

Shedding Future Carbs and More: Reforming Transport to Reduce Pollution, CO2

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Shedding Carbs and More Contents

• Intro – Sustainable Transport?

- The Pillars of Sustainable Transport and the Roof - Governance

• What is Wrong – the Externalities?

- ASIF – Components of GHG emissions and other problems from transport
- The rise in CO2 emissions from transport: Inevitable? Desirable?

• Driving Forces and Farces – Mostly Outside the Domain of CO2 Policy

- Rising incomes, motorization, sprawl, cheap fuel/subsidies
- Solutions - lower growth in motorization, fuel economy, low carbon fuels
- Systems approach – Avoidance, not just mitigation

• Scenarios and Closing Remarks –

- Hanoi 2020 – Transport futures drive emissions, not the other way around
- Deal with sustainable transport, not just its symptoms
- Add components for clean air, low CO2 to the transport portfolio

*Why Do We Never have Time to Do it Right
Always Have Time to Do it Over Again?*



**Cheap Two Wheelers,
but No Sidewalks**

**The Peoples' Car:
Which People?**



Congestion or Access?









How Sustainable Transport Serves, not Severs, Urban Development

- **Economic Sustainability**
 - Affordable to users and authorities
 - Attractive as a business
 - Each mode bears social costs
- **Social Sustainability**
 - Promotes access for all, not just a few
 - Makes room for all
 - Avoids irreversible binds
- **Environmental Sustainability**
 - Leaves no burdens for future generations
 - Minimizes accidents and damage to human health
 - Reduces greenhouse gas emissions



*Governance - The Roof Over these Pillars
Make and Keep the Rules, Protect the Weak*

Sustainable Transport: Which are Relevant to Today's Challenge?

Congestion in Bangkok



Two-Wheelers in Hanoi



Belching bus in Porto Alegre



Shanghai Maglev



Congestion Pricing Singapore



Delhi CNG?



Honda Accord Hybrid



Llama Rapid Transit? Lima



Mexico City Metrobus



Why Transport in Most Developing Countries is Unsustainable

- **Unbridled Growth In Personal Vehicle Use**
 - Little support for walking, cycling, animal power
 - Flyover farms and metro mania
 - Burgeoning fuel use, local and greenhouse emissions
- **Worsening Conditions of Urban Buses, Rail**
 - Vehicles dirty
 - Riders leaving for dirtier smaller transport or private cars
 - Urban sprawl outpacing growth in transit systems
- **Slow Progress with Clean Fuels, Vehicles**
 - Long vehicle life times, poor maintenance means few meet standards
 - Slow conversion to cleaner fuels
 - Growth in total km driven greater than reduced emissions/km

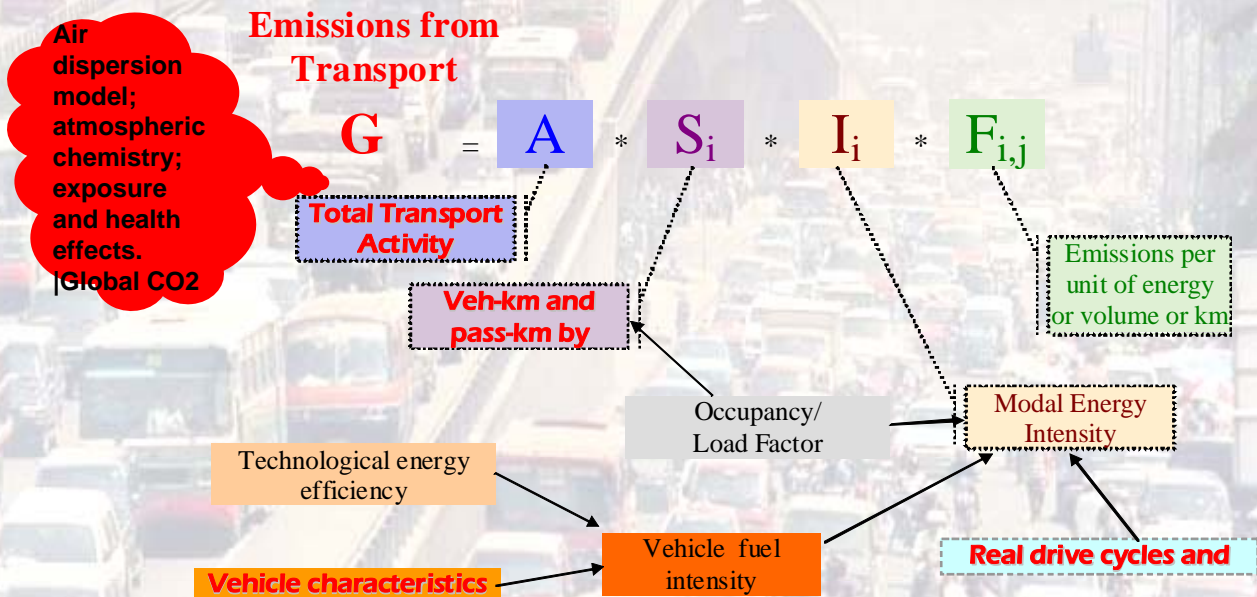
Bottom Line: More travel in dirtier, smaller vehicles

What Else is Not in Balance-Governance Asia Improving – Time is running Out

- **Political Will – Or Lack Of Will**
 - Pressures to keep fuel, vehicle taxes low
 - Slow response of national fuel companies
 - Decay of management of bus systems
- **Poor Environmental Standards**
 - Bad fuel quality and adulteration (6th commandment)
 - Lack of monitoring and enforcement against dirty vehicles
 - Poor air quality monitoring systems
- **Little Regional/National/Local Coordination**
 - Poor harmonization of standards
 - Dirty, “chocolate” vehicles crossing national boundaries
 - Most localities with no capability for monitoring and enforcement

***Dirty Air and Bad Traffic Was no Accident:
It Was Permitted By Lax Authorities***

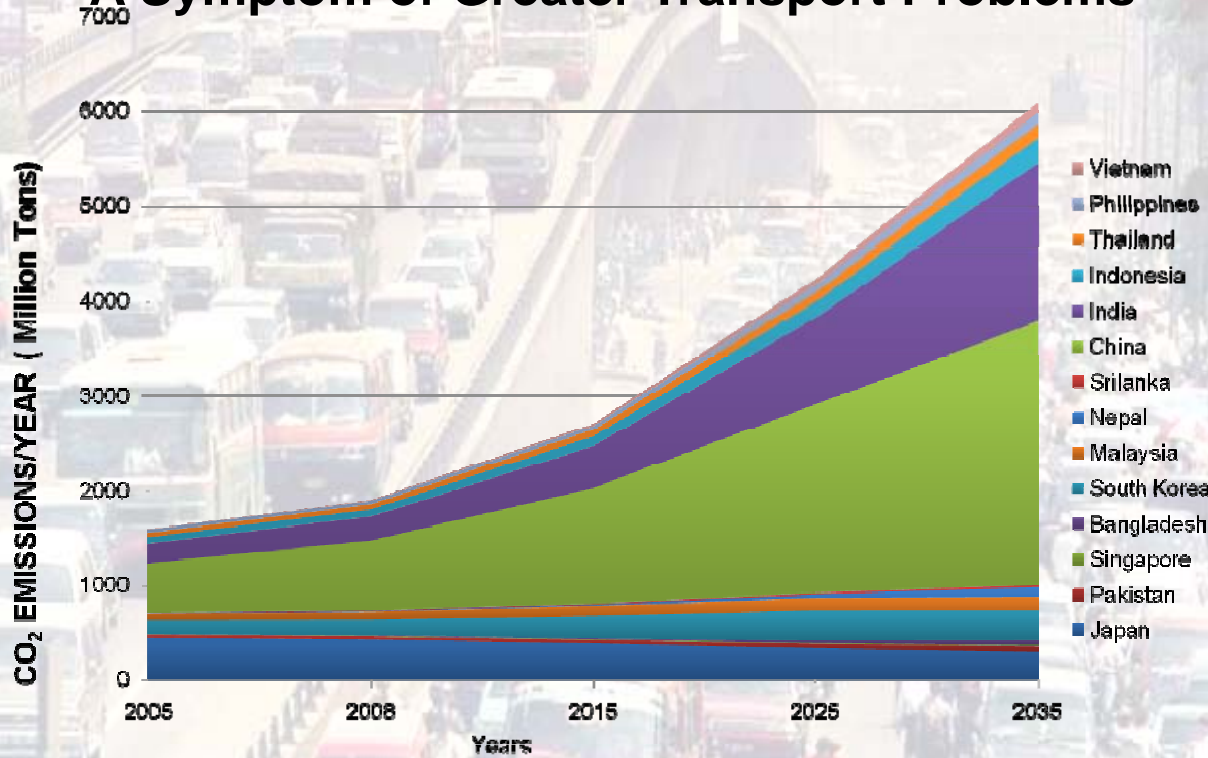
“ASIF” Decomposition Identify Driving Forces, not Farces



**Lesson : Attack All Components of
Pollution and other Transport Problems**

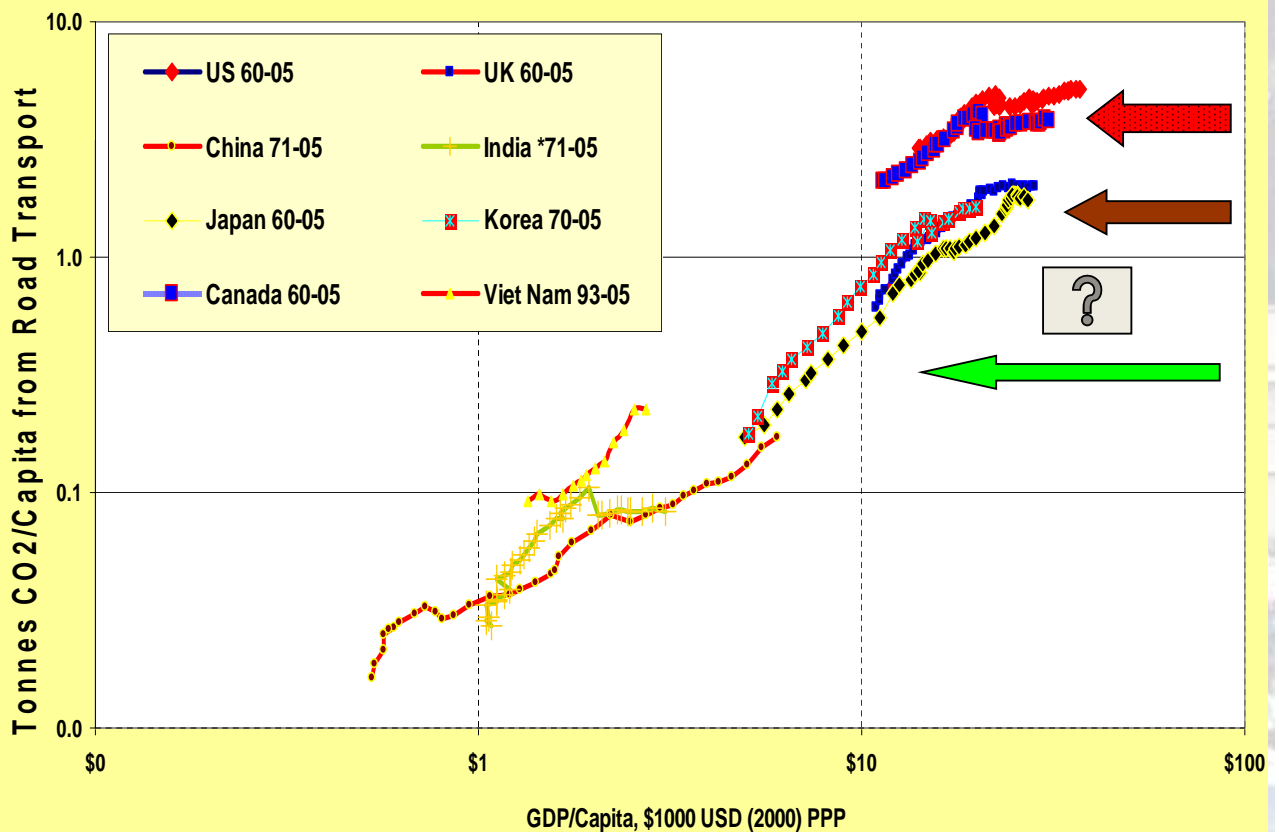
Projected Transport CO2 Emissions in Asia

A Symptom of Greater Transport Problems



Source: 2008. Segment Y, ADB and CAI-Asia from various sources

CO2 Emissions from Road Transport



-Source: IEA

The Carbon Challenge



Congestion Pricing in Stockholm

Tried in 2006 After 15 Year Debate

- Tested January-July 2006
- Vehicles entering the inner city area are charged US\$1.55 – US\$2.90 per trip at 18 entry points
- Voters accepted in Sept 06 - Live now

Impact

- Traffic volume decreased by 25%, removing 100,000 vehicles during peak hours
- Increasing daily public transit rider-ship by 40,000
- Daily revenue of US\$500,000 to \$2.7 million

Other Effects – **Extend to Efficient Cars?**

- Lower fuel use, CO2, particulate matter
- Quieter streets
- Overall benefits ~ \$100 mn/year on \$400 mn investment
- Traffic benefits > CO2 benefits



Creating a New System – Mexico's Metrobus

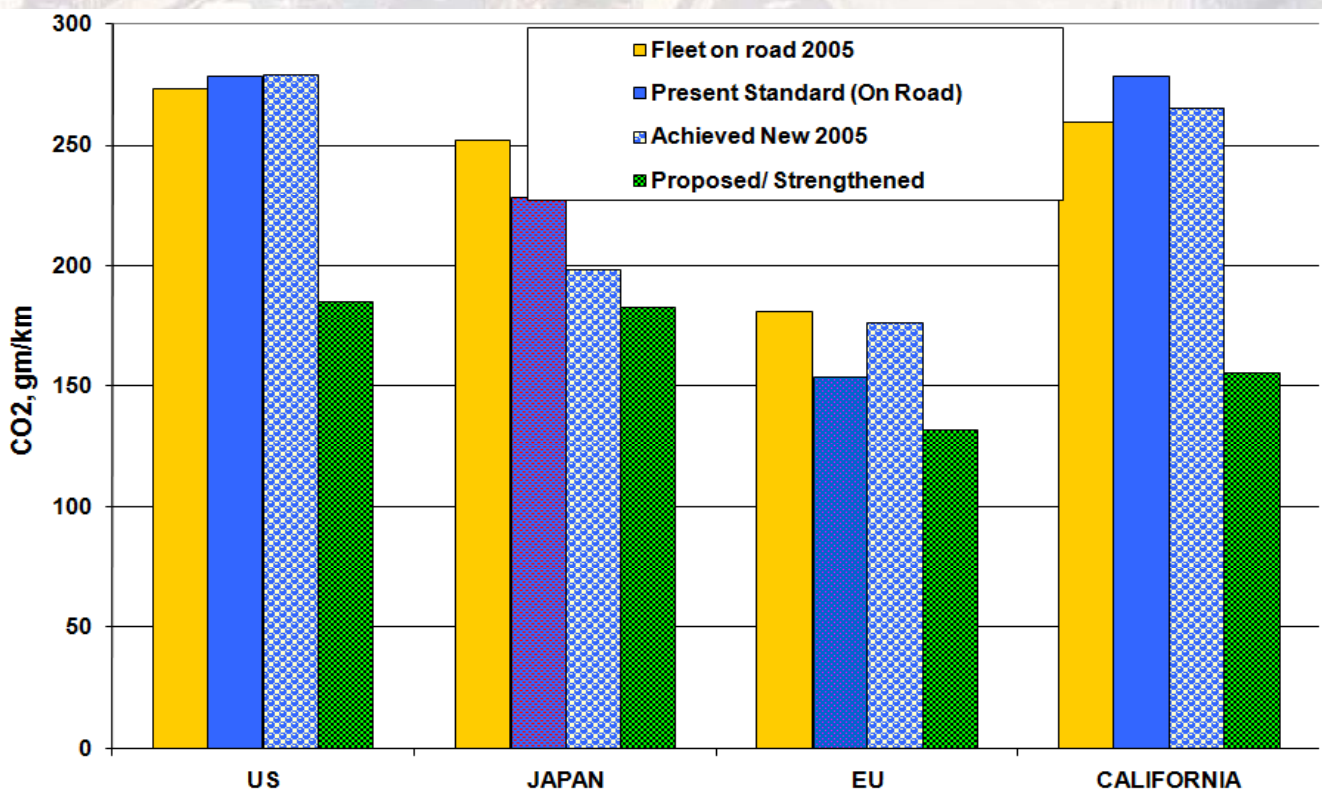
260,000 people/day over 20km for US \$60mn

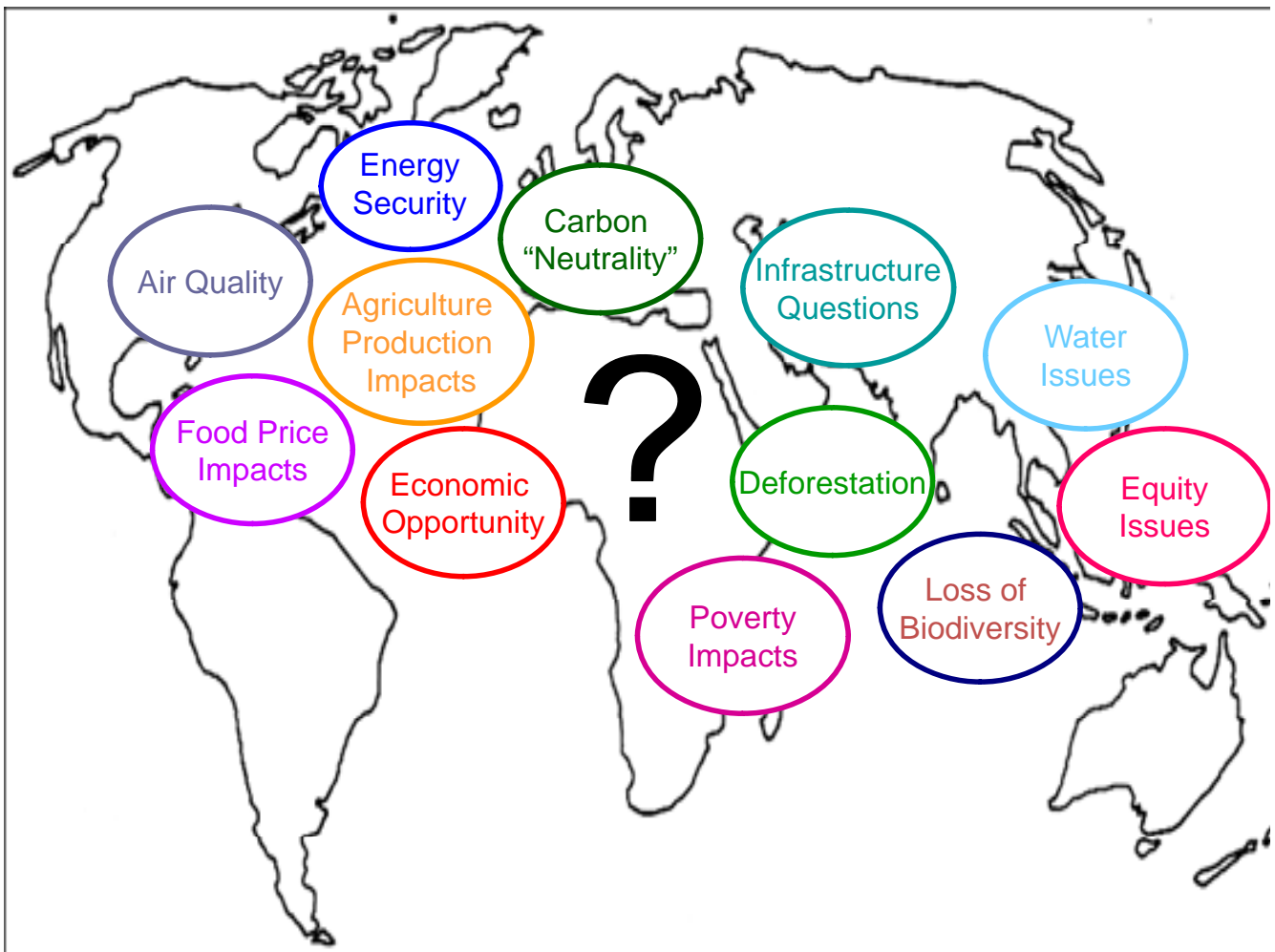
Lower emissions, CO₂, reduced car traffic



New Vehicle Fuel Economy Standards and Targets: "Fleet, On Road"

Don't be Dumped by Diesel or Hyped by Hybrids





Hitting Each Component of ASIF

- **Growth in Motorized Activity**
 - Land use planning, keeping Asian cities compact
 - Reducing bulk in freight, producing and shopping locally
 - Congestion pricing in most city centers
- **Modal Shifts**
 - Making each mode pay its own way
 - Giving feet, pedals, collective transport real priority
 - Transit and foot-oriented development
- **Fuel Economy (also for buses, trucks)**
 - Technology, but also less weight, power, and speed, too
 - Improving traffic flow by reducing traffic to improve on-road
 - Avoiding traps like special fuels (e.g. diesel), hot-air cars, etc
- **Alternative Fuels or Aging Fools? Large Scale Alternatives Not Here**
 - Searching (beyond Brasil) for truly low-carbon,
 - Low impact (no food conflict) as important as low carbons
 - Price oil security and carbon, don't subsidize winners that are losers

Make Transport Work

Accounting Rules For ASIF

CO2 Focus Important, but Not Everything

- **A – Total Distance Traveled**
 - How far different vehicles, people, and goods move
 - Important to specify region, who/which goods traveling
 - Look for possible rebound effects from lower travel/fuel costs
- **S – Modal Split**
 - Distances traveled by mode (or shares of distance)
 - Wide difference in emissions per veh-km, pass-km, tonne-km
 - Walking and cycling have zero emissions
- **Vehicle or Modal Fuel Intensity**
 - Fuel or emissions/vehicle kilometer
 - Fuel or emissions/tonne-km or pass-km important too
 - In mode shifts, issue of whether to count average or margin
- **Decarbonizing Fuel Choices**
 - Focus on CO₂, but other gases important (CH₄, N₂O..)
 - Fuel-cycle analyses (FFCA/LCA) expose hidden fossil fuel inputs
 - Some inputs (indirect land use/soil changes) hard to measure

Saving and De-Carbing

A Broader Transport Perspective

- **Avoidance – Carbon is a 2nd tier Consideration**
 - Land Use: Building a city or country differently (Singapore, Curitiba, ?)
 - Internalizing costs at an early stage of development
 - Shifting the balance away from high-carbon transport
- **Co-benefits of Transport, Urban Dvpt Strategies**
 - Bus Rapid Transit and other improvements to transport system
 - Congestion pricing and other strategies to reduce externalities
 - Improved fuel use in pursuance of lower air pollutant emissions
- **Direct Approach – Mitigation by Tech, Operations**
 - Technology to reduce fuel use/km with improved traffic flow
 - Fuels with lower carbon/unit of energy
 - Improved vehicle or system utilization, modest restraint in km

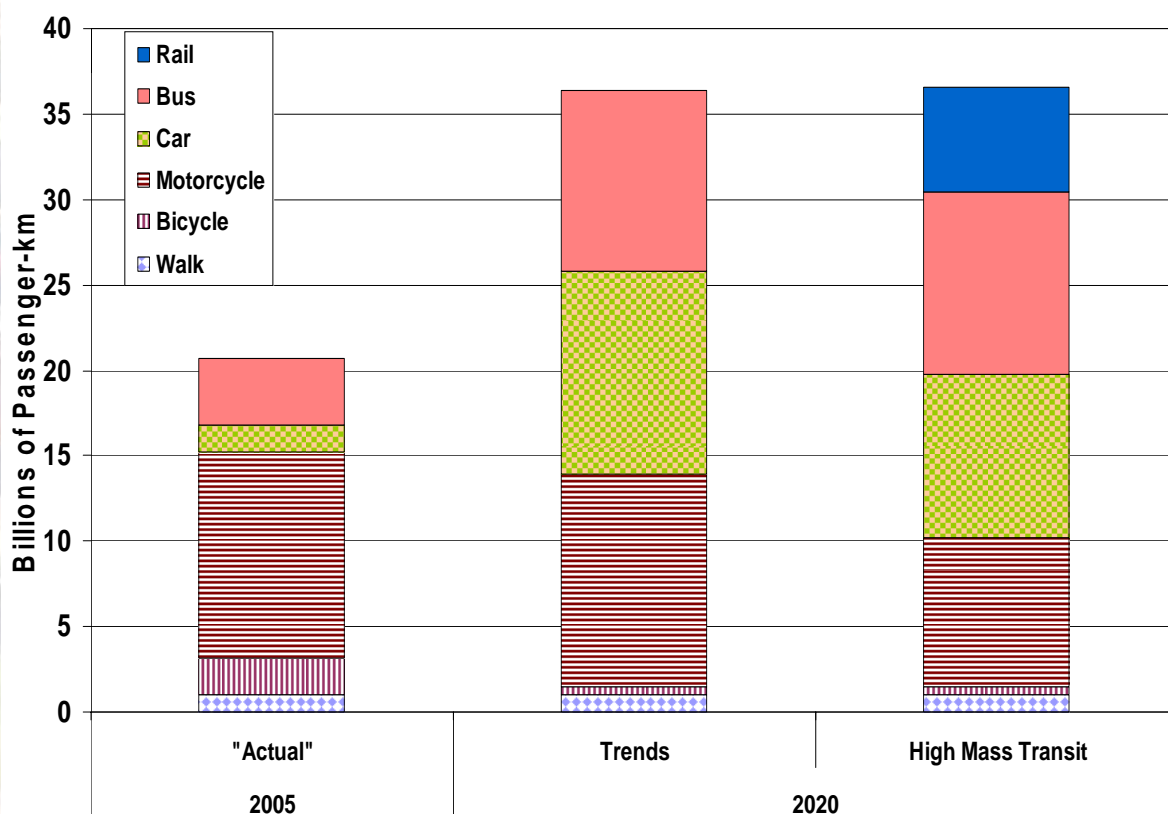
This is not a North-South Issue!
Avoidance Tomorrow by far Largest Potential

Accounting Rules For ASIF

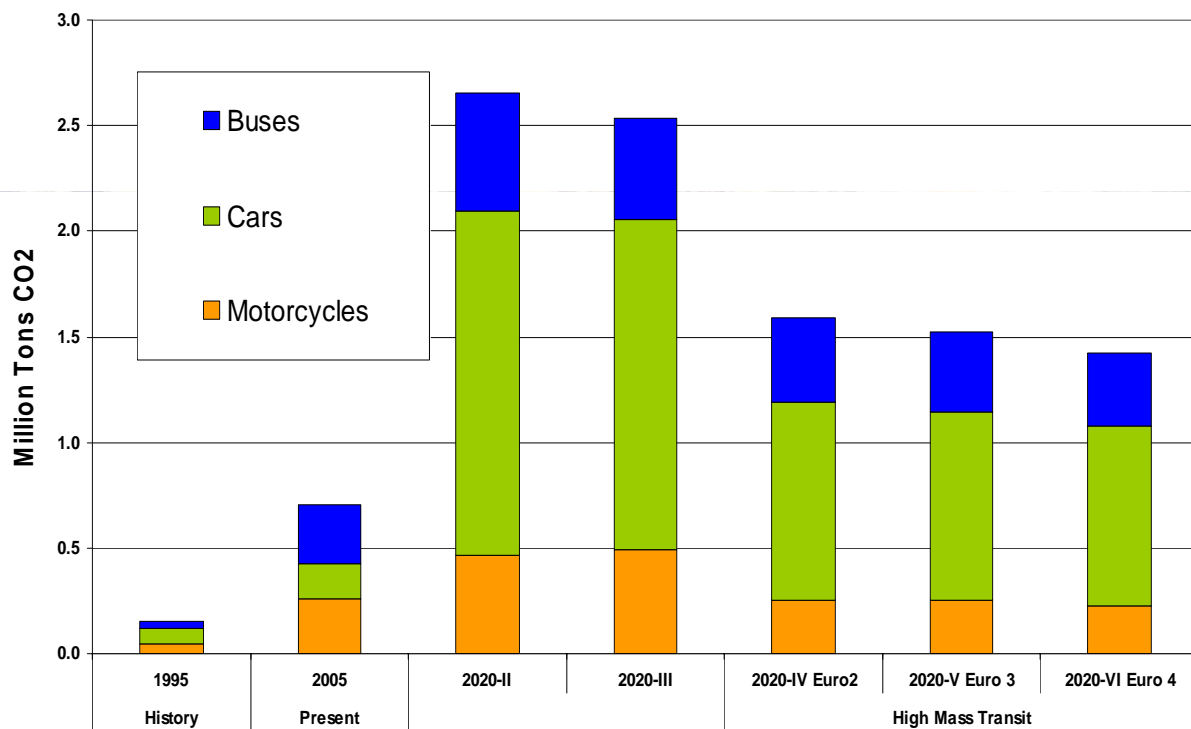
- **A – Total Distance Traveled**
 - Are transport services properly priced, particularly when congested?
 - Are people moving long distances from home to work to shopping?
 - Are goods running back and forth in poorly loaded trucks?
- **S – Modal Split**
 - Are all modes coordinated and financially healthy?
 - Are busses stuck in traffic and rail facilities difficult to access?
 - Are walkers, cyclists and transit riders endangered species?
- **Vehicle or Modal Fuel Intensity**
 - Is fuel dirty and under priced?
 - Are new and used vehicles taxed properly
 - Are vehicles fully utilized (particularly cars and trucks)
- **Decarbonizing, Clean Fuel Choices**
 - Is diesel under priced?
 - Are fuel quality standards high and enforced?
 - Does a carbon tax driver out the fake low-carbon fuels?

Passenger-Kilometers by Mode in Hanoi

Source: Hanoi Master Plan, EMBARQ estimates



Resulting CO2 emissions: Transport Patterns As Important as Technology



Seeing What You Master: Data Hitchhiking For Better Analysis

- **How Many Vehicles are There Really?**
 - In-use, not just registrations
 - Where are they garaged?
 - Who owns them (vehicles don't drive themselves, people drive them)
- **How Far Do They Run, Where, with Whom or What on Board?**
 - Coupling between mobility of goods/people and purposes of movements
 - Real loadings, both absolute and share of people or tonne capacity
 - Kinds of traffic, drive cycles, speeds etc
- **What are the Real Fuel Consumption Rates?**
 - Difference between test and reality is huge, and varies by region/country
 - Differences among similar vehicles using different fuels can be surprising
 - Diary and measured data needed to develop survey

*These Uncertainties Today's View of Transport
Many Authorities Need to know the Numbers*

Conclusions: Avoid Carbo-Centricity

- **Keep Sustainable Transport in Focus - A People Problem**
 - Safety, congestion, exclusion, dirty air still the worst problems
 - Confronting those challenges also helps reduce CO2 emissions
- **Don't Focus Too Heavily on Technology – People Can Subvert It**
 - Technologies only do what they are asked to do
 - Standards help, but economic signals must be in place
 - Tax losers, don't pick winners
- **Confront the Tough Institutional Transport Problems First**
 - Transport reform means that – institutions, finance, enforcement
 - Address urban land development and land use problems
 - Understand how to lower flow of bulk while raising economic welfare

