



# Co-benefits of Public Transport in Urban Centers: Experiences from industrialized and developing countries

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New York, NY  
April 13, 2010

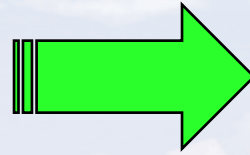
# Key messages



- Effective climate action is incomplete without addressing the overall system performance of the transport sector
- Climate action in the transport sector should recognize co-benefits
- Overall benefits of public transport systems in the long run are higher than the (total) costs
- Carbon finance mechanisms and associated procedures should catalyze sustainable transport policies, programs and projects

*The Bellagio Declaration on  
Transportation & Climate Change*

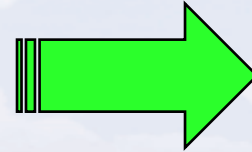
# Enhanced Freight Management



- Improved logistics
- Freight Transfer and Consolidation Facilities
- Fleet Standards
- Delivery schedule regulation



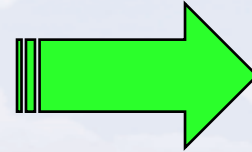
# Integrated transport, land use and environment strategies



- Promote high-density land use along public transport corridors
- Prevent urban sprawl
- Revitalize urban centers
- Improve access for all



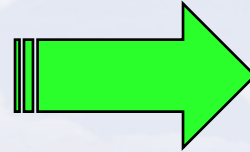
# Improved public transportation



- Reorganize network layout
- High capacity modes on trunk corridors
- Intra- & inter-modal service integration



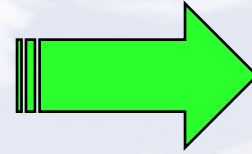
# Travel demand management



- Commute trip reduction strategies
- Traffic calming
- Parking policies
- Congestion pricing



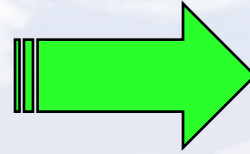
# Promotion of non-motorized transport



- Promote bike use
- Finance bikeways and pedestrian facilities
- Promote intermodality NMT & public transport



# Improved Technologies and Fuels

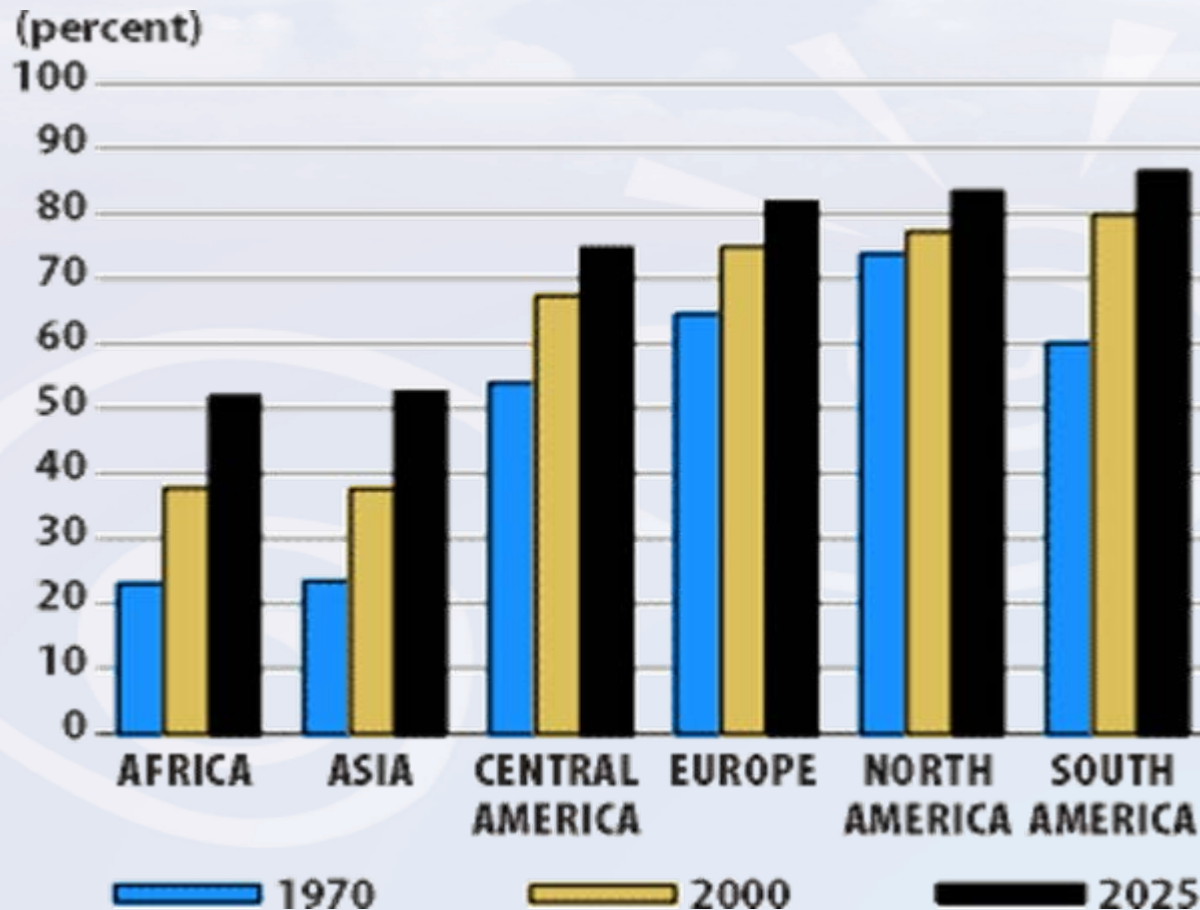


- Cleaner, more efficient Vehicle technologies
- Ultra low sulfur fuels
- Alternative fuels
- Inspection & Maintenance





# Population Residing in Urban Areas, by Region, 1970-2025



Source: United Nations (U.N.) Population Division, *World Urbanization Prospects (The 1996 Revision)*, on diskette (U.N., New York, 1996).

# Public transport share is decreasing

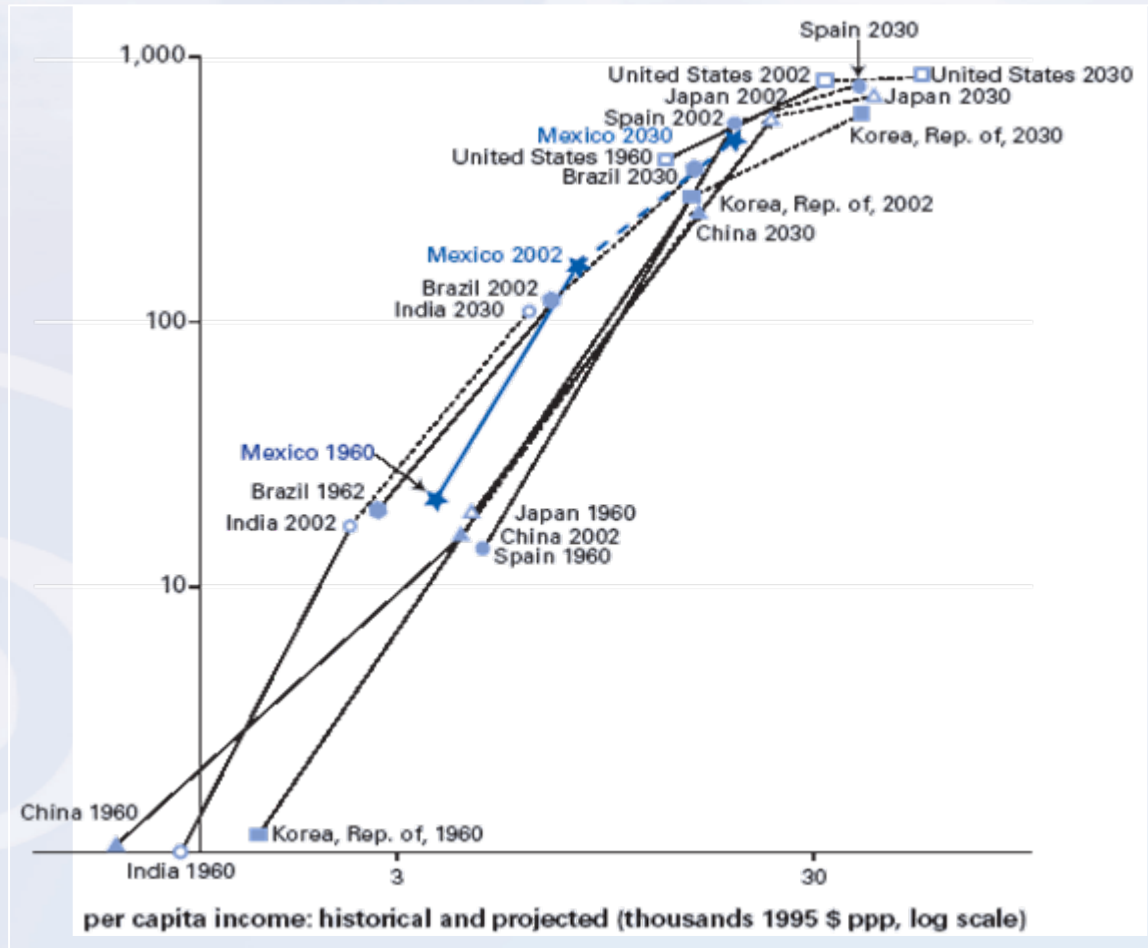


City	year	Public transport as a % of motorized trips	year	Public transport as a % of motorized trips
Bangkok	1970	53	1990	39
Buenos Aires	1993	49	1999	33
Kuala Lumpur	1985	34	1997	19
Mexico City	1984	80	1994	72
Moscow	1990	87	1997	83
Sao Paulo	1977	46	1997	33
Seoul	1970	67	1992	61
Tokyo	1970	65	1990	48
Shanghai	1986	24	1995	15



# Motorization is increasing

- High rates of motorization
- Increasing income
- Low price of fuel
- Low price of maintenance and keeping a vehicle

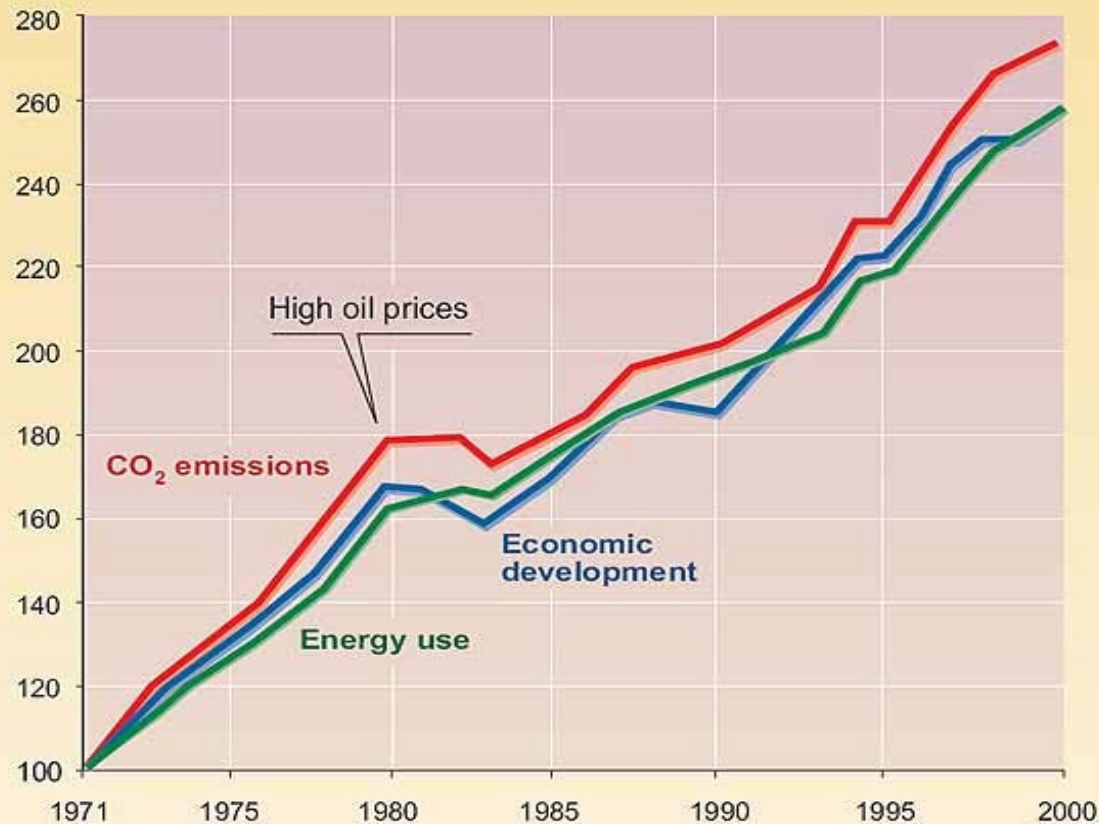


# CO<sub>2</sub>, Energy Use and Economic Development



CO<sub>2</sub> emissions, energy use and economic development  
Latin America and the Caribbean

Index=100 in 1971



# CO2 emissions in associated with transport



## CO<sub>2</sub> emissions from transportation in 2000 selected countries of Latin America and the Caribbean

% of total CO<sub>2</sub> emissions from fossil fuels





# Air Pollutants

## Criteria Pollutants

CO    O<sub>3</sub>    SO<sub>2</sub>    NO<sub>2</sub>PST    PM<sub>10</sub>  
PM<sub>2.5</sub>    Pb

## Air Toxics

Toluene, benzene xilene, methanol,  
amonia, chlorine, lead, chrome,  
cadmium, etc.

## Green House Gases (GHG)

CO<sub>2</sub>    CH<sub>4</sub>    SF<sub>6</sub>    N<sub>2</sub>O  
HFCs    etc.

## Ozone Depleting Substances

CFCs    PFCs    HCFCs    ...

# Air pollution can impair human development if not prevented and controlled



## Human Activities

- Energy
- Motorised transport
- Agriculture
- Land management
- Industrialisation
- Urbanisation
- Mining operations

## Emissions

- Particulate matter
- Sulphur dioxide
- Nitrogen oxides
- Carbon monoxide
- Carbon dioxide
- Methane
- Ammonia
- Volatile organic compounds

## Air Pollution

Secondary pollutants:

- Ozone (from NO<sub>x</sub>, VOCs and CH<sub>4</sub> in the presence of sunlight)
- Sulphate, nitrate and ammonium aerosol

## Exposure

- People
- Animals
- Vegetation
- Man-made materials
- Soils
- Watershed

## Impacts

- Premature deaths
- Reduced crop yields
- Acidification
- Eutrophication
- Reduction of biodiversity
- Impaired ecosystems services
- Climate interactions

Costs

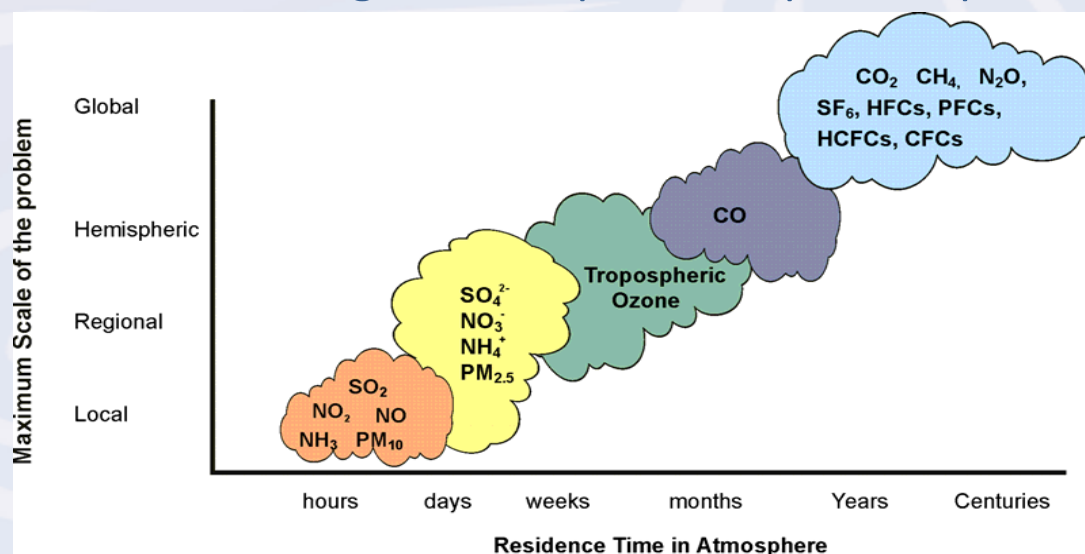
Competitiveness Losses



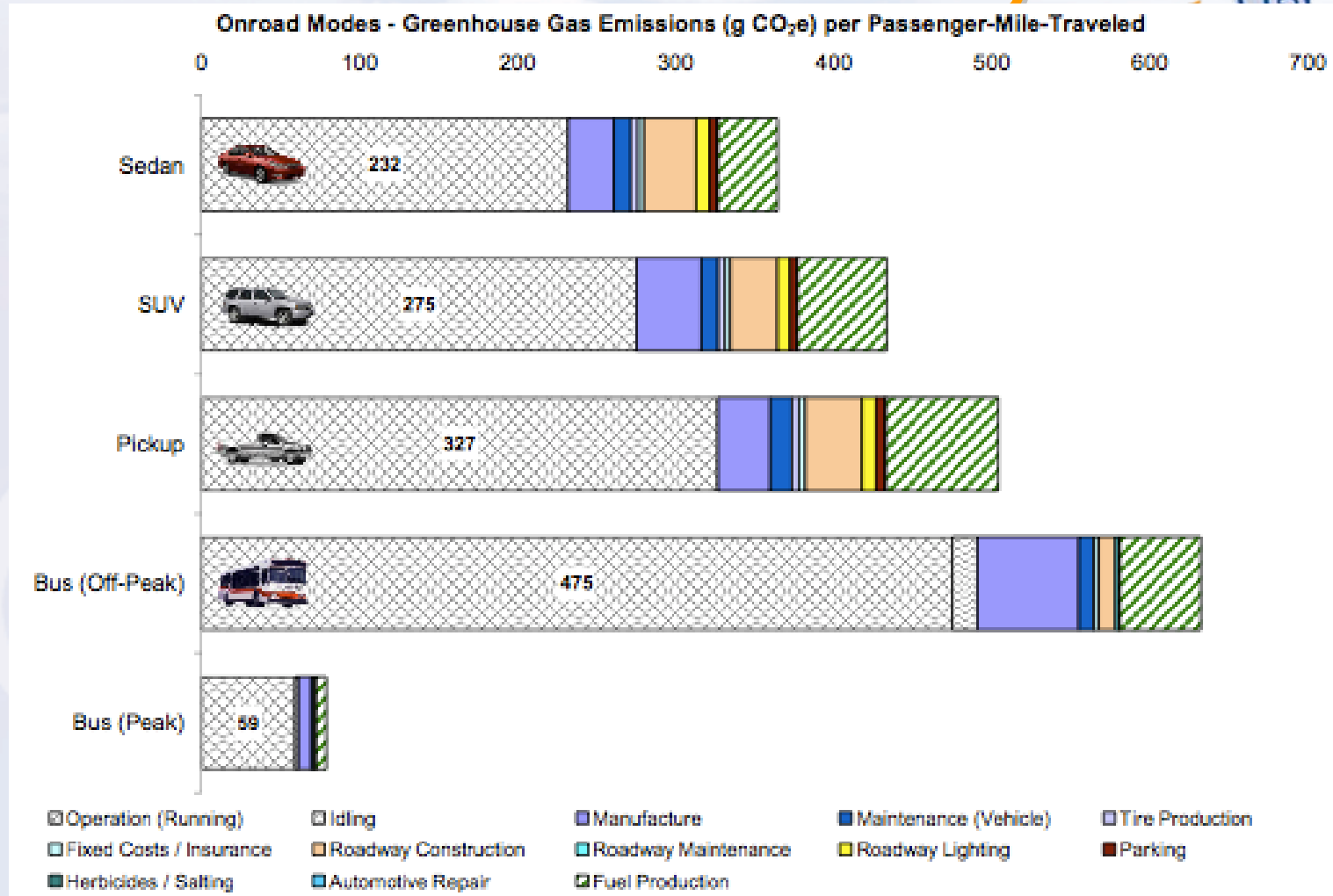
# Challenges and opportunities



- Addressing air pollution as a serious threat to public health and obstacle for sustainable development.
- Dealing with air pollution and across the scales
- Moving from assessment to action
- Creating awareness of true costs of poor air quality and benefits in key stakeholders
- Integration of climate change and air pollution policies producing co-benefits



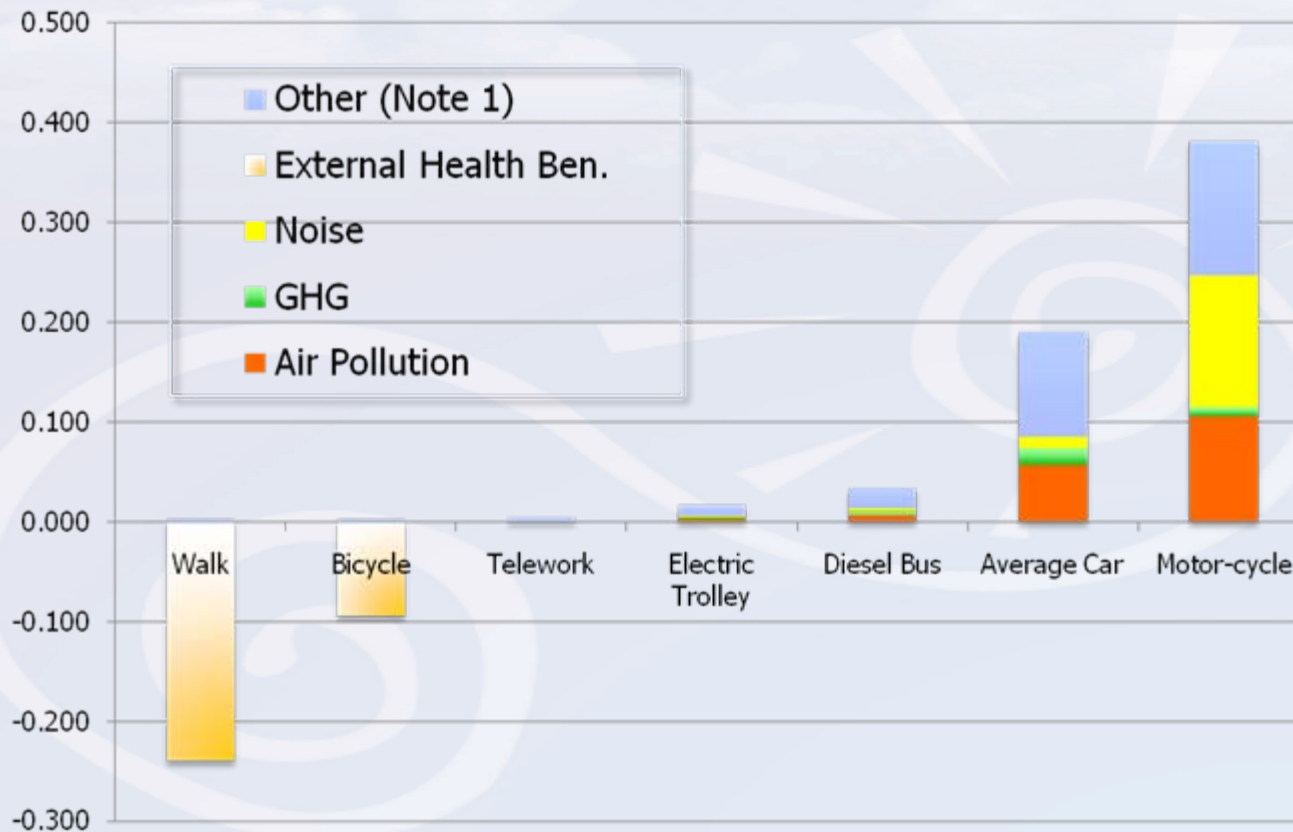
# Onroad GHG Inventory



Source: Chester, M.: "Environmental Life-cycle Assessment of Passenger Transportation: A Detailed Methodology for Energy, Greenhouse Gas and Criteria Pollutant Inventories..." Berkeley, 2008

# Transportation Costs

Selected External Costs at Urban Peak in the US  
(2007 U.S. Dollars per mile)

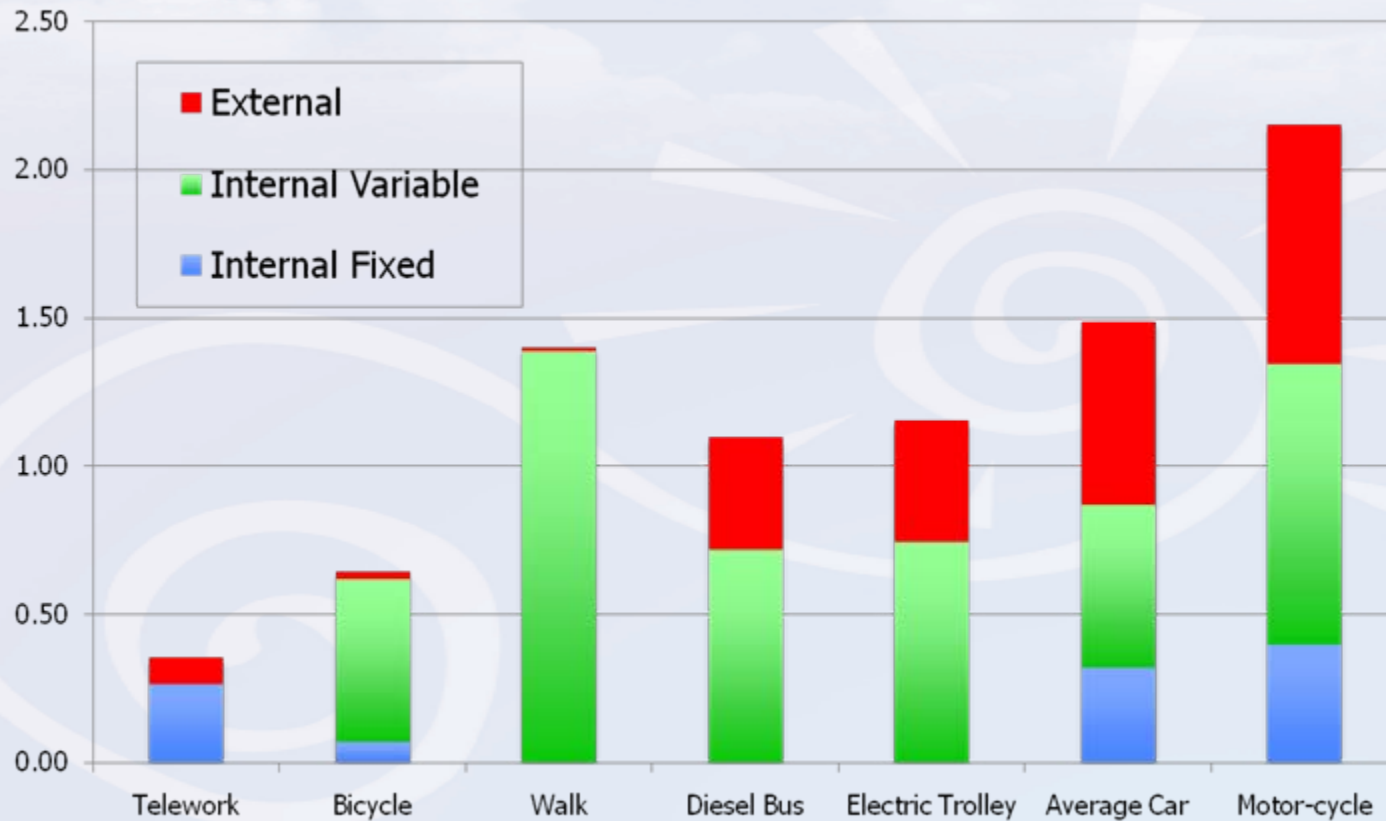


Note 1: Other includes: water pollution, external crash and resource externalities

Source: CAI Based on Victoria Transport Policy Institute, "Transportation Costs and Benefit Analysis". January 2009.

# Transportation Costs

Internal and External Costs at Urban Peak in the US  
(2007 U.S. Dollars per mile)



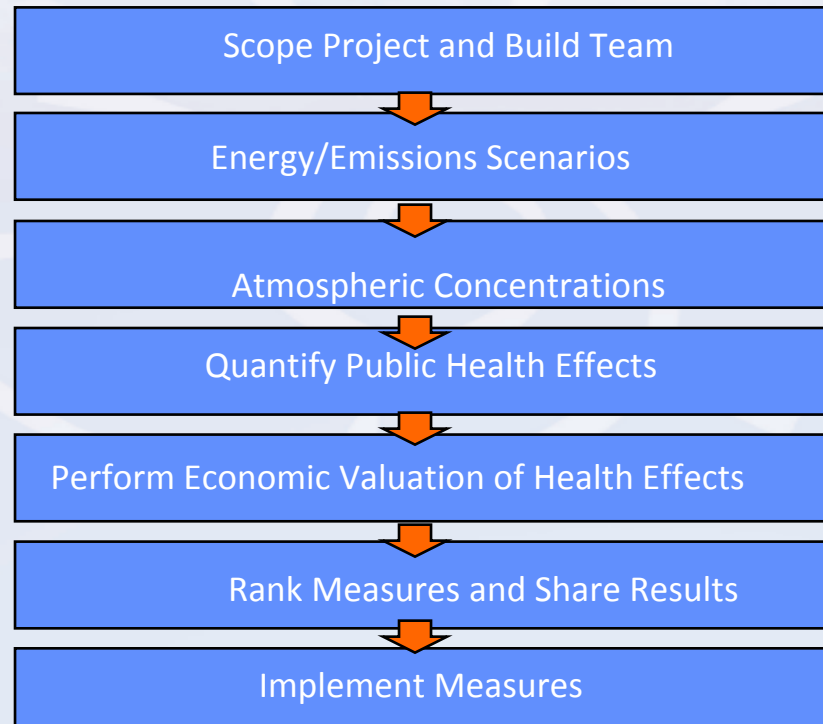
Source: CAI Based on Victoria Transport Policy Institute, "Transportation Costs and Benefit Analysis January 2009."

# Integrated Environmental Strategies Approach (IES)



- The IES Approach helps identify policies and technologies that reduce emissions of greenhouse gases (GHGs) and local air pollutants.
- By analyzing and implementing “integrated” policies and measures such as sustainable transport, IES communities have an opportunity to make a positive impact on local air quality, public health, and the economy, while at the same time reducing GHGs at the global level.

## IES STEPS



Source: US Environmental Protection Agency

# IES Evaluation of the Insurgentes Corridor



**Table 10.1.** Annual benefits and costs of the Metrobús system circulating on Insurgentes Avenue, million U.S. dollars, adjusted for inflation to 2005. The net present value is calculated using a discount rate of 7%.

Year	Travel Time Benefits (Million USD)	Health Benefits (Million USD)	Operational Costs (Million USD)	Net Benefits (Million USD)	Greenhouse Gas Reduction (Thousand tons CO <sub>2</sub> equivalent)
2005	0.7	2.0	43.3	-40.7	13.2
2006	1.3	3.7	-2.4	7.4	26.5
2007	1.3	3.6	-3.2	8.2	26.5
2008	1.3	3.5	-3.2	8.1	26.6
2009	1.3	3.3	-3.2	7.9	26.6
2010	1.3	3.1	-3.2	7.7	26.6
2011	1.3	2.9	-3.2	7.5	26.7
2012	1.3	2.7	-3.2	7.3	26.7
2013	1.3	2.6	-3.2	7.2	26.7
2014	1.3	2.4	-3.2	6.9	26.7
2015	1.3	2.1	-3.2	6.7	26.7
Net Present Value*	10.1	23.7	21.5	12.3	279.4

\*Total greenhouse gas emissions reduction was summed rather than discounted.

# Conclusions



- Sustainable transport interventions represent a suitable and important solutions on the way to sustainable transport.
- An comprehensive understanding and recognition of its overall impacts is needed to mobilize decisions and resources.
- An integrated approach should be used to evaluate options and prioritize policies, programs and policies.
- New financial (i.e. carbon finance) instruments need to be developed, consistent with the magnitude of challenge



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## Recovering public space



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