



Transport and CO2 Emissions: A New Framework for a New Challenge

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Key Messages: Saving CO2 in Transport

- **Transport Matters A Lot for CO2; CO2 Matters Little for Transport**
 - Transport fastest rising CO2 emissions source (24% global 2006, “50% urban”)
 - Light duty vehicles at center of urban transport problems and rising emissions
 - High CO2 symptom of poor urban transport in most developing cities
 - Technology improvements to LDV important, but VKT growth the major problem
- ✓ **Frame problem as a transport problem, not a CO2 problem**
 - Transport suffers major externalities; congestion, pollution, accidents, noise, CO2
 - This cheap transport stimulates VKT even more, particularly in LDV
 - CO2 (even at \$85/tonne) not major determinant – take as cobenefit of good transport



Key Messages: Major Restraint In CO2 Impossible Without Strong Sustainable Transport

- ✓ **Measuring Carbon, Testing and Validating impacts of policies and technologies**
 - Measure and monitor to validate measures, strengthen where needed
 - Impacts –Compare with/without a policy or other intervention
 - “ASIF” approach or more detailed travel models/fuel simulation necessary
 - Use models, data to estimate changes in travel, vkt, fuel; time, accidents, CO2
 - **Serious problem for Asia – basic data on vehicles, travel, freight, fuel missing**
- ✓ **Mitigate CO2 In Urban Transport –The new ASIF is not by tailpipe alone**
 - **Avoid** – Sustainable urban development (Singapore?) served by good transport
 - **Shift** - Improve access with collective modes, NMT, with restraint on car use
 - **Improve** – Reduce carbon intensity of vehicles, travel and freight
 - **Finance** good transport, not just CO2 reductions
- ✓ **The Way Forward with Serious Policies (Leather ADB or Mitric WB)**
 - Internalization of externalities – taxes, regulations, oversight and monitoring
 - Efficiency standards on light duty vehicles
 - Reform freight and logistics
 - Financing and demonstration (FAD)

Congestion or Access?

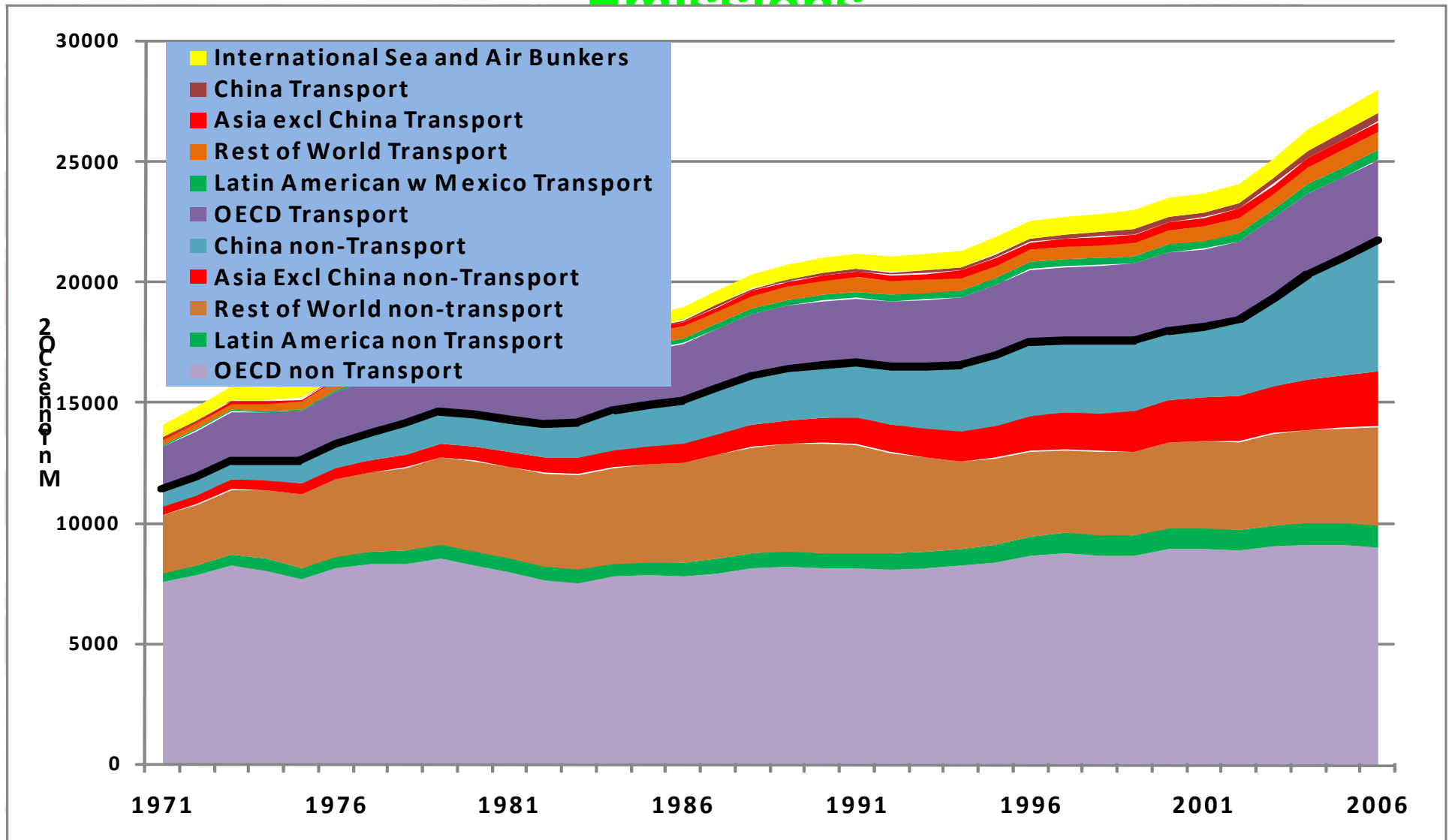


DON'T RUN
ACROSS
THE ROAD
AND CONFUSE
THE DRIVER

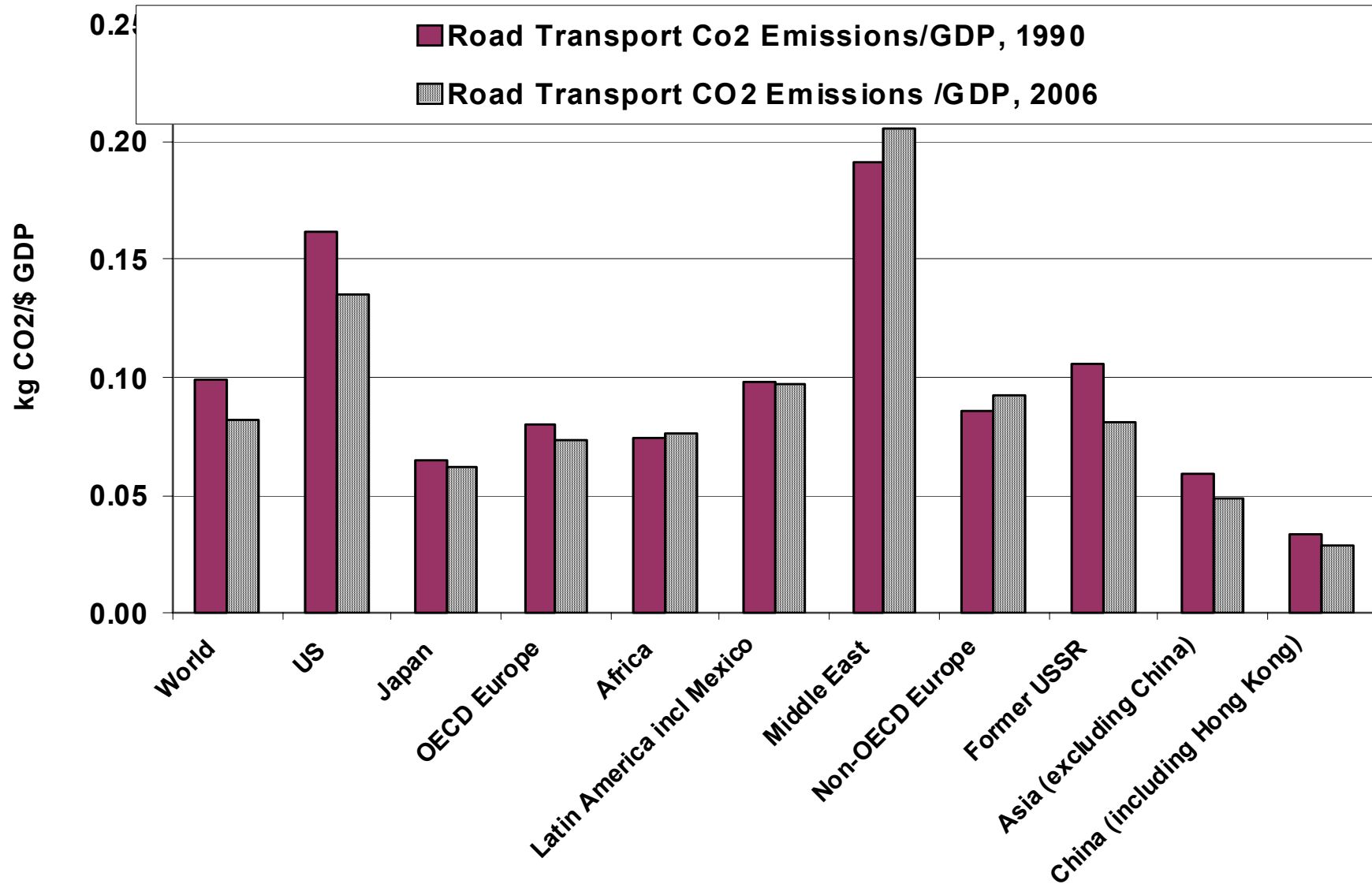


Transport Most Rapidly Rising CO2 Emission Source

Road Transport ~ 75% of National Transport Emissions

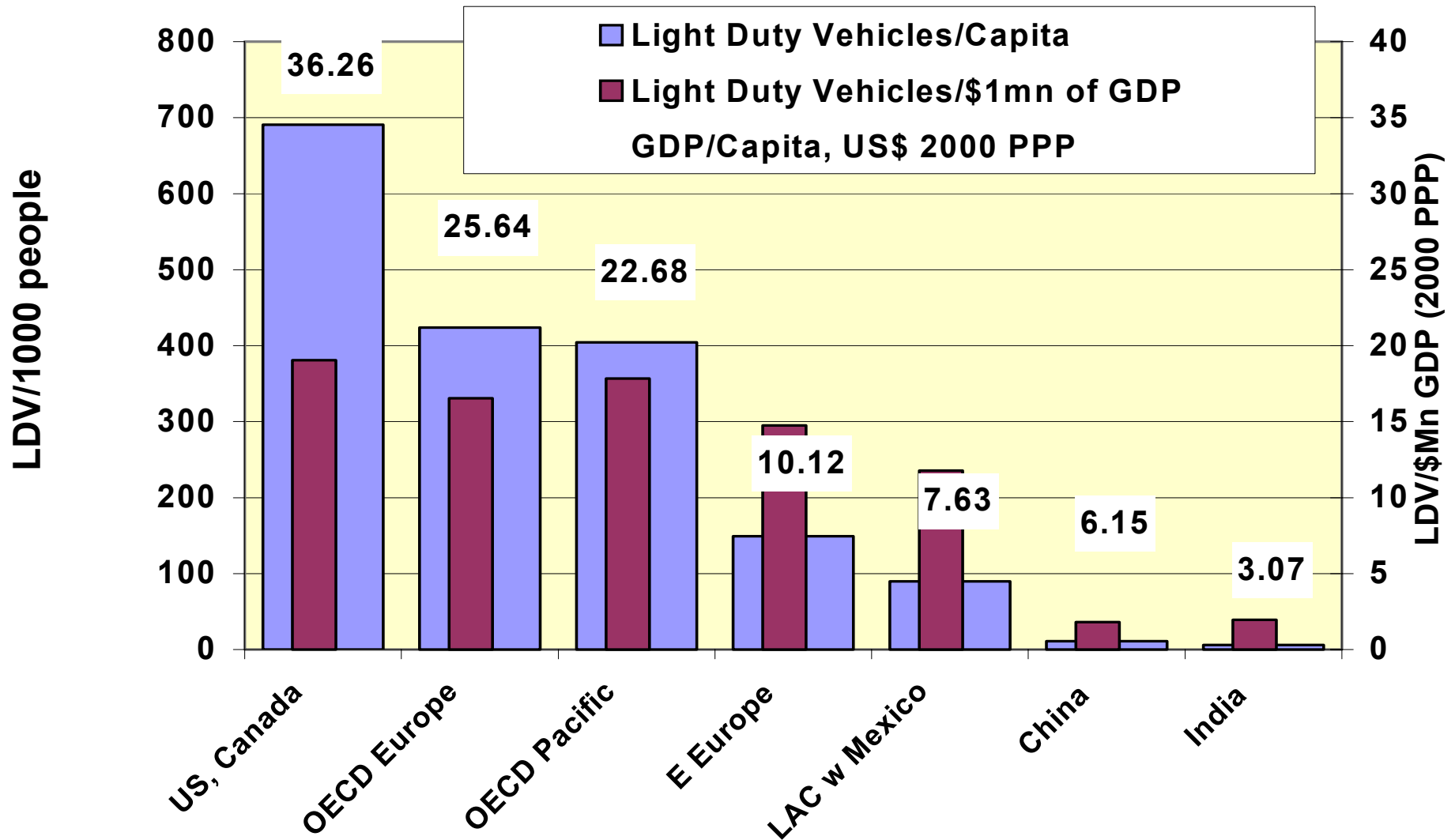


Ratio Road Transport CO₂/GDP Falling Only Slowly



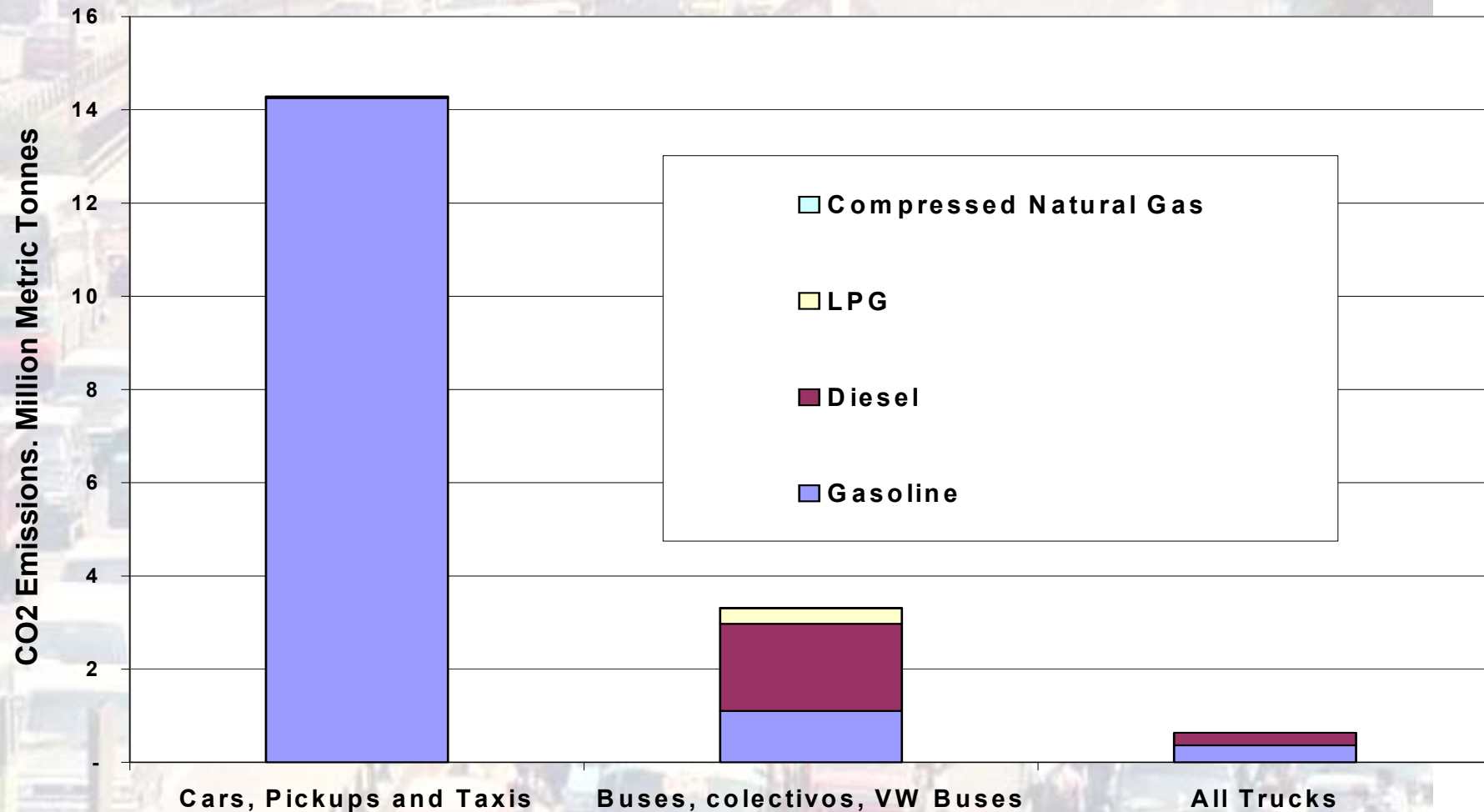
Light Duty Vehicle Ownership and Income

CO2 Mitigation Must Aim at Cars!



Light Duty Vehicles Dominate Traffic and CO2 Emissions from Road Transport in Cities –

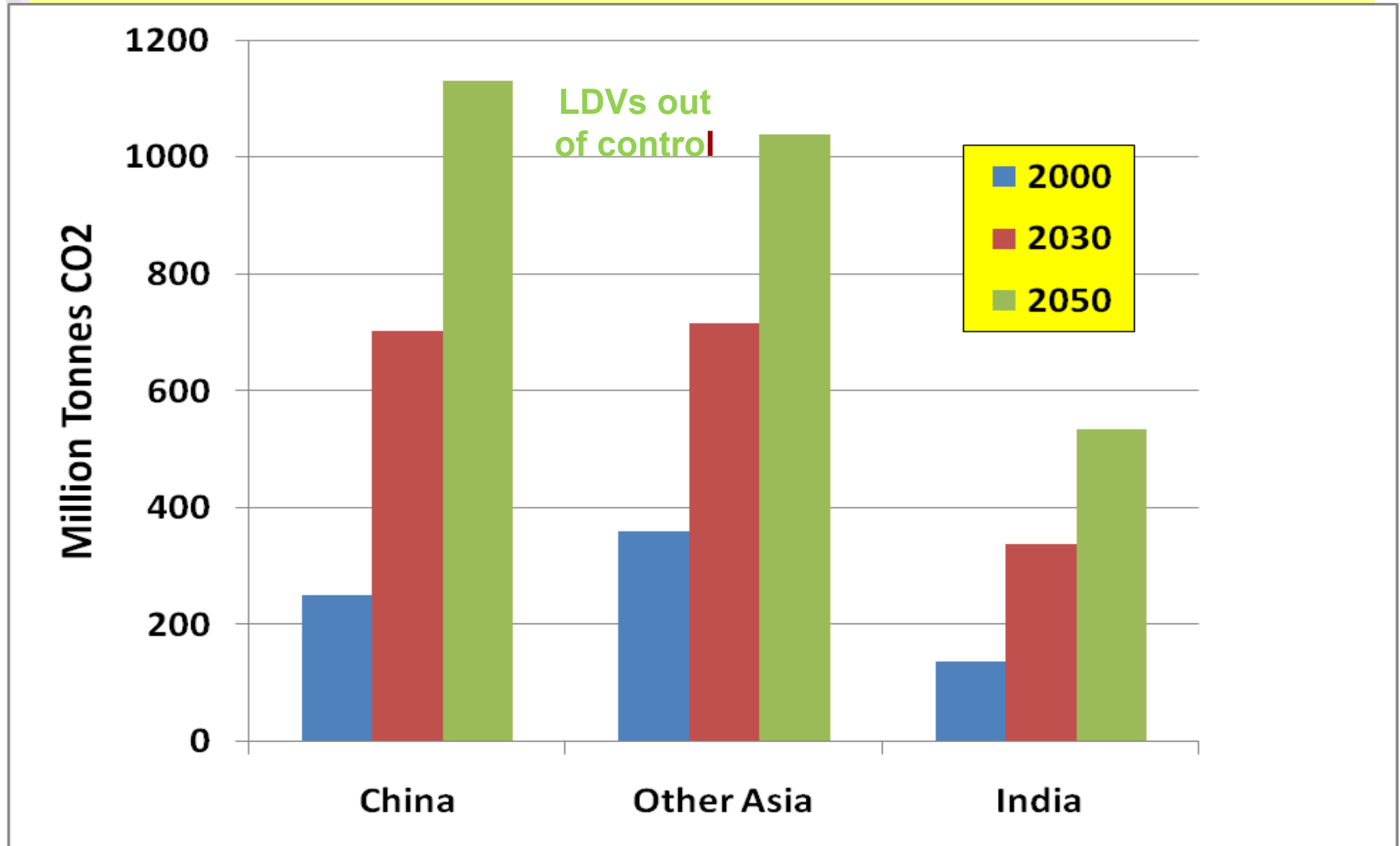
Similar Patterns for other Latin American and Asian Cities *



***Source: Mexico City Environment Office Bottom-up Emissions Inventory**
In much of Asia, 2 wheels contribute more VKT, similar CO2 as cars do in Latin America

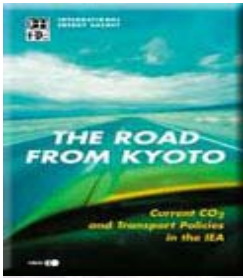
Future CO2 Emissions from Transport in Asia Even After 20% Reduction in Fuel/km, Still Out of control

(Source WBCSD Sustainable Mobility Project)



The CO2 PROBLEM IS A TRANSPORT PROBLEM, PREDOMINANTELY CARS AROUND URBAN AREAS





“The Road From Kyoto” (2000): Transport/CO2 Policies in 6 IEA Countries”

- **Potential Large, Progress Slow, Risks High**
 - Technology getting better there but price signals still weak;
 - Political will missing in 2000, stronger now
 - Absence of meaningful initial progress in the US changing now?
- **Main Elements Still Important Today**
 - Transport sector reform as umbrella for process
 - Voluntary agreements (soon mandatory) on car fuel economy important
 - Fuel pricing also important, particularly for United States
- **Hard Lesson: Many Years to See Impacts**
 - Countries moved weakly towards better transport policies
 - Voluntary agreements achieved half their goals
 - Threats from distractions (bio-fuels, oil-price fluctuations, CO2 fights)

*Oil and CO2 more important in 2009 than before:
Transport Policies Even More Important*

Transport- CO2 Mitigation: Avoid and Shift but also Improve/Mitigate



**Avoid CO2-Intensive Development:
Singapore Land Use Planning,
Congestion Pricing**



**Shift and Strengthen:
Mexico City Metrobus**



**Improve and Mitigate:
Efficient Vehicles**



**Improve and Mitigate:
True Low Carbon Fuels**

Transport Externalities in US Context

Range of Costs/km large- Which are Most Important in Asia?

Range External Costs in Cost-of-Driving Studies	Low	High	(JEL)	Comments on Asian Situation
Air Pollution	0.6	8.5	1.5 cents/km	Values are probably higher for Asian cities because of higher levels of air pollution, even after adjusting for Quality-adjusted value of life.
Climate Change	0.2	0.7	0.2-2.1 cents/km	Uncertainty large (Nordhaus 2008; Stern 2006) and certainly dependent on national and local situation. For US 0.2 cents/km = \$10/tonne CO ₂ ; 2 cents/km= \$80/tonne CO ₂
Congestion	2.5	10	3-4.2	Does not apply to all travel. Depends on value of time (50% of wage rate?). Delays worse in Asia, value of time lower.
Accidents	-0.6	6	1.2-4.2	Depends on valuation of accidents and life. Accident rates and fatalities much higher in Asia
Energy Security	0.9	1.7	0-1.5	Values depend on local energy supply situation.

CO₂ Is A Small Externality Compared to Others
CO₂ Will NOT Be A Driving Factor for Transport

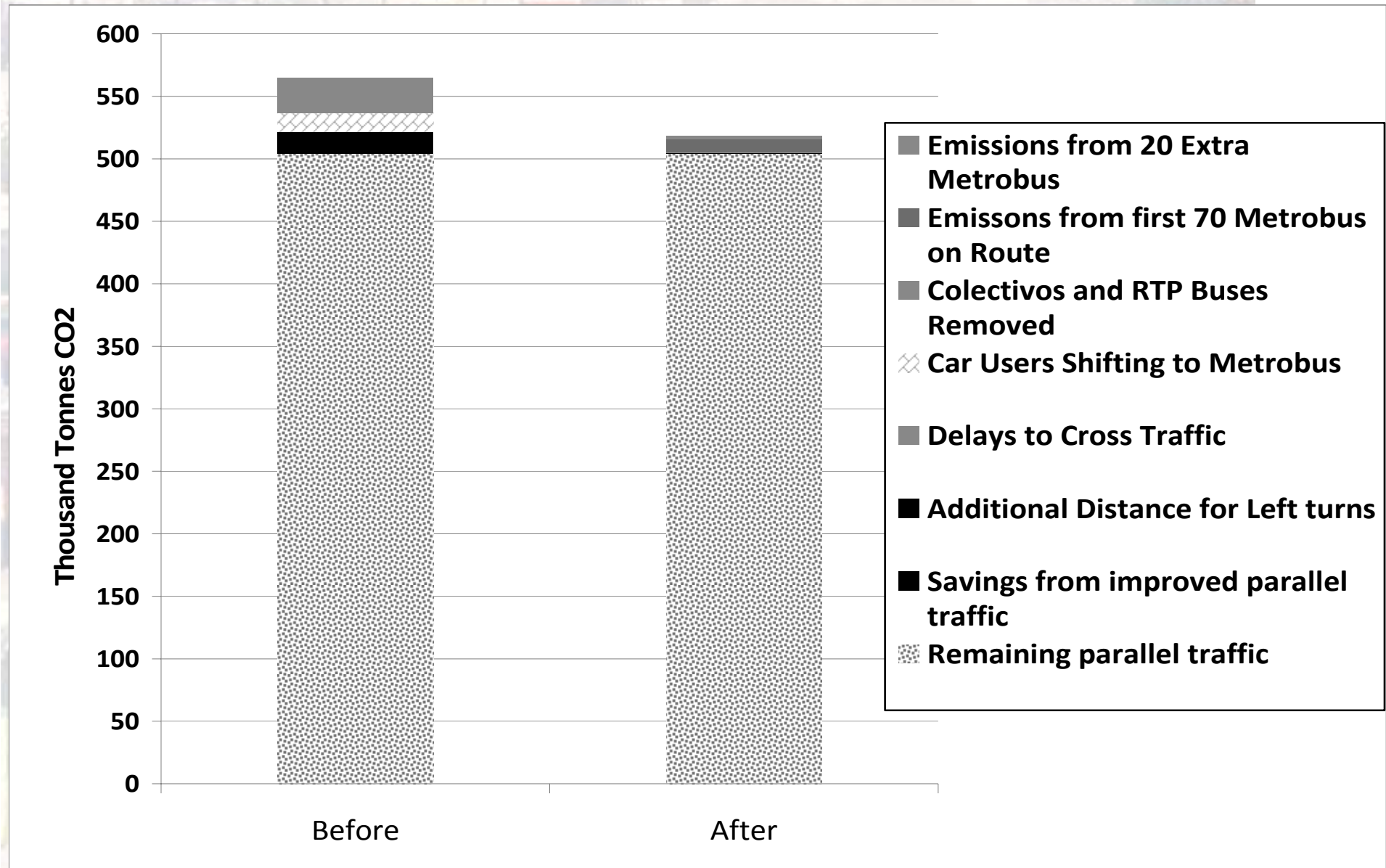
Shift and Reap Co-benefits Bus Rapid Transit: Mexico's 1st Metrobus Line 50 000 Tonnes of CO2 without trying



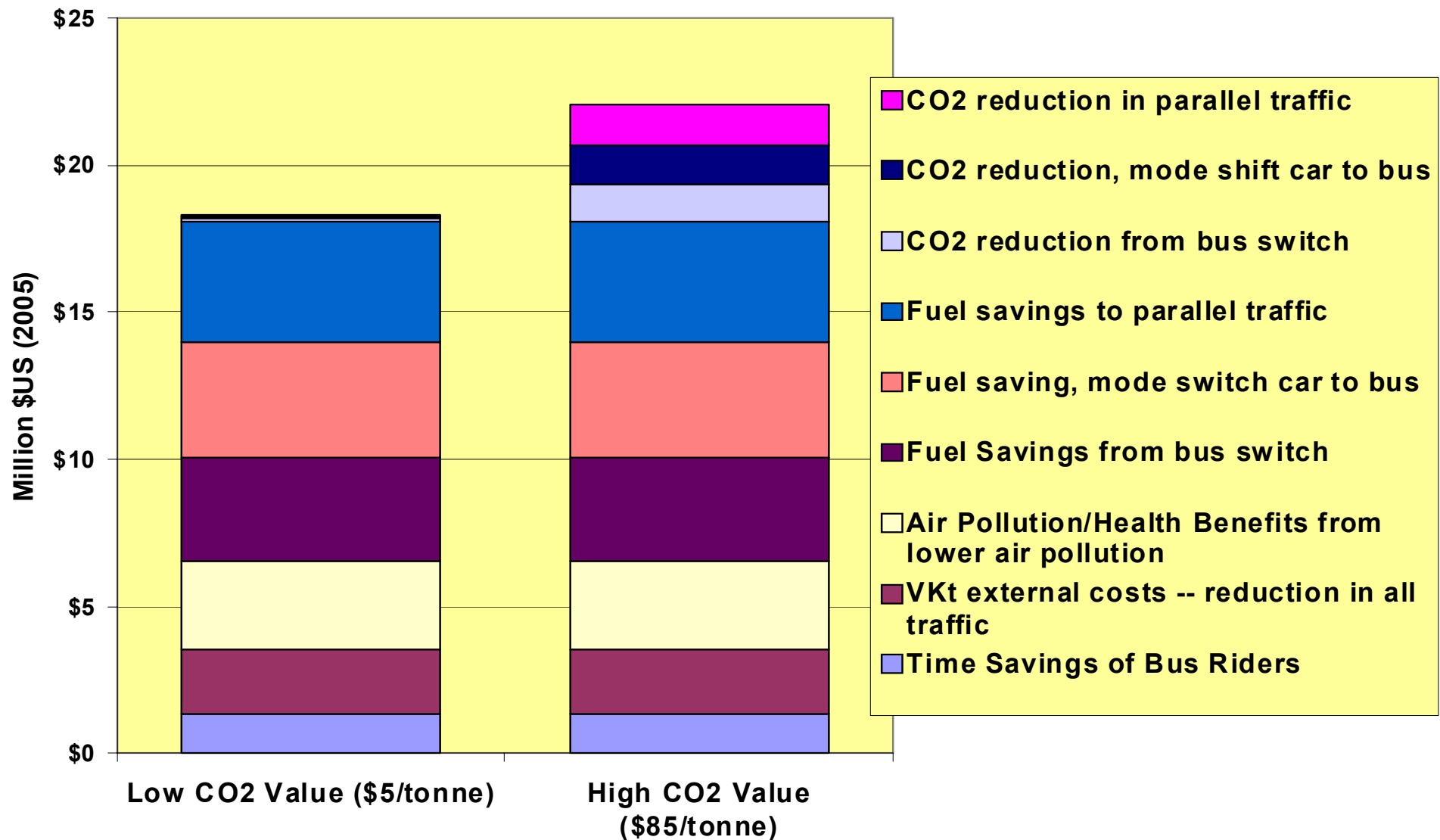
Metrobus CO2 Changes by Component

Larger buses, Mode Shift, Improved Parallel Traffic Almost Equal Parts

Source Rogers 2006, 2009



Benefits from Metrobus: Broad Than Just CO2 Transport, Health Benefits >> CO2 Benefits

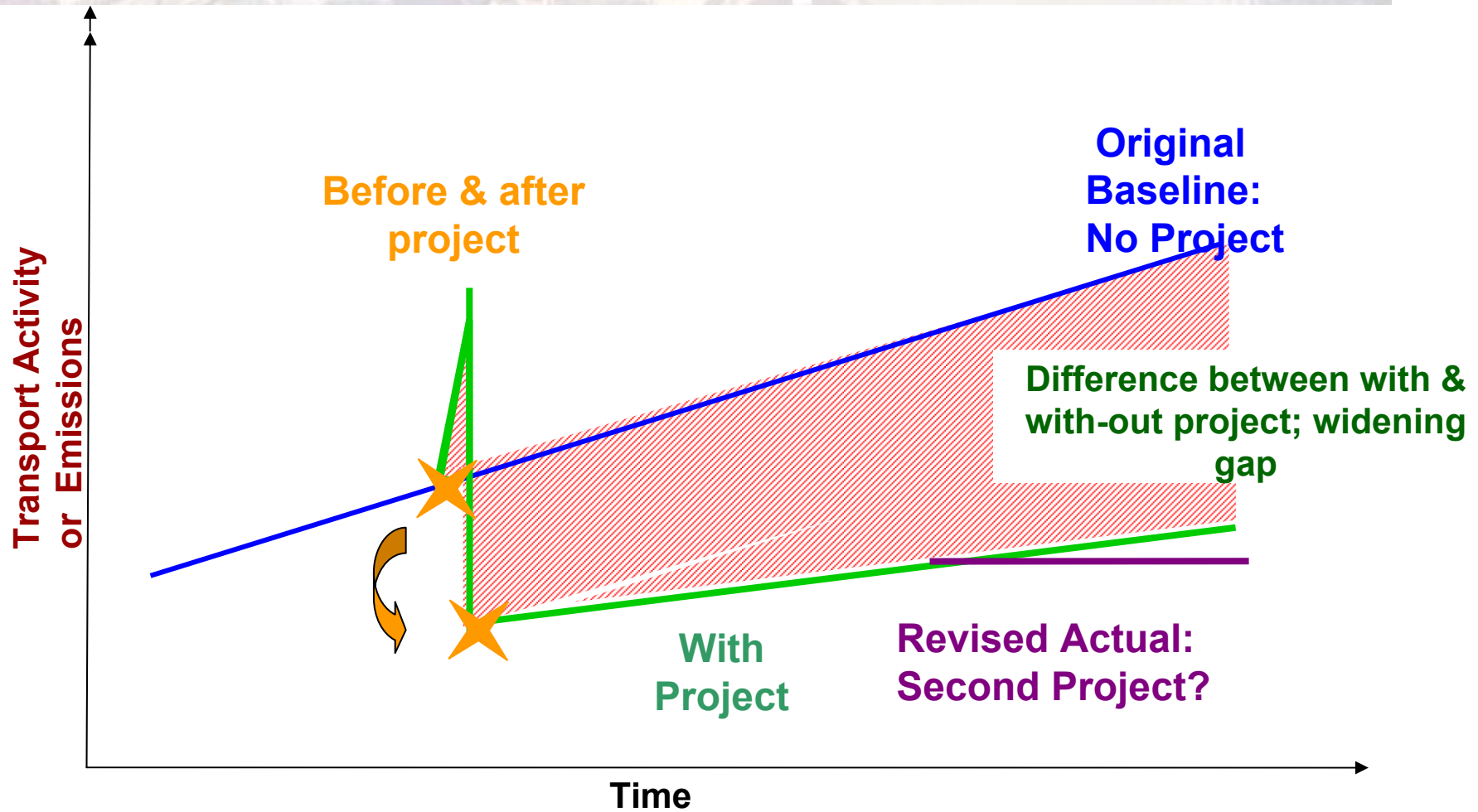


MEASURING CARBON FOR GOOD POLICY: YOU CANNOT MASTER WHAT YOU CANNOT SEE

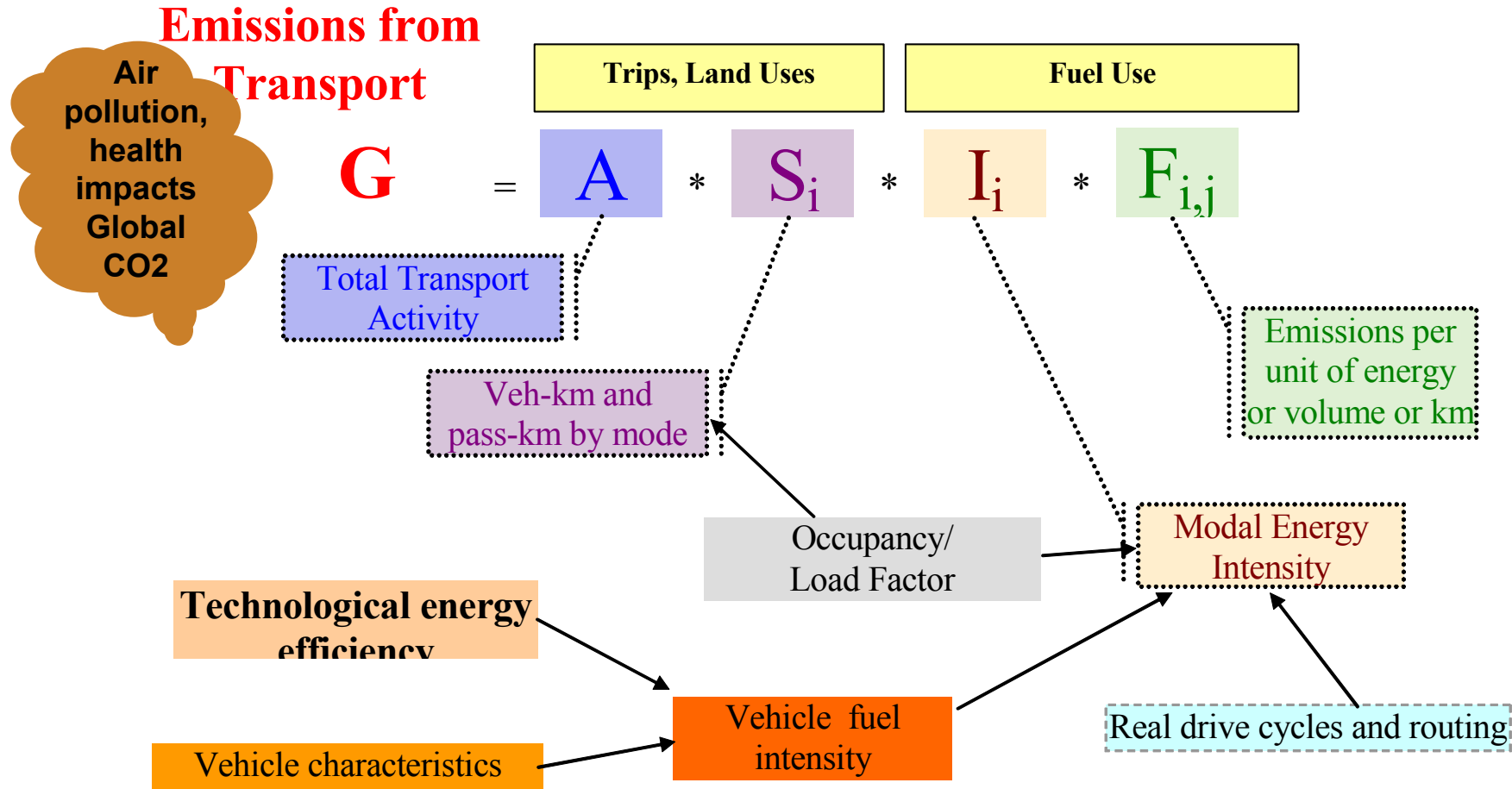
- Analysis of Status Quo and Role of High vs Low C Modes
 - What are the components of “ASIF” today and in the past?
 - What are the current parts undergoing most rapid change?
 - What are key driving factors causing this change?
- Projections -- Looking Forward for Projections
 - How will project or policy affect transport patterns and vehicle use?
 - How will changes in vehicles and traffic affect fuel?
 - What technical changes to vehicles will affect fuel use
- Evaluation of Policies – Looking Back
 - How did urban development change to avoid CO₂
 - How have traffic and transport patterns changed from projected
 - How did new vehicle technologies perform compared to promises

*Almost no Developing Countries or Cities
Have Data and Models Today for this Approach*

KEY APPROACH TO EVALUATION COMPARE BASELINE TO ACTUAL (WITH AND WITHOUT MEASURES)



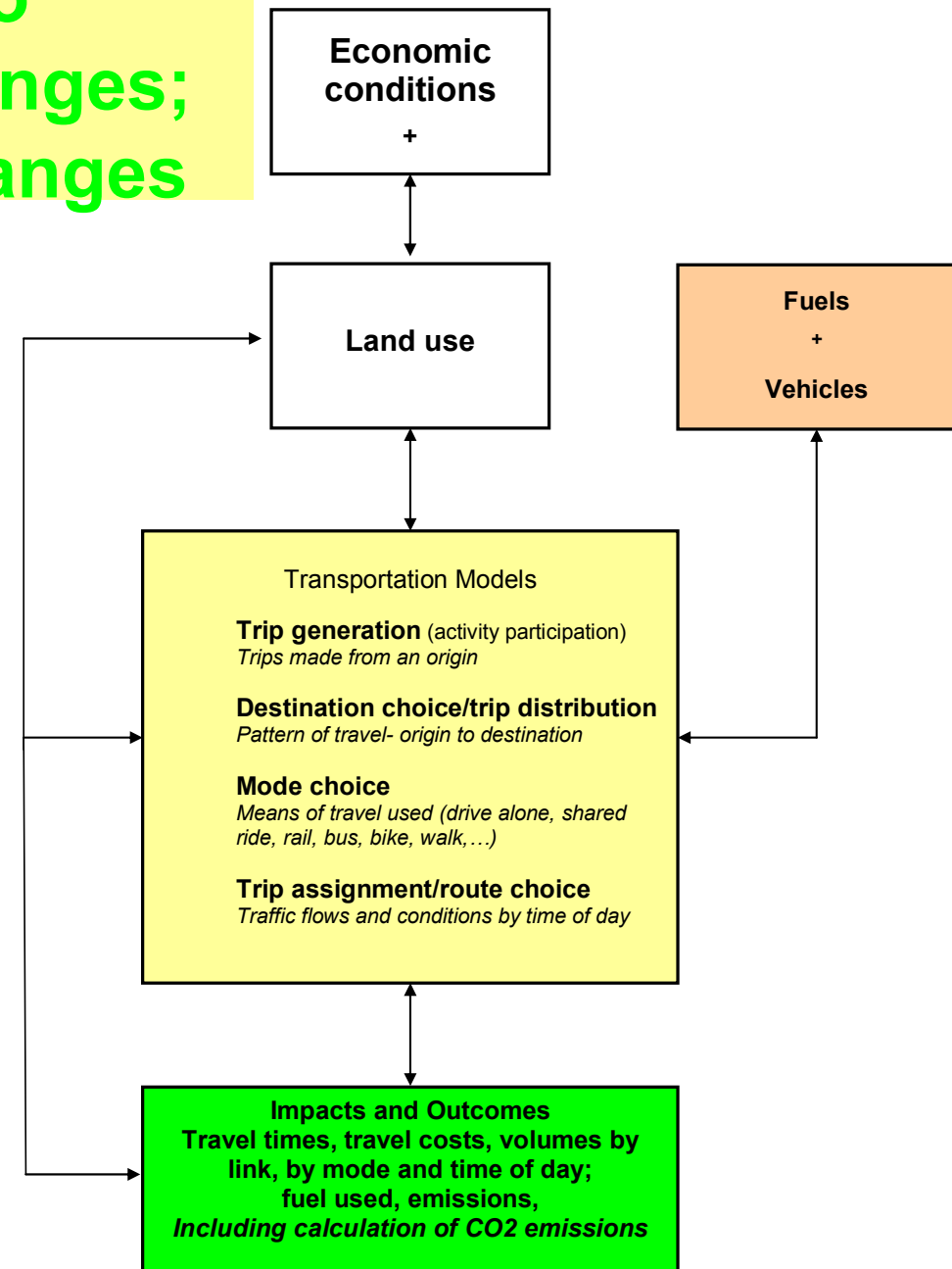
“ASIF” Decomposition: Road Map For Saving Road Map for Evaluation



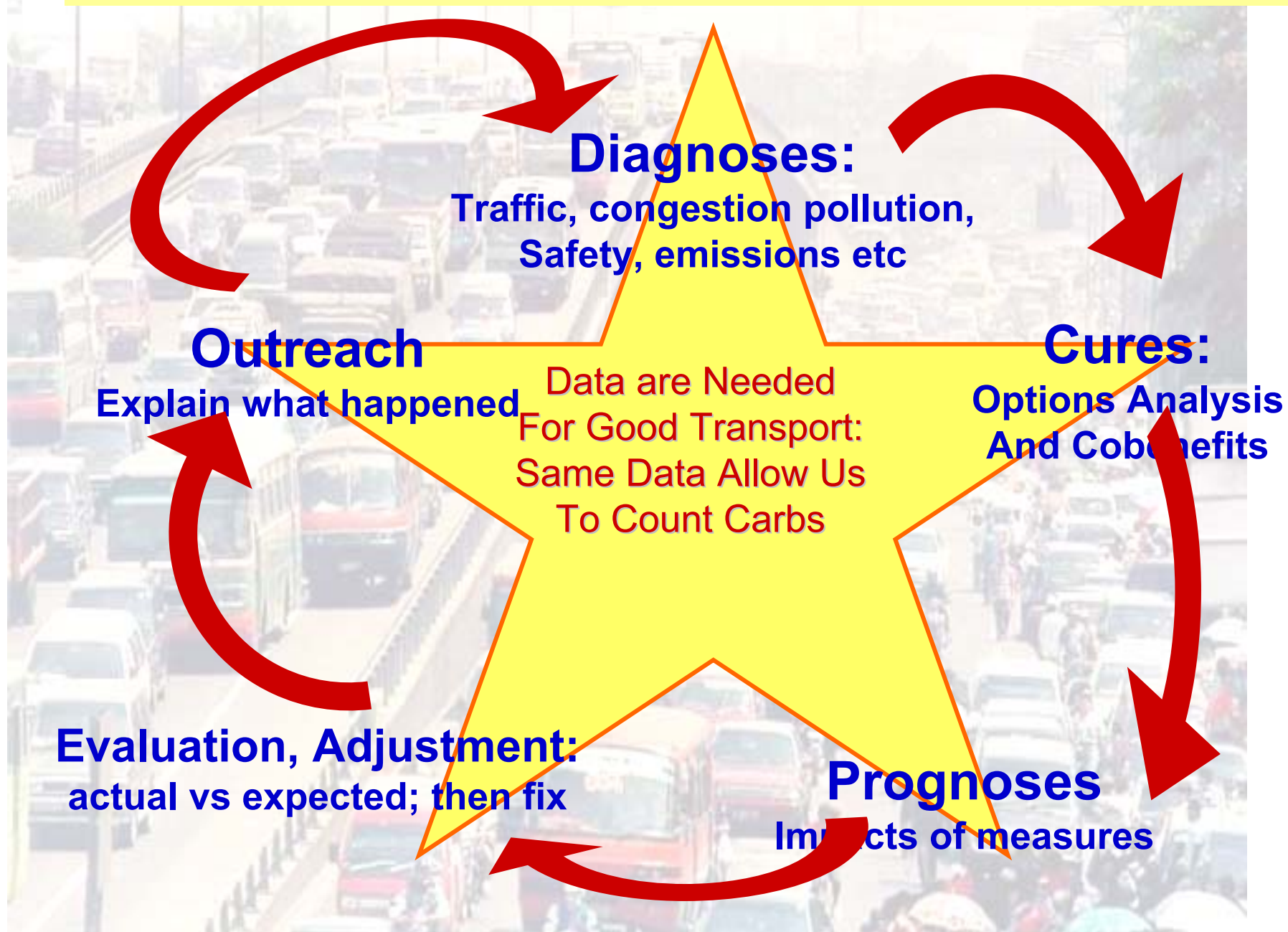
Lesson: Attack all Problems of Transport
Not Just Technological Efficiency and Fuels

Use Models, Data to Estimate Transport Changes; Then Count Carbon Changes

- Start with basic L.U and transport models and data
- Estimate from scope and scale zone of influence
- Determine impacts on people and vehicles
- Use fuel model to determine changes in fuel and CO2 emissions
- Track changes in major transport and environmental variables
- Try to model longer-term feedbacks on land use, trip generation
- Data required are needed for good transport and environmental planning and management



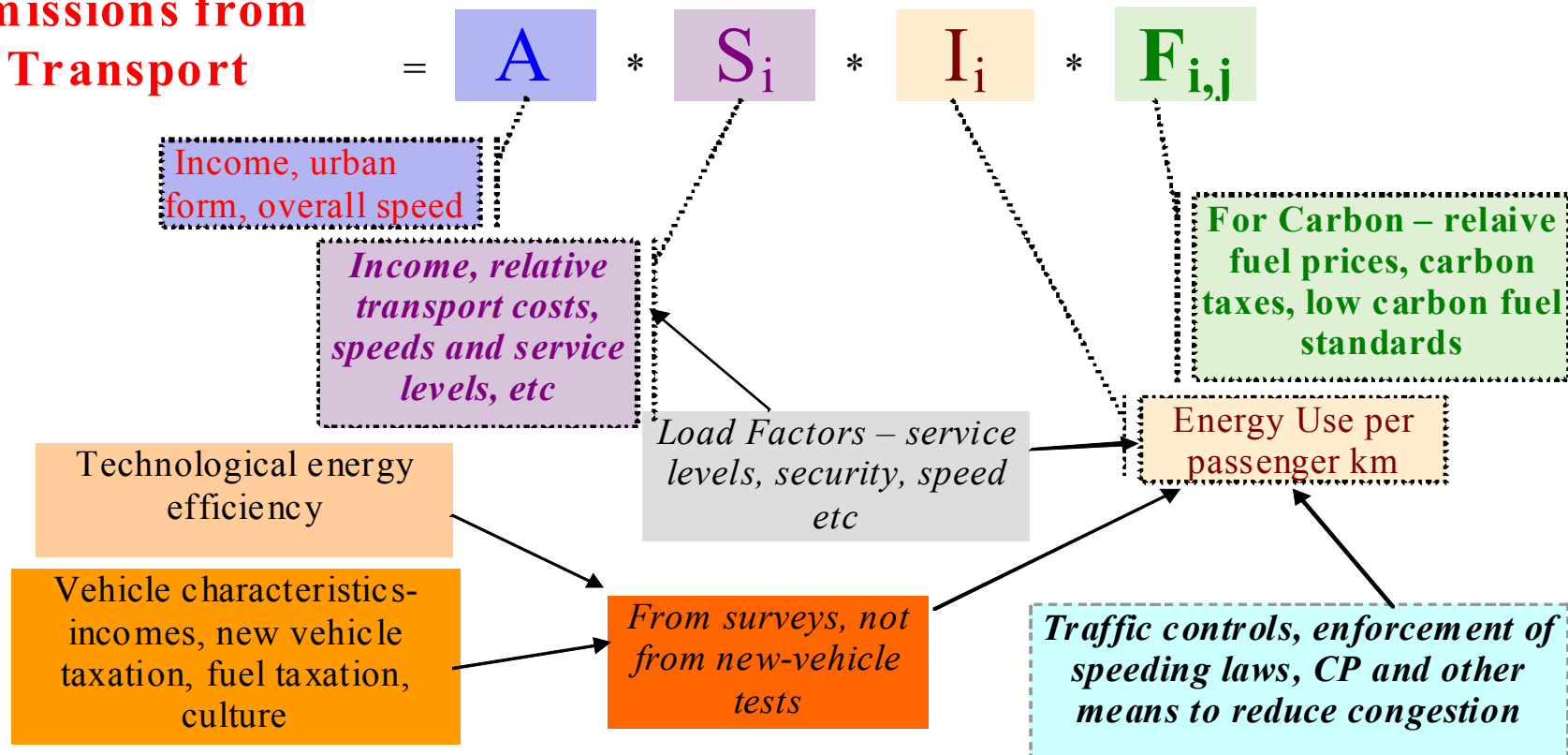
Counting Carbs in the Policy Process



Provoking Changes in Transport Emissions

Intervene with Links Among Driving Forces

Fuel Use and Emissions from Transport



Few Asian Cities or Countries Can Quantify The Links

Policy for Low Carbon Transport: the New ASIF

- **Avoid – Saving Carbon Through Urban Development**
 - Land Use: Building a city or differently (Singapore, Seoul)
 - Internalizing costs at an early stage of development
 - Shifting the balance away from high-carbon transport
- **Switch: Co-benefits of Transport, Development**
 - Bus Rapid Transit and other improvements to transport system, LOS
 - Careful transition from smaller to larger, better managed transit vehicles
 - Congestion pricing and other strategies to reduce externalities
- **Improve by Operations, Technology: Carbon costs Count**
 - Lower fuel use/km with improved traffic flow
 - Higher vehicle occupancy
 - Efficient vehicles, low carbon fuels – Mostly national initiatives
- **Finance: Local Authorities, MDBs**
 - Demonstrations
 - Measurement and evaluation techniques

Saving and De-Carbing in Transport

Opportunities for Intervention?

- Reform for Sustainable Transport
 - Internalization and variabilization of external costs to all modes
 - No more subsidies for fuels, individual vehicles
 - Role for “North” and MDB’s: Demonstration
- Technology for Decarbonized Transport
 - Smaller, less powerful, efficient individual vehicles
 - Low carbon fuels??
 - New role for vehicle and transport industries?
- Policy Framework – Lesson from Singapore?
 - Sustainable (urban) development with all the taxes
 - Slower march of global trade with high carbon price
 - Trust among government, priv. sector, civil society

Measuring Impacts of These Policies Takes Effort
Ignoring Mistakes is Costly

Conclusions: The CO2 Transport Challenge is about Sustainable Transport

- A New Framing of the Issue: NOT “Climate Change”
 - CO2 not a leading transport issue, but transport leading source of CO2
 - Developing countries don't need to reduce, they need to avoid
 - Current CO2 emissions not the point; address future transport
- Sustainable Development and Sustainable Transport
 - Social, Economic and Environmental Sustainability
 - Transport measures not focused on carbon (avoid the \$/ton syndrome)
 - Measure carbon to be sure trends change to lower carbon in transport
- Avoid, Shift, and Improve/Mitigate
 - Avoiding best long-term goal for developing countries
 - Co-benefits from Shift and Strengthen important everywhere
 - Mitigation important, but there is little to “mitigate”, much more to avoid

**Political Will and Strong Governance
Key Elements more than Money and Technology**

ありがとうございます

Arigatou gozaimasu

谢谢

Trân trọng cảm ơn!

Thank you

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***Even with a car that
absorbed its own
carbon,
and needed no oil,
we would still need
strong transport
policies!***