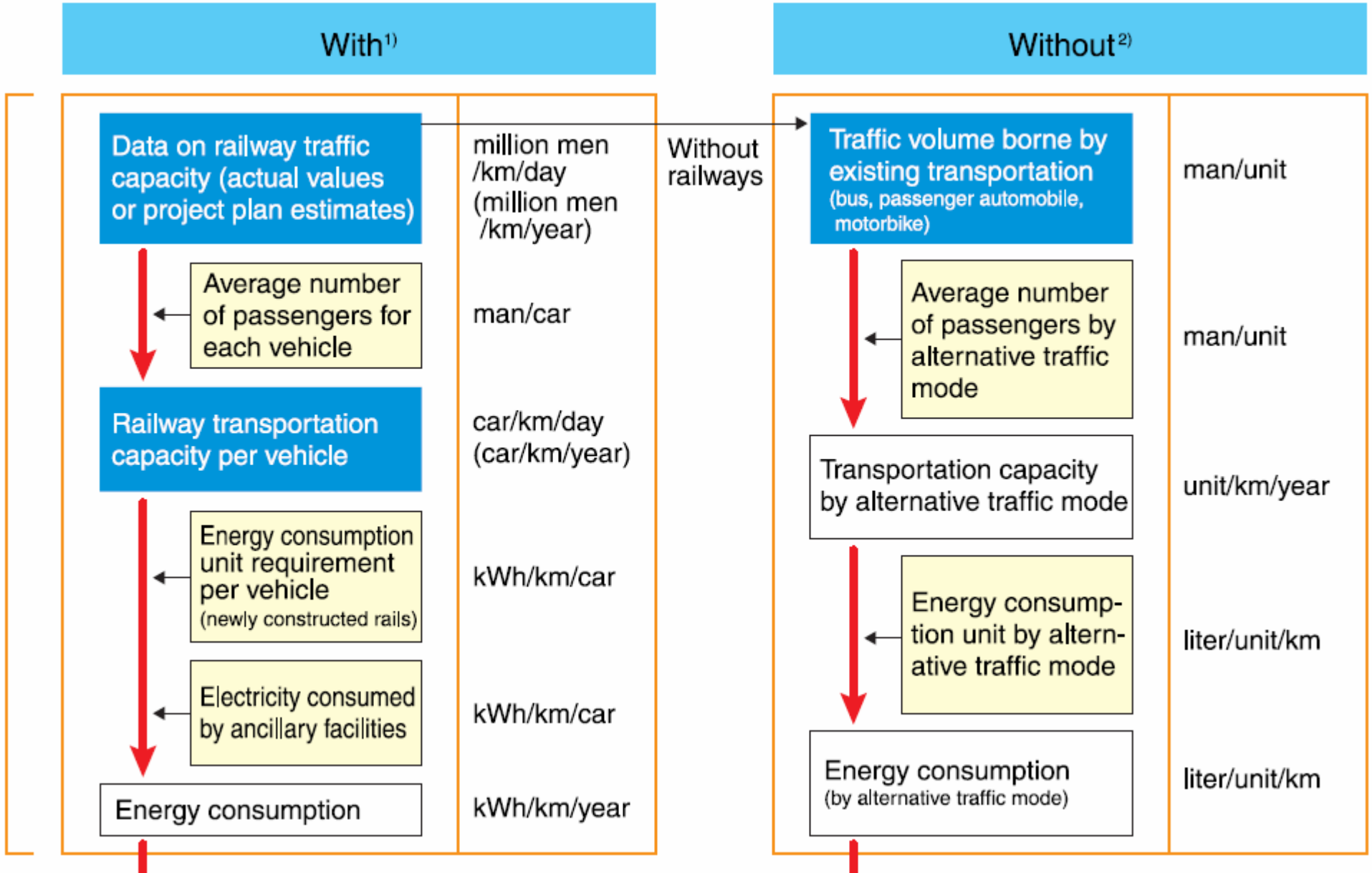
Forest Area Needed

When CO2 is Absorbed by Newly Planted Trees (2/2)

Railway Project	Comparison with major facilities in individual host countries
3-1 Mass Transport System Project in Bangkok (Red Line)	3.9 times the site area of Suvarnabhumi International Airport (3200ha)
3-2 Mass Transport System Project in Bangkok (Blue Line)	4.9 times the site area of Suvarnabhumi International Airport (3200ha)
3-3 Mass Transport System Project in Bangkok (Purple Line)	3.3 times the site area of Suvarnabhumi International Airport (3200ha)
4 Ho Chi Minh City urban railway	13.6 times the site area of Tansonnhat International Airport (675ha)

How to assess cobenefit (Calculation scheme) (1/2)

Evaluation of energy consumption

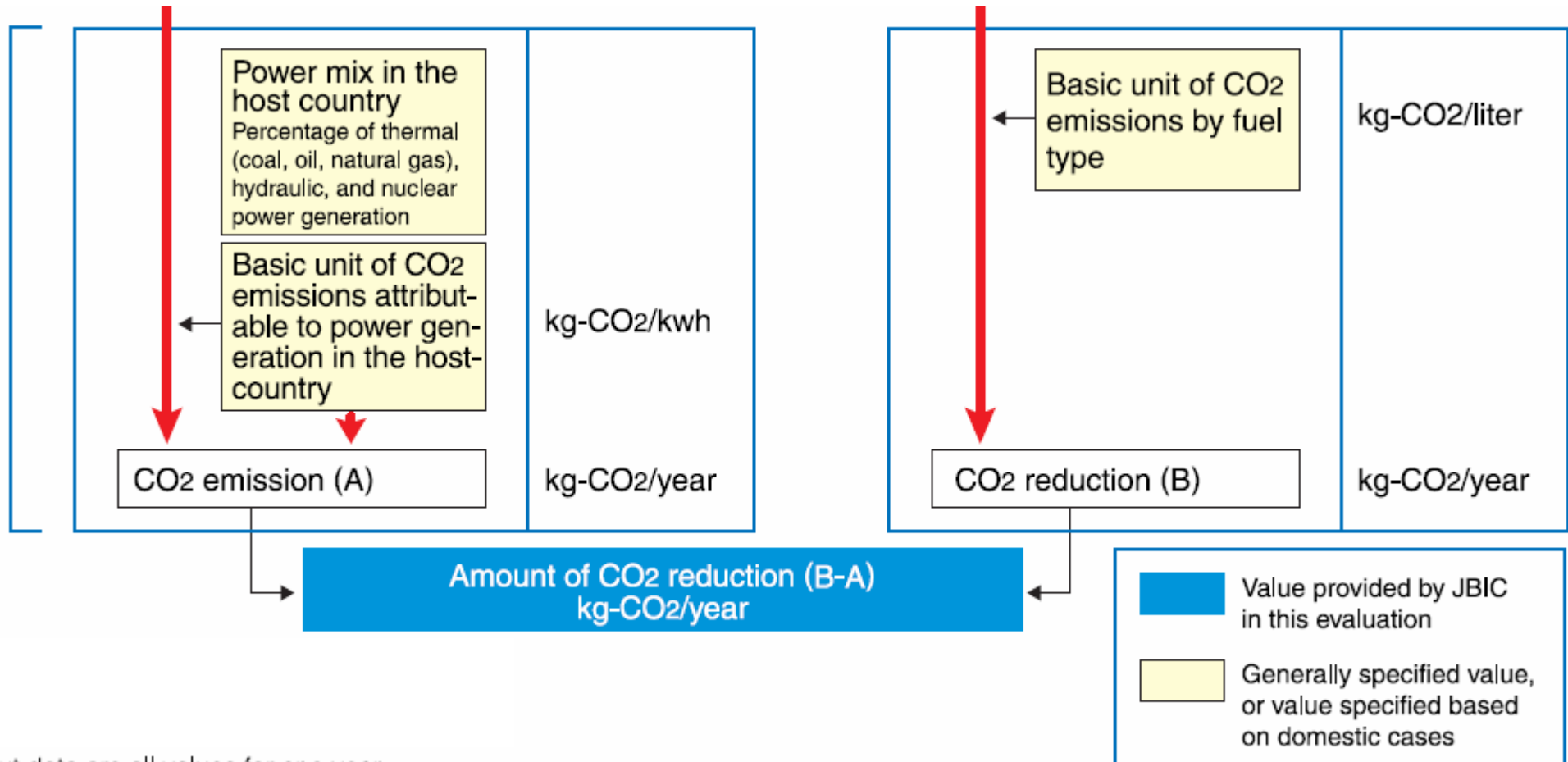


(Continued on the next page)

How to assess cobenefit (Calculation scheme) (2/2)

(Continued from the previous page)

Evaluation of CO2 Emission



Input data are all values for one year.

1. With evaluation: Evaluation in a case if the project is implemented
2. Without evaluation: Evaluation in a case if the project is not implemented (or evaluation in the existing conditions)

Thank you very much.

For your reference

<http://www.jbic.go.jp/>