Mainstreaming Co-benefits:
Concepts and Applications

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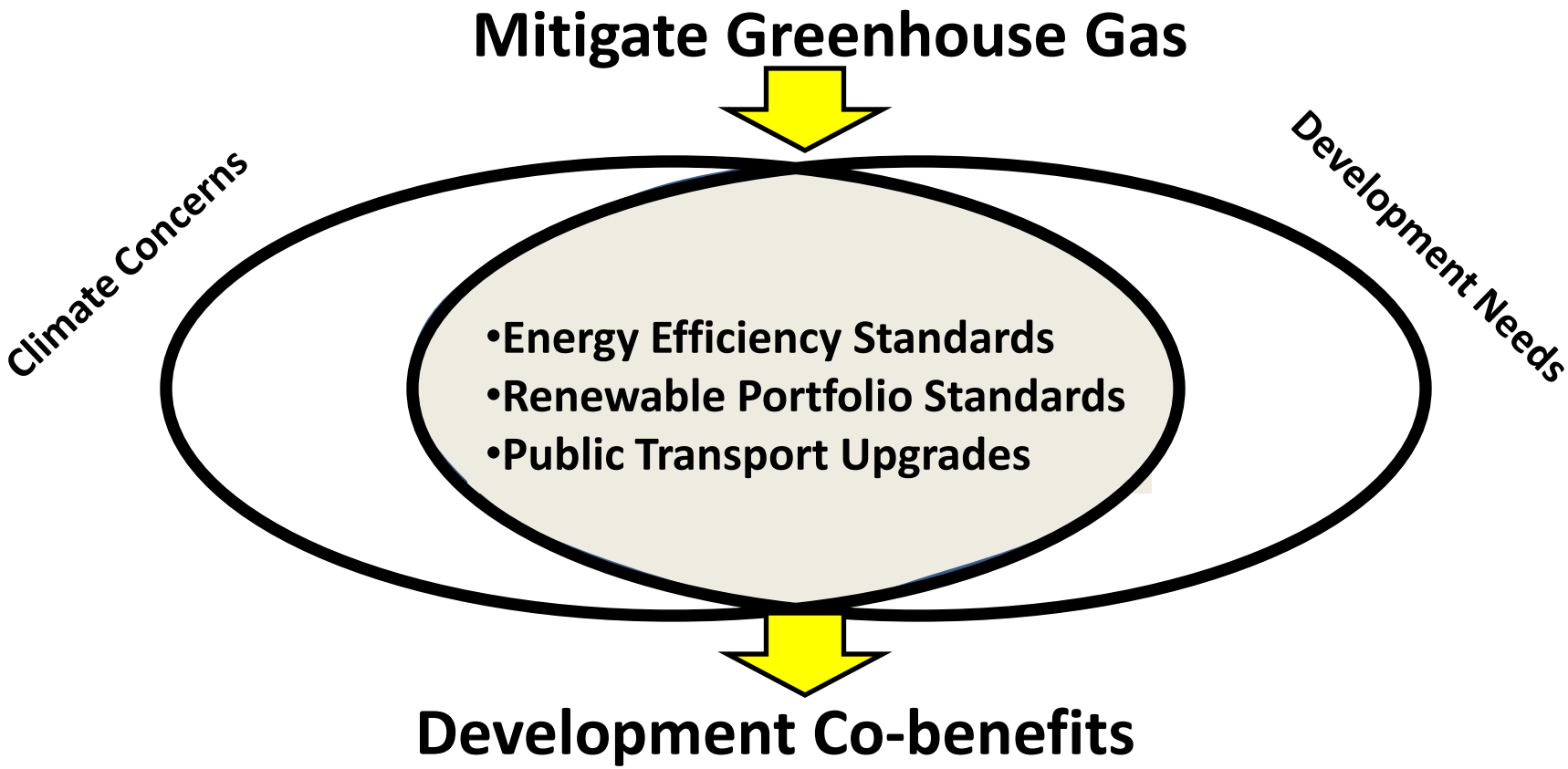
Roadmap

1. Background and Concepts
2. Toward a Co-benefits Approach
3. An Example
4. Discussion Questions: Recognizing and Rewarding

Background and Concepts

Nice to Meet you Co-benefits



Economic	Environmental	Social
•Cleaner Technologies •Faster Commutes	•Improved Air Quality •Reduced Waste	•Greater Energy Access •Enhanced Mobility

Economic	Social	Environmental

Co-benefits

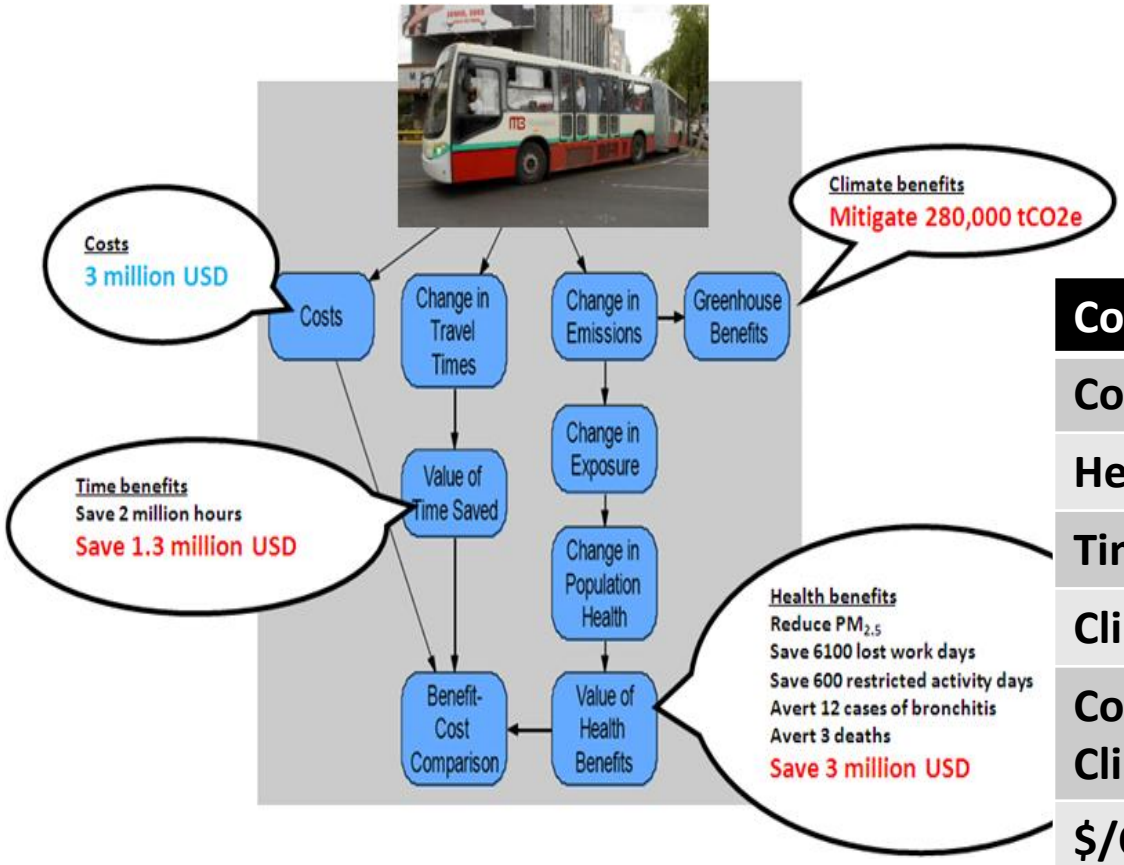
Why Co-benefits

- **GHG mitigation benefits**
- **GHG mitigation costs**
- **Development benefits**

Spatial	Temporal	Certainty
Global	Long-term	Uncertain
Local	Near-term	Certain
Local	Near-term	Certain

Krupnick , Butraw and Markandya, 2000

Most studies quantify co-benefits



Costs/ Benefits	Value
Costs	$3,000,000
Health Benefits	$3,000,000
Time Benefits	$1,300,000
Climate Benefits	280,000 tCO_2e
Co-Benefits/ Climate Benefits	$4,300,000/ 280,000$tCO_2e$
$/$CO_2e$	$15.00

Source: USEPA, 2007

Measuring Benefits: Not New

1804-1866
Jules Dupuit

1936 Flood
Control Act

1980 Executive
Order 12291

Research on Co-benefits

Many studies quantified air quality improvements and monetized health benefits

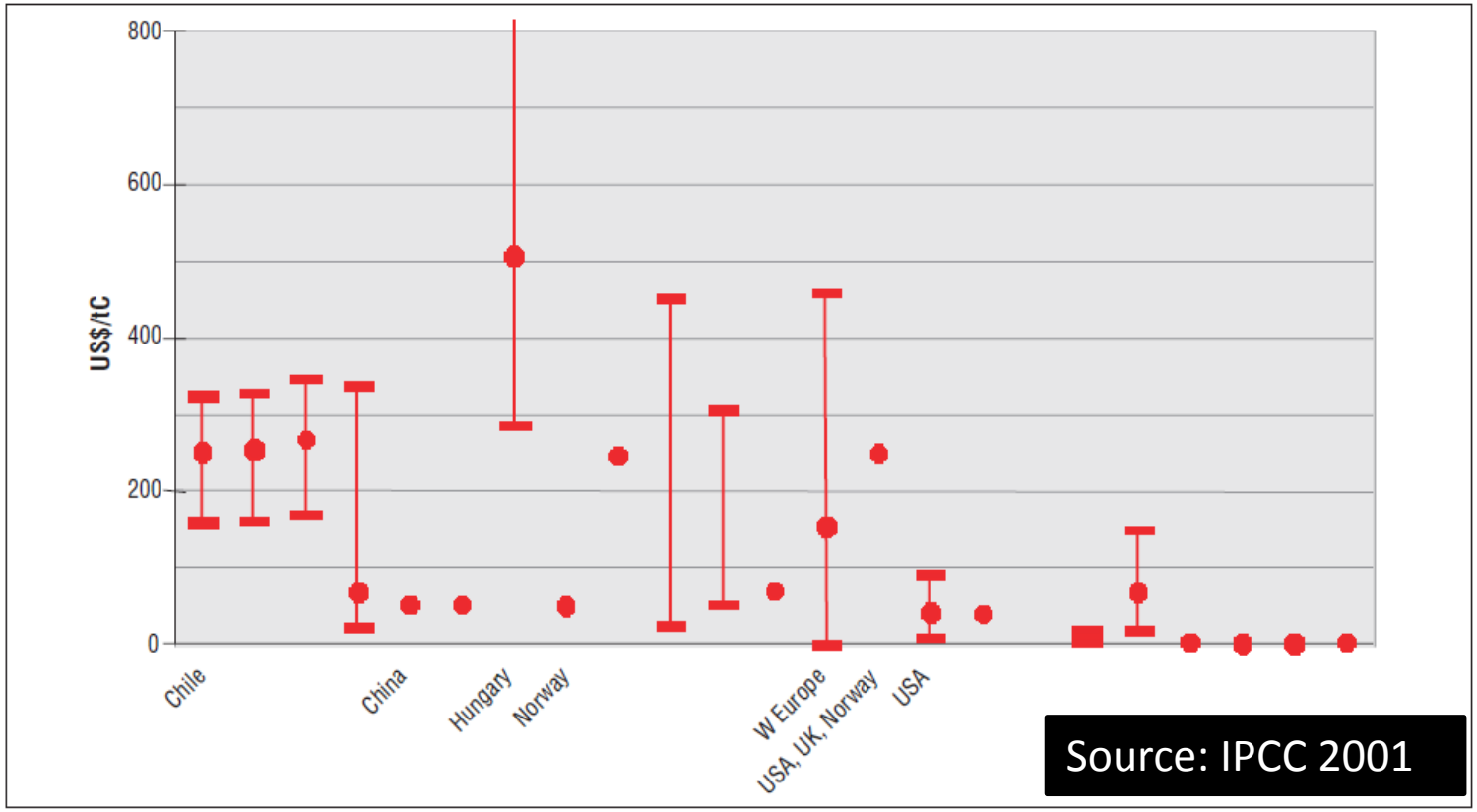
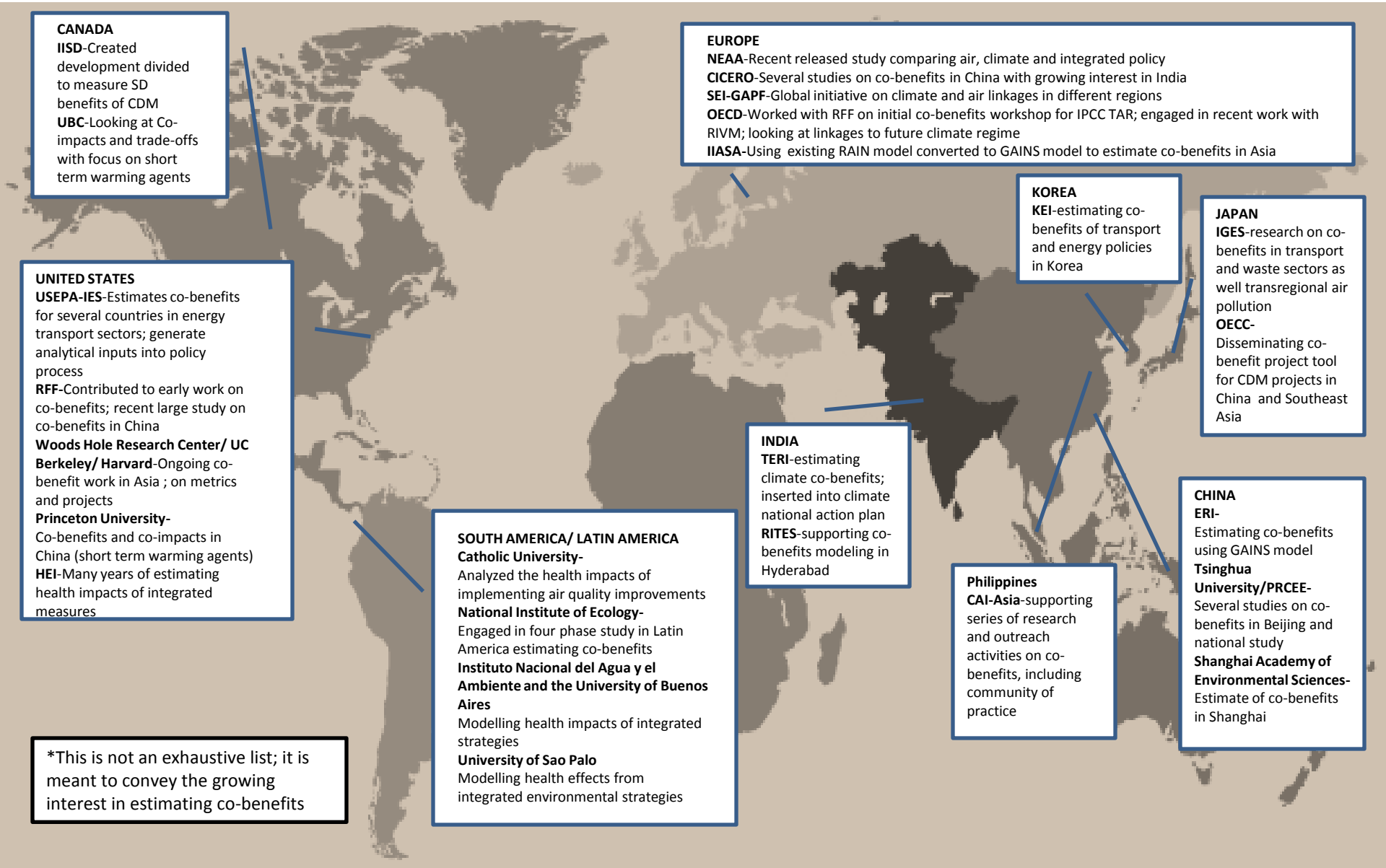


Figure 8.9: Summary of ancillary benefits estimates in 1996 US$/tC.

Many Organizations Conducting Research



CANADA
IISD-Created development divided to measure SD benefits of CDM
UBC-Looking at Co-impacts and trade-offs with focus on short term warming agents

EUROPE
NEAA-Recent released study comparing air, climate and integrated policy
CICERO-Several studies on co-benefits in China with growing interest in India
SEI-GAPF-Global initiative on climate and air linkages in different regions
OECD-Worked with RFF on initial co-benefits workshop for IPCC TAR; engaged in recent work with RIVM; looking at linkages to future climate regime
IIASA-Using existing RAIN model converted to GAINS model to estimate co-benefits in Asia

KOREA
KEI-estimating co-benefits of transport and energy policies in Korea

JAPAN
IGES-research on co-benefits in transport and waste sectors as well transregional air pollution
OECC-Disseminating co-benefit project tool for CDM projects in China and Southeast Asia

UNITED STATES
USEPA-IES-Estimates co-benefits for several countries in energy transport sectors; generate analytical inputs into policy process
RFF-Contributed to early work on co-benefits; recent large study on co-benefits in China
Woods Hole Research Center/ UC Berkeley/ Harvard-Ongoing co-benefit work in Asia ; on metrics and projects
Princeton University-Co-benefits and co-impacts in China (short term warming agents)
HEI-Many years of estimating health impacts of integrated measures

INDIA
TERI-estimating climate co-benefits; inserted into climate national action plan
RITES-supporting co-benefits modeling in Hyderabad

Philippines
CAI-Asia-supporting series of research and outreach activities on co-benefits, including community of practice

CHINA
ERI-Estimating co-benefits using GAINS model
Tsinghua University/PRCEE-Several studies on co-benefits in Beijing and national study
Shanghai Academy of Environmental Sciences-Estimate of co-benefits in Shanghai

SOUTH AMERICA/ LATIN AMERICA
Catholic University-Analyzed the health impacts of implementing air quality improvements
National Institute of Ecology-Engaged in four phase study in Latin America estimating co-benefits
Instituto Nacional del Agua y el Ambiente and the University of Buenos Aires
Modelling health impacts of integrated strategies
University of Sao Palo
Modelling health effects from integrated environmental strategies

*This is not an exhaustive list; it is meant to convey the growing interest in estimating co-benefits

Toward a Co-benefits Approach

Co-benefits in Policy

Welcome to Europe

Protocol	Date Ratified
The 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone; 26 Parties.	17 May 2005.
The 1998 Protocol on Persistent Organic Pollutants (POPs); 31 Parties.	23 October 2003.
The 1998 Protocol on Heavy Metals; 31 Parties.	29 December 2003.
The 1994 Protocol on Further Reduction of Sulphur Emissions; 29 Parties.	5 August 1998.
The 1991 Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes; 24 Parties.	29 September 1997.
The 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes; 34 Parties.	14 February 1991.
The 1985 Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent; 25 Parties.	2 September 1987.
The 1984 Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP); 44 Parties.	28 January 1988.

Co-benefits have been featured in the Clean Development Mechanism

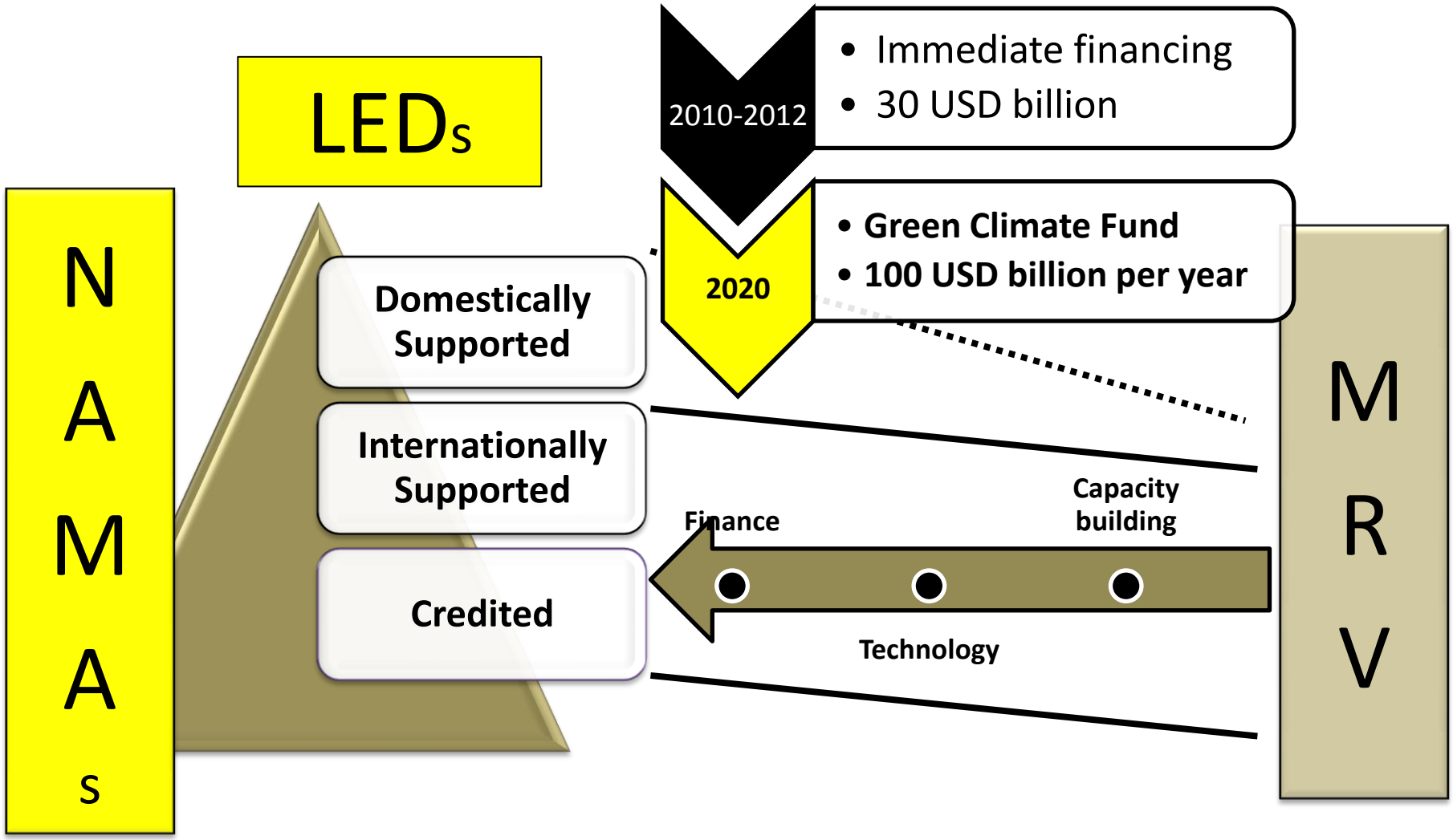
Laos PDR:
Criteria for CDM

(3) Sustainable Development Criteria and Assessment Matrix

Sustainable Development Criteria	
Category 1: Environment	**Category 3: Economic**
1.1 Contribution to mitigation of global climate change	3.1 Share of project budget spent in-country
1.2 Reduction in air pollution	3.2 Reduced dependence on imported fossil fuels
1.3 Reduction in water pollution	3.3 Reduced dependence on imported energy
1.4 Reduction in soil pollution	**Category 4: Transfer of Technology and Knowledge**
1.5 Sustainable use of land resources	4.1 Transfer of appropriate and best available technology (BAT)
1.6 Biodiversity conservation and protection of endangered species	4.2 Capacity building of local stakeholders and industries/businesses
1.7 Rational use of mineral resources	
1.8 Sustainable use of forest resources	
1.9 Sustainable use of water resources	
1.10 Protection of archaeological, cultural, historical and spiritual heritage and sites	
Category 2: Social	
2.1 Concrete contribution to poverty alleviation	
2.2 Contribution to gender equality and social inclusion	
2.3 Stakeholder consultation	
2.4 All groups, both men and women, have equal access	
2.5 Creation of employment in the country	
2.6 Improvement of community infrastructures & services	
2.7 Nuisance and risks for the people in the vicinity of the project area	

Source: CDM Guideline, MONRE

Co-benefits may become part of NAMAs and the Green Climate Fund



Co-benefits in National and Local Policies

	India	Indonesia	Philippines
National Climate	National Action Plan on Climate Change	Climate Change Sectoral Roadmap	National Framework Strategy on Climate Change 2010-2022
National Transport	Jawaharlal Nehru National Urban Renewal Mission (JNNURM)	Road Transport Act (2009)	National EST Strategy (2010)
Subnational Transport	Delhi Metro	Jakarta BRT	Cebu BRT

An Example

Data Inputs

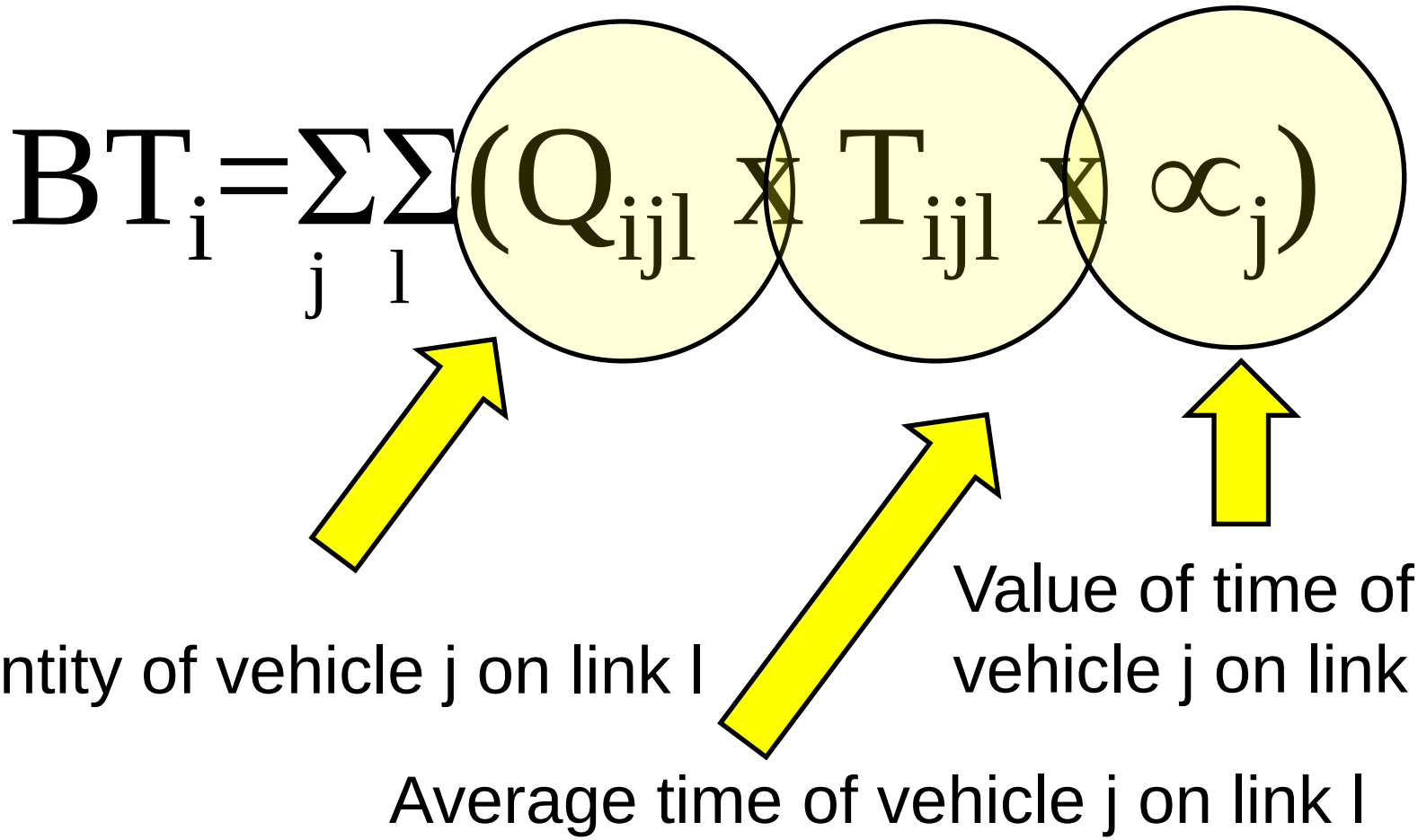
$$BT = BT_{WO} - BT_{W}$$

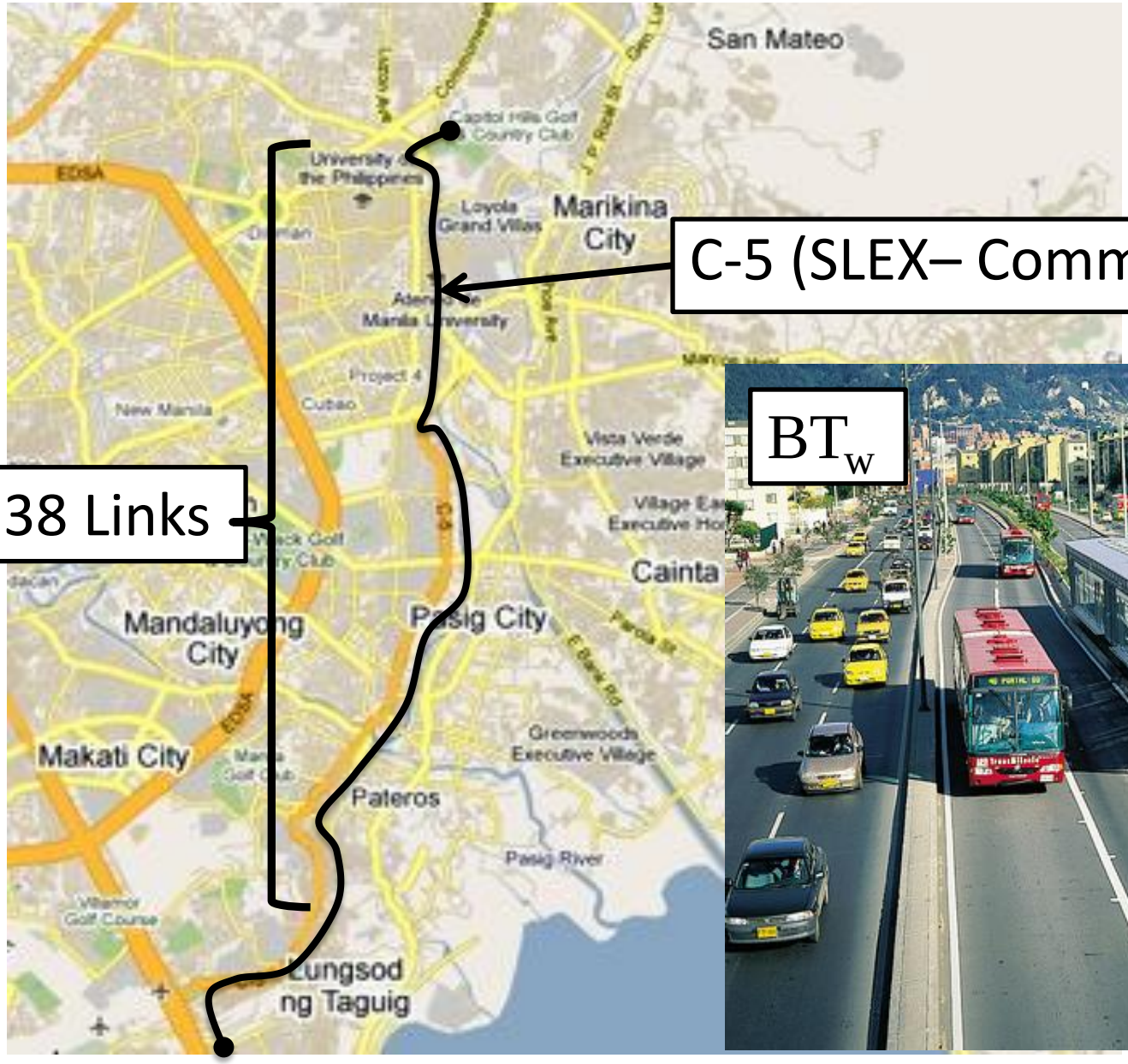
Benefit of time savings

Without the project

With the project

Data Inputs


$BT_i = \sum_j \sum_l (Q_{ijl} \times T_{ijl} \times \propto_j)$
Quantity of vehicle j on link l
Average time of vehicle j on link l
Value of time of vehicle j on link l


San Mateo
Capitol Hills Golf & Country Club
University of the Philippines
EDSA
Loyola Grand Villas
Marikina City
Diliman
Ateneo de Manila University
Project 4
New Manila
Cubao
Vista Verde Executive Village
Cainta
Mandaluyong City
Pasig City
Makati City
Greenwoods Executive Village
Pateros
Pasig River
Villamor Golf Course
Lungsod ng Taguig
C-5 (SLEX– Commonwealth Ave.)
38 Links


BT_w

Co-benefits Calculator for Transport Projects

Beta Version

Name of Project: Manila BRT (2008)

Results

Input

Click here for the color coding guide for the input cells

Vehicles

Vehicle Emission Factors

Links

Accidents

Accidents: Option for Calculation Approach

Option A: General Approach (Accident Loss)

Option B: More detailed Approach

Number of Accidents

Option for Ave. Damage Costs of Human Accidents

Option A: General Ave. Cost

Damage Costs of Human Accidents

Option B: More detailed Ave. Cost

Human Accident Costs

Number of Injured Persons/accident

Options for Ave. Costs of Injuries

Option A: Default Values

Option B: Detailed Inputting of Costs

Material Damage and Loss due to Congestion

Accident Costs -Full

Emissions

Impact of Speed on Emissions

Project Emissions

Cost of Pollution

Emissions and Costs of Emissions

Traffic Volume and Travel Time

Travel time Costs

Travel Time

Vehicle Operating Cost per Kilometer

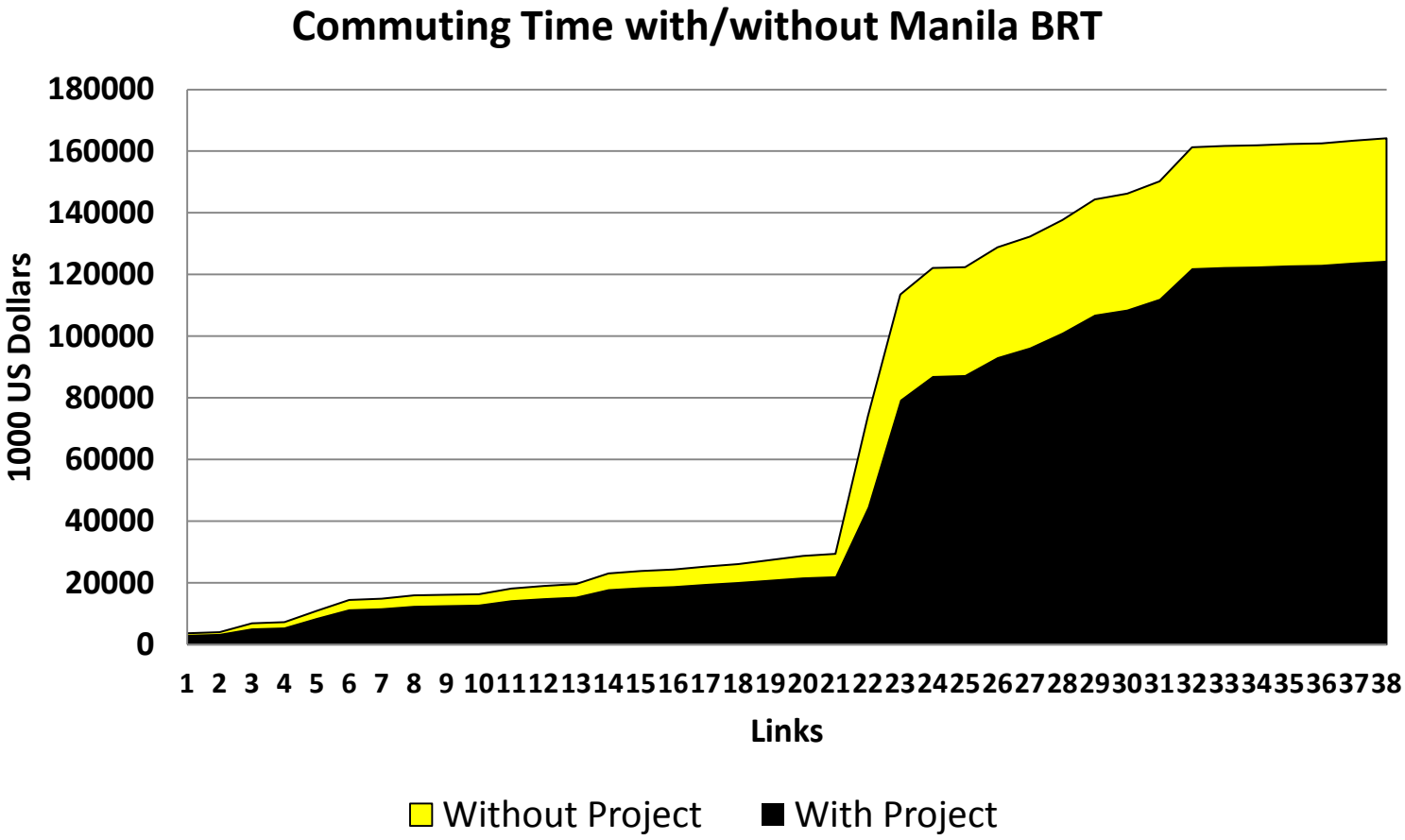
Vehicle Operating Costs

VOC

CO-BENEFITS SUMMARY

This calculator is a tool which uses the Transport Co-benefits Guidelines developed by the Institute of Global Environmental Strategies (IGES).
This excel tool is developed by the Clean Air Initiative for Asian Cities Center (CAI-Asia).

Co-benefits Calculator



Co-benefits Calculator

Traffic Volume (vehicles/day)

Without Project

	1	2	3	4	5
Passenger Car	115,678	77,921	70,152	76,472	87,635
Public Utility Vehicle	4,632	3,714	7,505	5,158	7,182
Public Utility Bus	1,495	1,389	1,449	1,448	1,722
Truck	1,671	1,71[illegible]	1,653	1,675	1,422

$$BT_i = \sum_j \sum_l (Q_{ijl} \times T_{ijl} \times \propto_j)$$

With Project

	1	2	3	4	5
Passenger Car	104,111	70,129	63,137	68,825	78,871
Public Utility Vehicle	2,31[illegible]	1,857	3,752	2,579	3,591
Public Utility Bus	[illegible]	694	725	724	861
Truck	[illegible]	1,713	1,653	1,675	1,422

Quantity of vehicle j on link l

Co-benefits Calculator

Notes: Taken from Pre FS, used to calculate speed

Average Travel Time (minutes)

Without Project

	1	2	3	4	5
Passenger Car	1.43	0.20	1.68	0.21	1.76
Public Utility Vehicle	1.43	0.20	1.68	0.21	1.76
Public Utility Bus	1.43	0.20	1.68	0.21	1.76
Truck	1.43	0.20	1.68	0.21	1.76

$$BT_i = \Sigma\Sigma(Q_{ijl} \times T_{ijl} \times \propto_j)$$

With Project

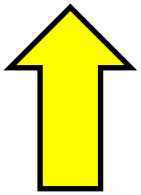
	1	2	3	4	5
Passenger Car	1.43	0.20	1.25	0.21	1.76
Public Utility Vehicle	1.43	0.20	1.25	0.21	1.76
Public Utility Bus	1.43	0.20	1.25	0.21	1.76
Truck	1.43	0.20	1.25	0.21	1.76

Average time of vehicle j on link l

Co-benefits Calculator

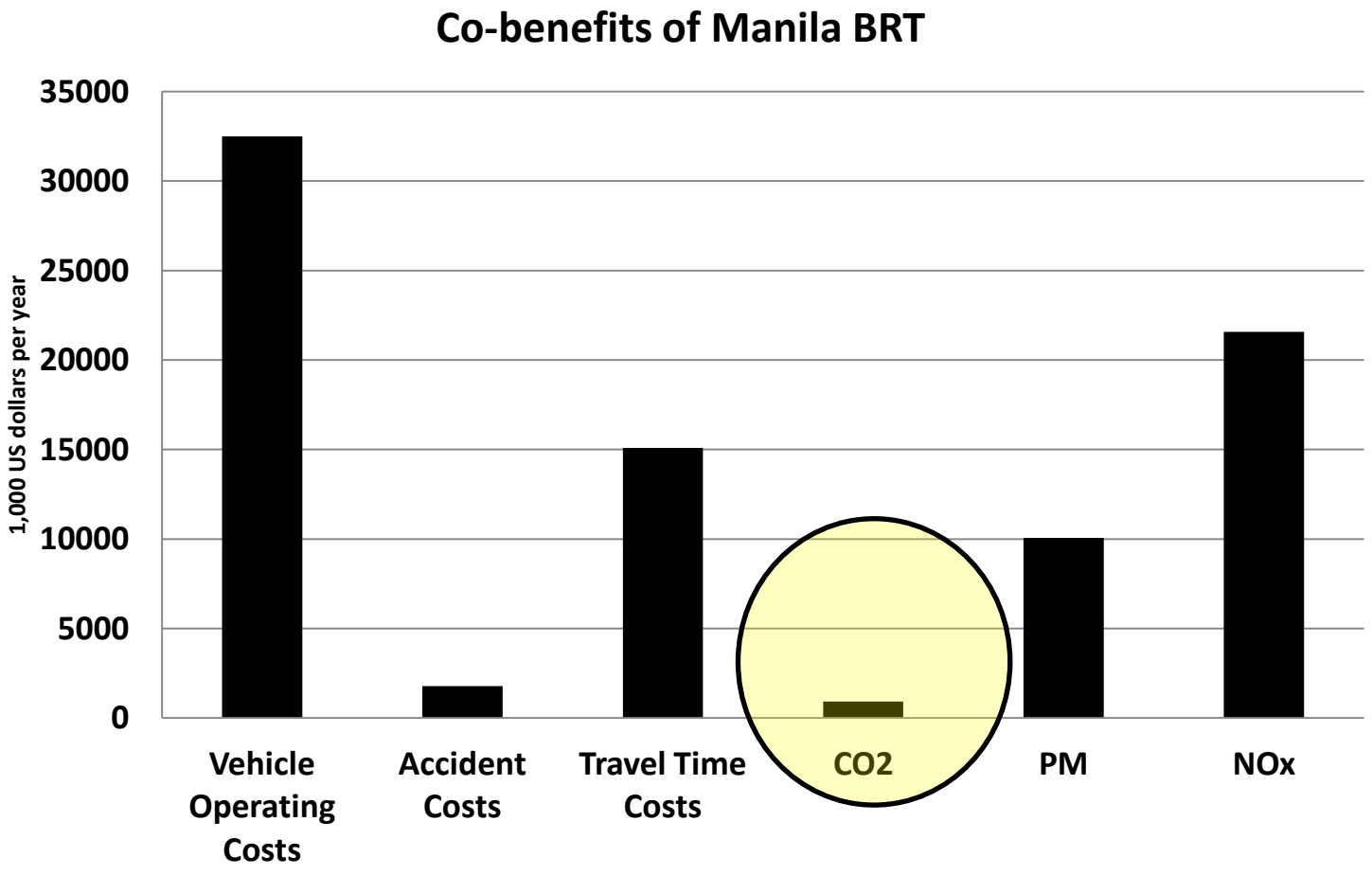
Vehicle Type	Value of Time *USD/vehicle-minute*
Passenger Car	0.02
Public Utility Vehicle	0.02
Public Utility Bus	0.09
Truck	-

$$BT_i = \Sigma\Sigma(Q_{ijl} \times T_{ijl} \times \propto_j)$$



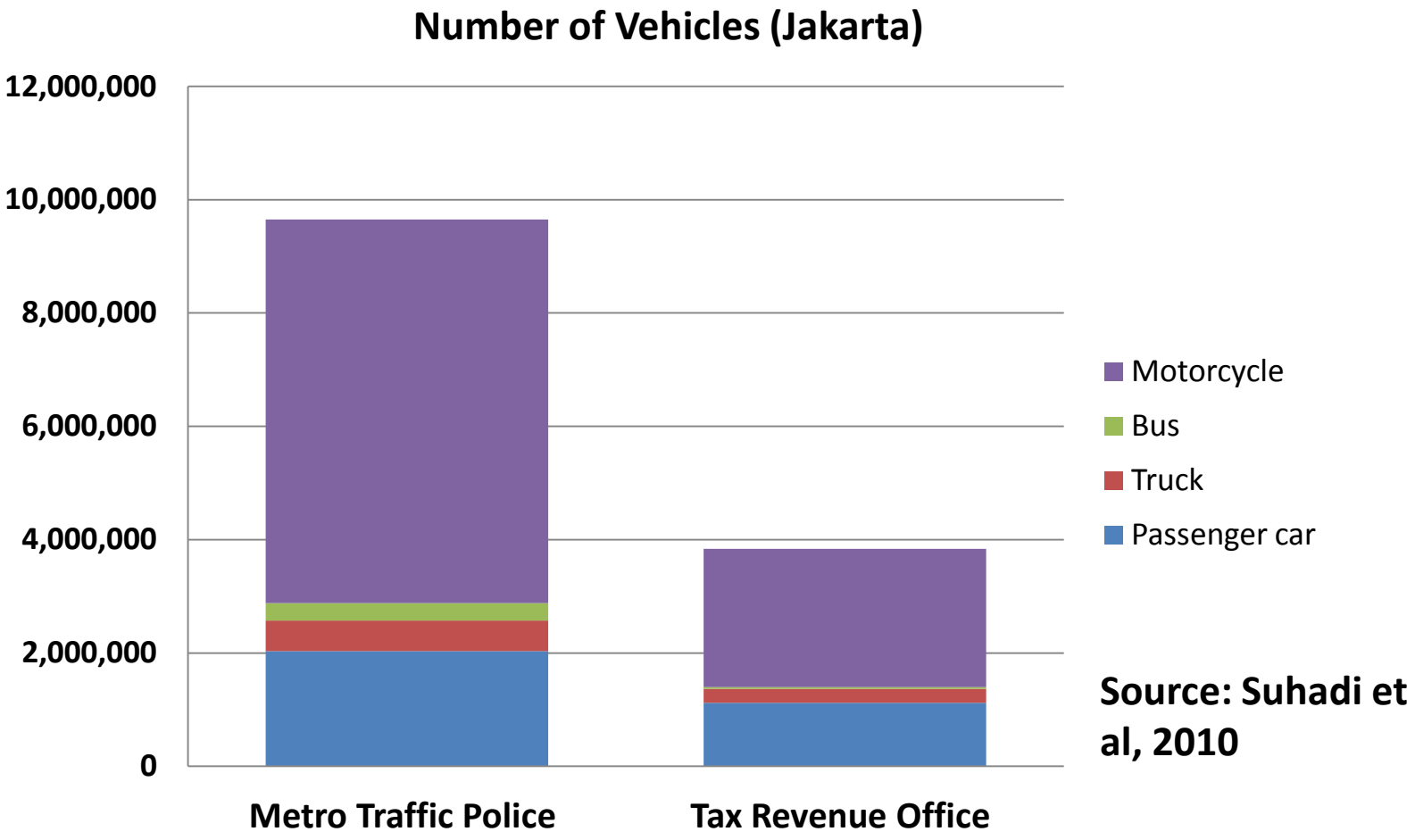
Value of time of vehicle j on link l

Co-benefits Calculator



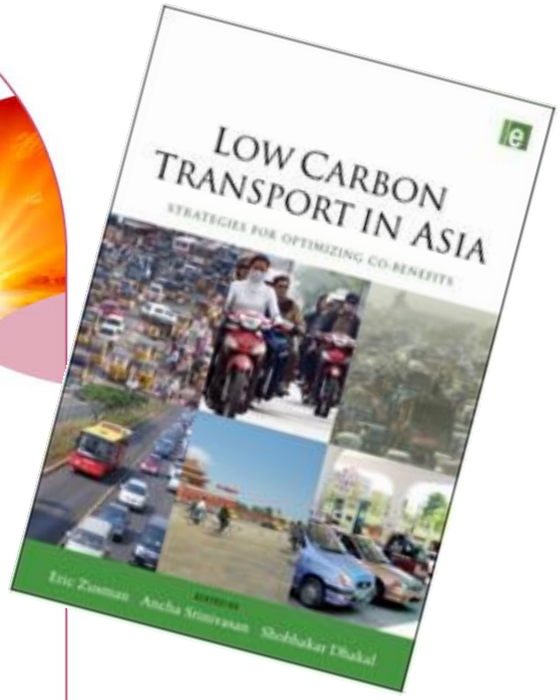
Data Limitations

Co-benefits calculations depend upon raw data



Source: Suhadi et al, 2010

Thank you



http://www.cobenefit.org/

Discussion Question

1. **What are some of the approaches we can use to recognize the co-benefits of a project?**

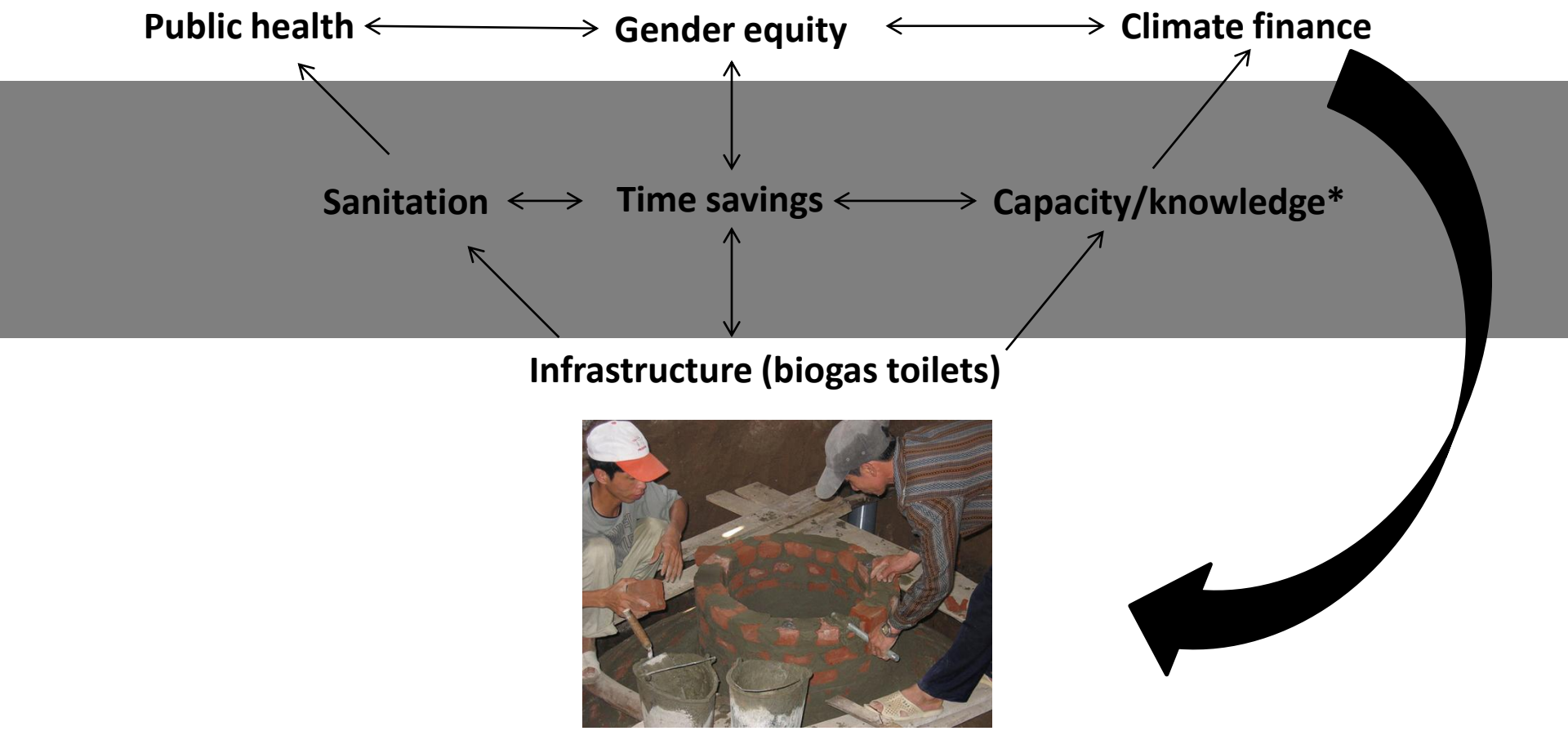
2. **What are advantages and drawbacks of those approaches?**

3. **What are some of the approaches we can use to reward the co-benefits from a project?**

4. **What are advantages and drawbacks of those approaches?**

	Approaches	Advantages	Drawbacks
Recognition			
Reward			

Appendix:
Identify and deliver benefits at the local level



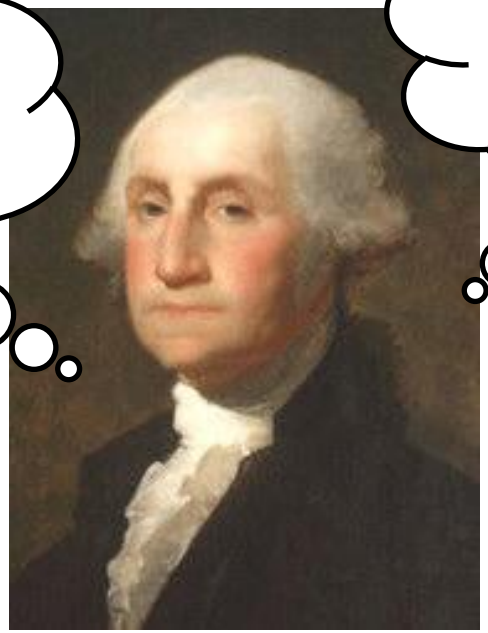
*Respondents referred to improved knowledge of climate change, climate finance, ODA, gender, and English language

Appendix

- **Reforming architectures and frameworks presents a practical and political dilemma**

Time

"Martha I will be late for dinner again; I need to model, measure, and monetize my co-benefits"



Sovereignty

"Nobody is going to tell this President how to define development"

Appendix

- **Most studies: intend to improve policy choices**
- **Few studies: analyze the architectures and frameworks in which choices are embedded**