Policy development for improving energy and environmental balance of transport

Mohamed Mezghani

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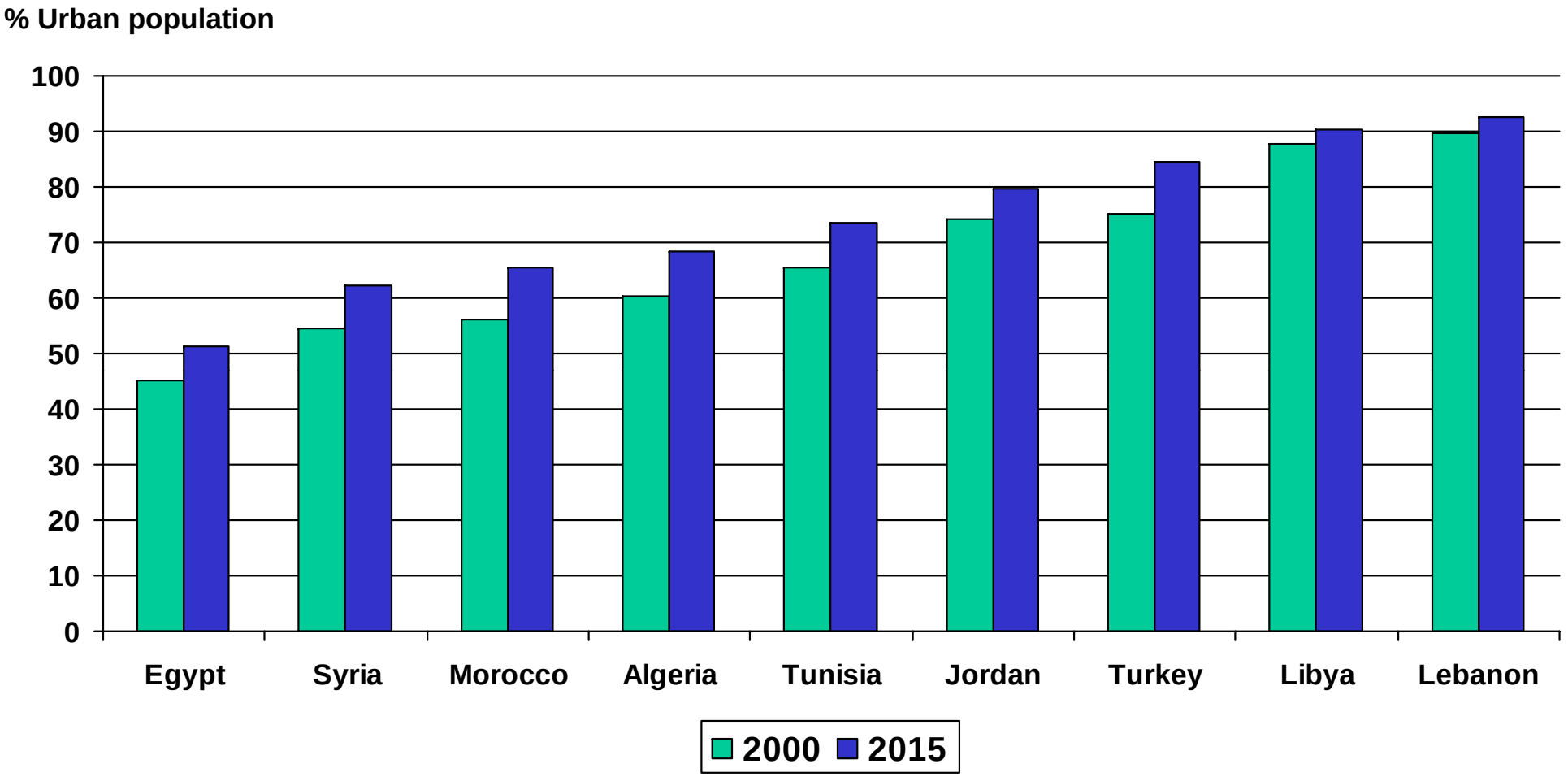
Outline of Presentation

- Main trends affecting people mobility
- Consequences on energy consumption
- Consequences on air pollution
- Improving energy efficiency and reducing environmental nuisances of urban transport
- Conclusions

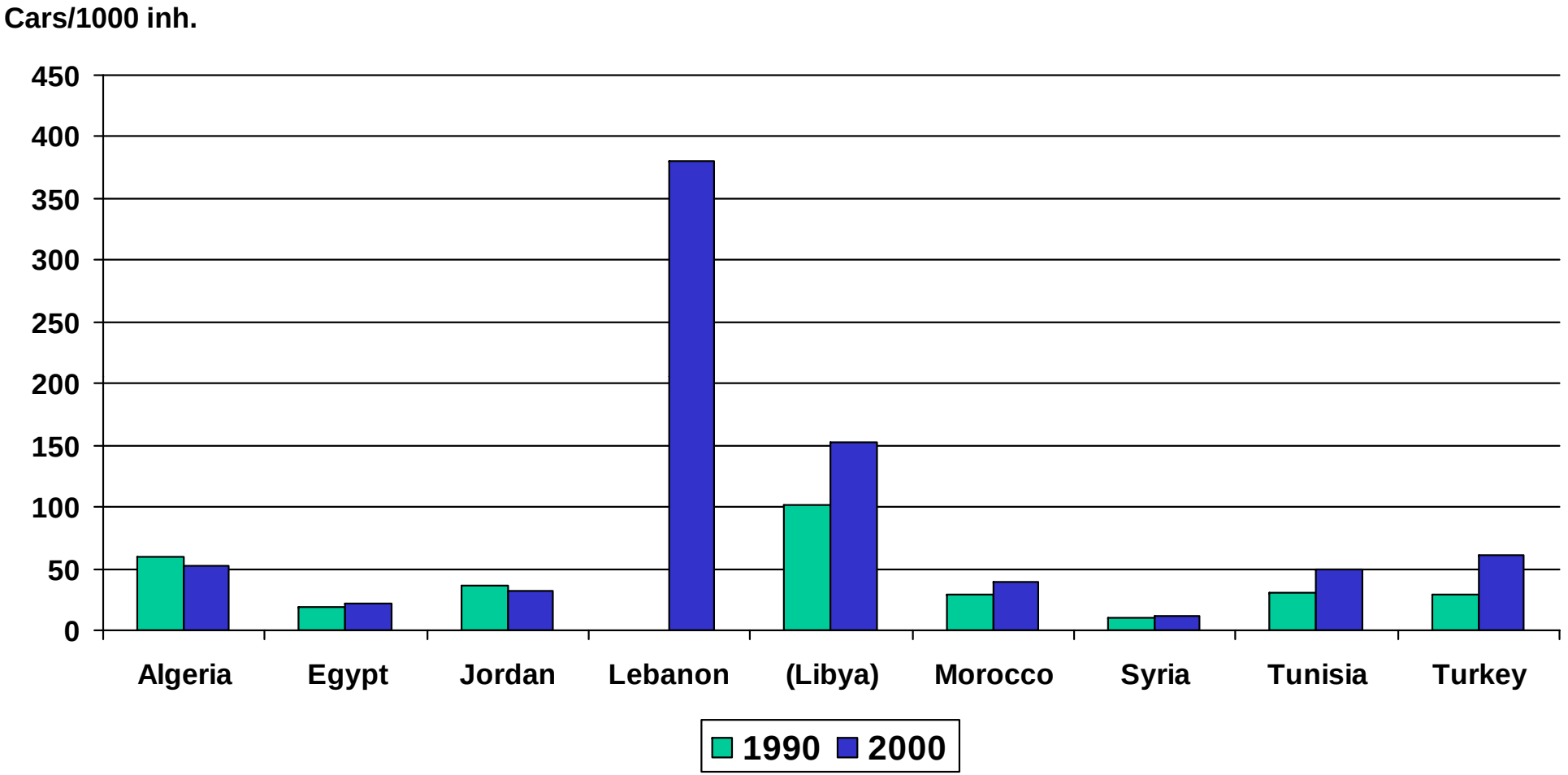
Main trends affecting people mobility
1. General and social issues

- Rapid urbanisation and rural depopulation: more and more people are living in urban and suburban areas
- Urban communities are becoming larger (urban sprawl)
- Lack of land use policy in most cases
- Rapid growth of car ownership but still a majority of people has no access to a car
- Youthful population

Urbanisation rates



Car ownership rates



Main trends affecting people mobility
2. Urban traffic issues

- Vehicle fleets grew more rapidly than road space
  ⇨ Increasing traffic congestion
- Ageing of vehicle fleet and lack of maintenance
- Lack of coordinated traffic management and control
- Lack of parking control (e.g. in pedestrian areas)
- High rates of road accidents and fatalities

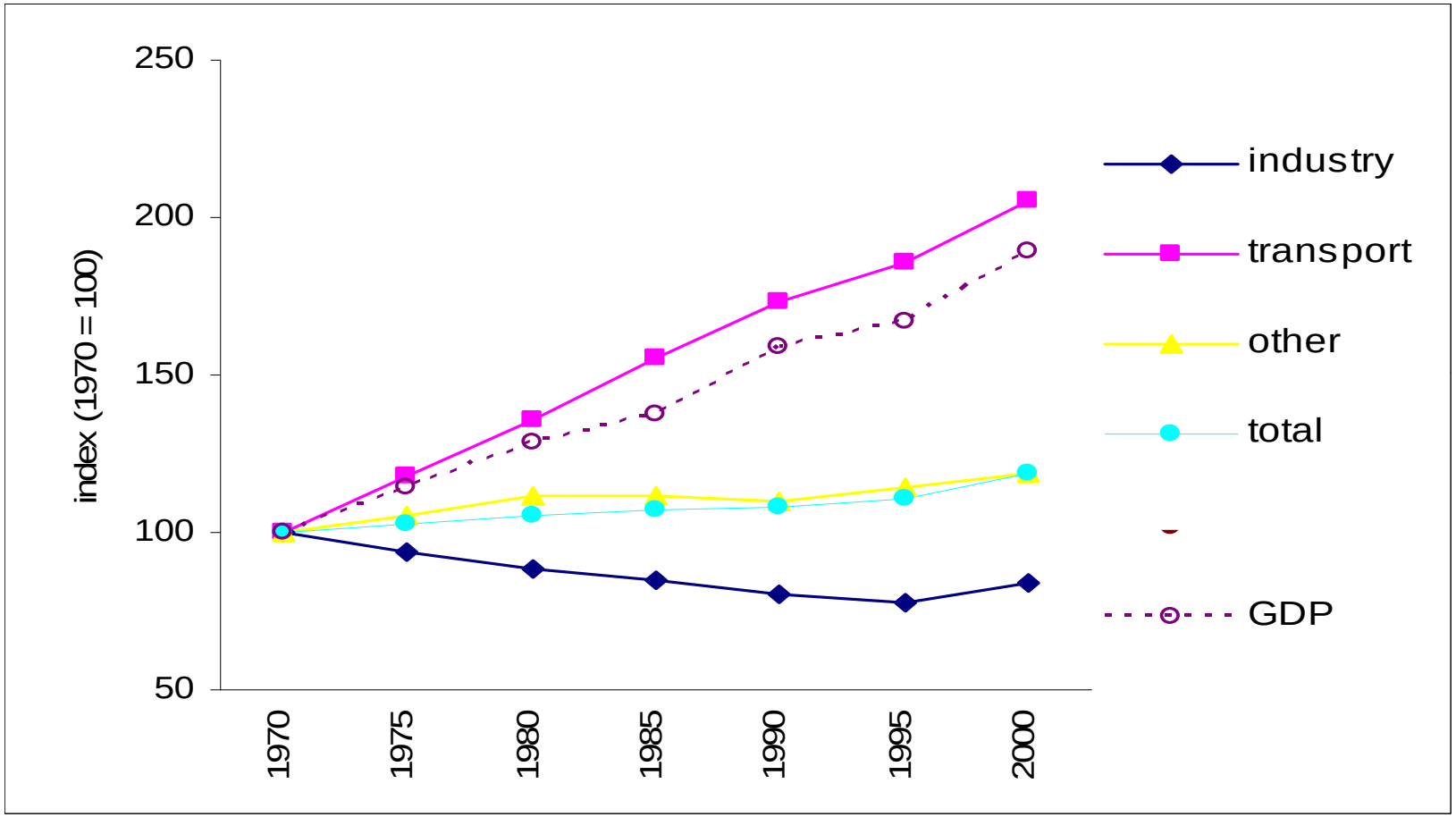
Main trends affecting people mobility
3. Public transport systems

- **Metros** in Cairo (2 lines, 62 km), Ankara (14.6 km), Istanbul (7.9 km)
- **Tramway/light rail** systems in Cairo (24 km since 1896), Alexandria (48 km since 1860), Helwan (48 km), Heliopolis (30 km), Tunis (5 lines, 32 km), Istanbul (18 km), Bursa (17 km), Ankara (8.5 km), Izmir (11 km), Konya (18 km)
- **Bus** fleets amount to some hundred in main cities excepting in some cases (e.g. Istanbul IETT (2,580) Casablanca RATC (1,200), (2,000), Tunis SNT (1,000)
- **Shared taxis** are very popular but operates often in a non-regulated context

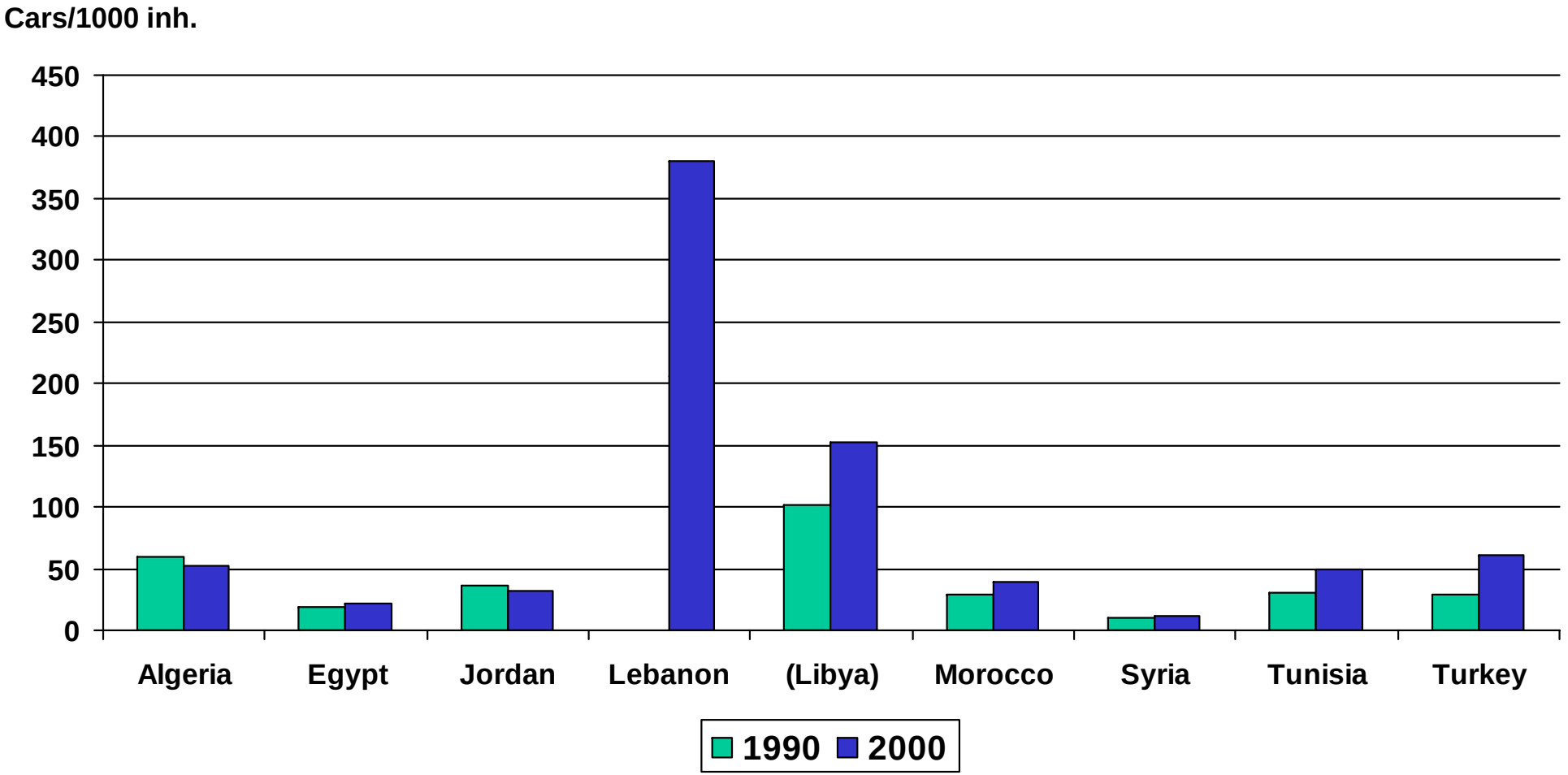
Consequences on energy consumption

- Transport sector will overtake industry as the largest energy user by 2020 ⇨ Annual increase rate of 2.1%
- Transport is responsible for 26% of all GHG emissions in the EU and this share is growing everywhere
- While we experienced worldwide a 4% average increase rate for transport energy consumption between 1996 and 1999, most MEDA countries recorded higher rates: +59% in Lebanon, +14% in Egypt, +12% in Tunisia and Morocco
- Energy consumed by road transport accounts for 55% to 90% of the sector final consumption and is mainly due to car traffic
- Urban transport energy efficiency is sharply decreasing
- Private cars account for about 50% of all CO_2 emissions and are the major source of CO_2 in urban areas

Transport is the sector with the fastest growing energy consumption



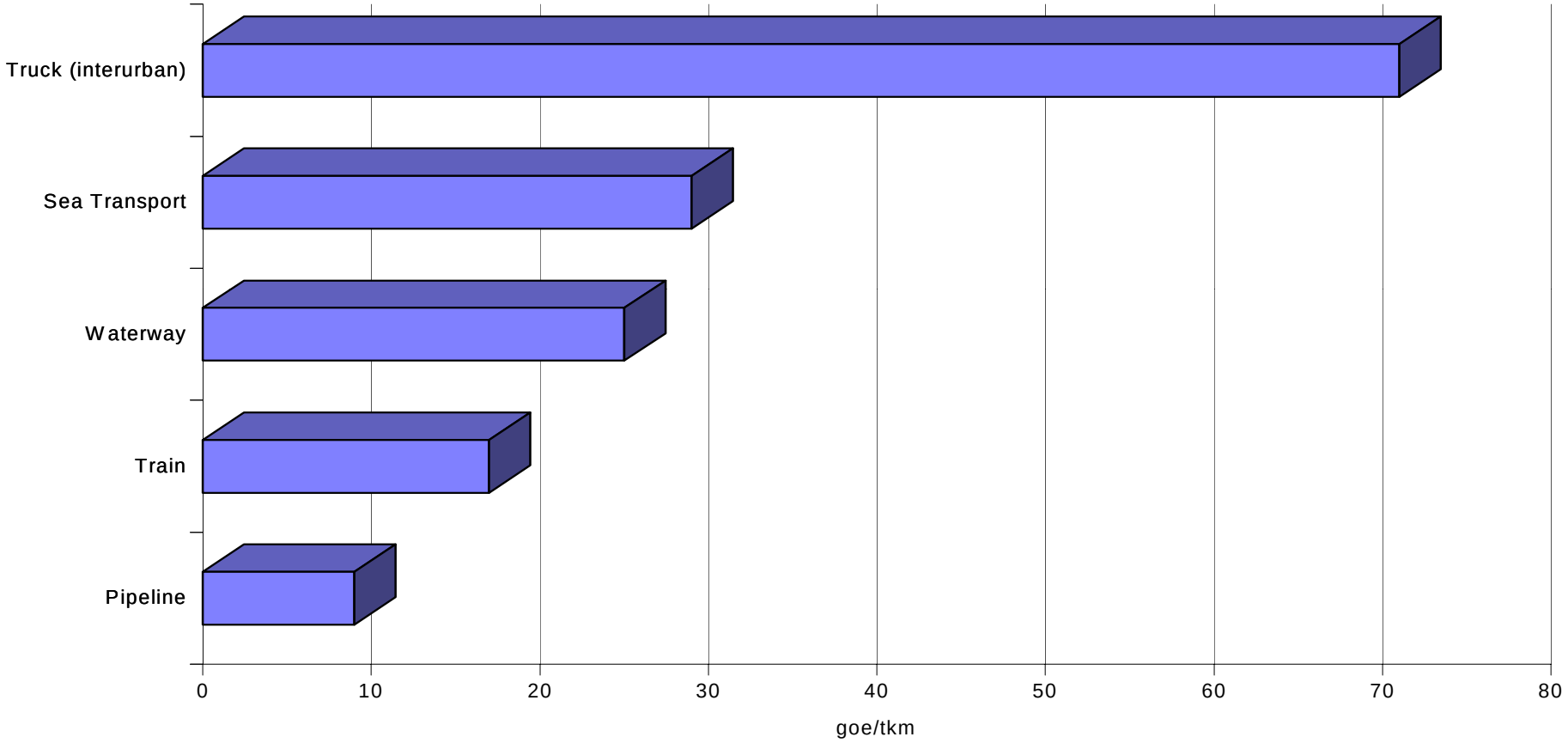
Transport energy consumption



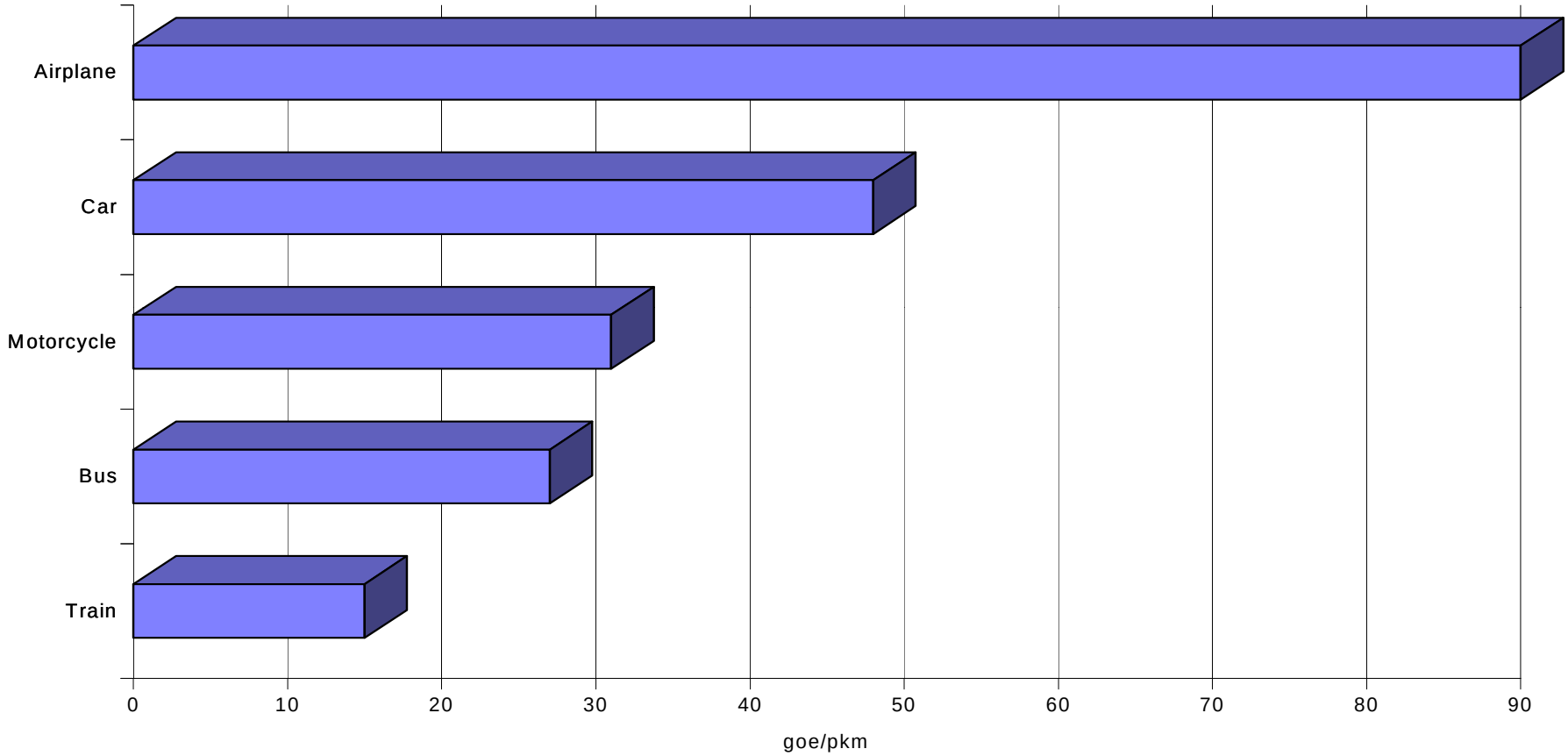
Contribution of transport to air pollution

Pollutant	Part of emissions due to the transport sector
CO	75%
HC	75%
NO_x	74%
SO_2	22%
Pb	80%

Energy efficiency of freight transport modes



Energy efficiency of passenger transport modes



Specific emission factors of passenger transport modes

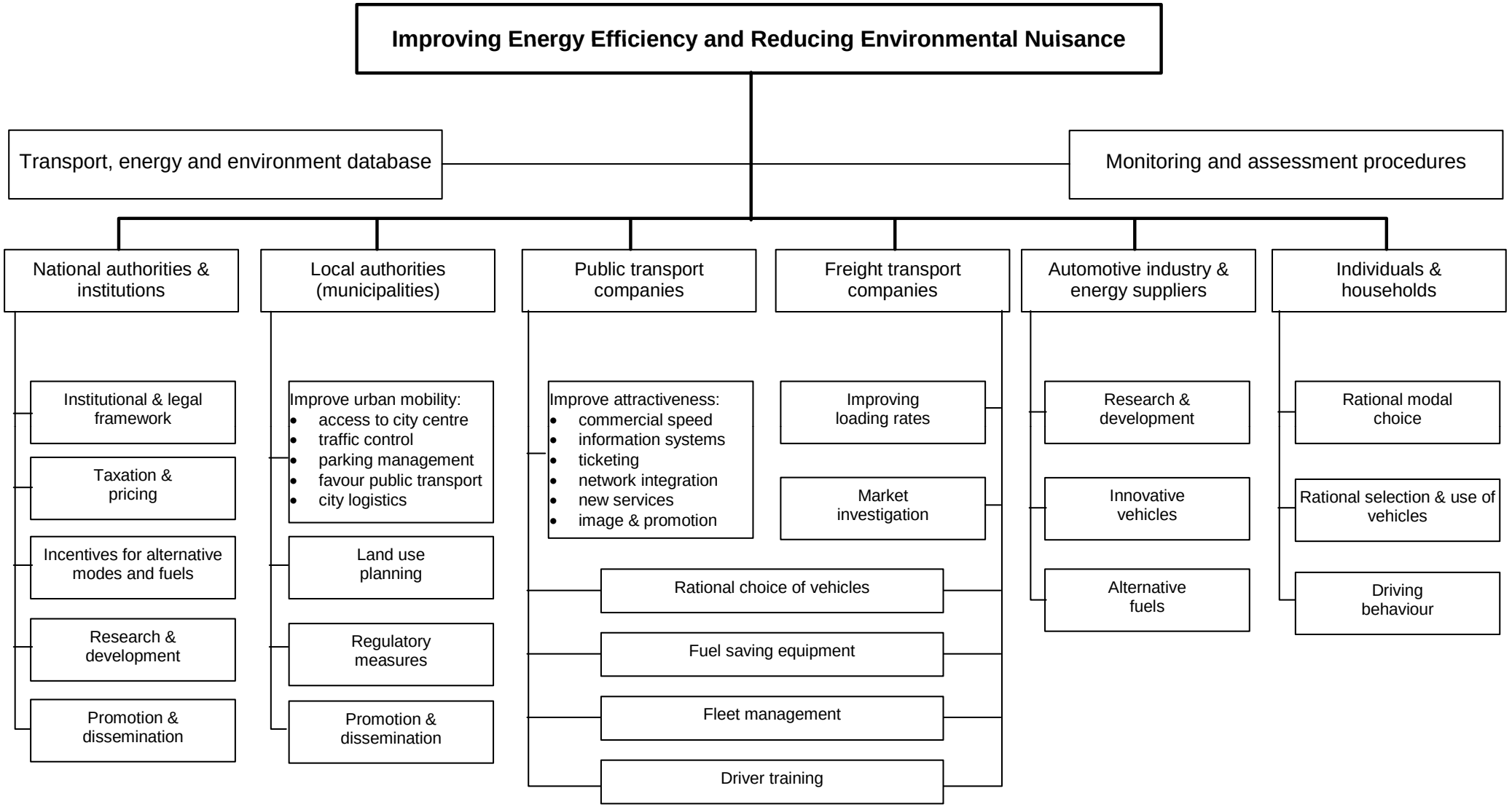
	Private car	Bus	Train
CO_2 (g/pass.km)	240	70	80
CO (g/pass.km)	21	1	0.01
HC (g/pass.km)	2.9	0.5	0.004
NOx (g/pass.km)	1.5	0.9	0.3

Improving energy efficiency and environmental nuisances related to transport

- It is urgent to develop adequate policies and measures to control road transport energy demand
- But transport is a complex sector:
  - multiplicity of actors involved
  - interaction with other parameters, e.g. land use and urban planning
  - transport is not an end in itself
- Technology-based measures are needed but not sufficient
- There is a need to combine short-term and long-term measures
- A coherent and integrated approach is essential in order to avoid contradictory policies
- In transport more than in other sectors, political commitment is the key condition for the success

Reform of the Legal and Institutional Energy Sector Framework

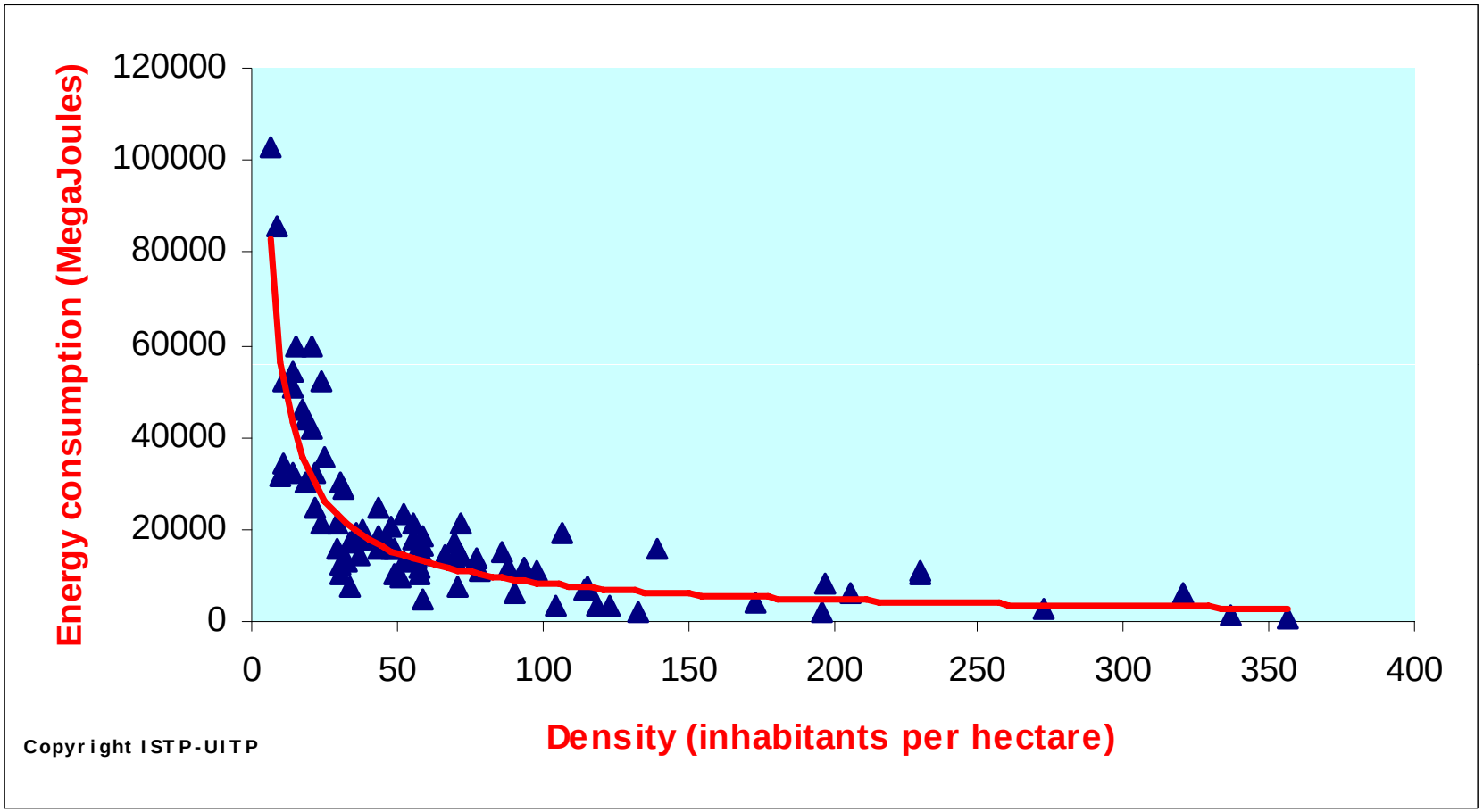
MEDA

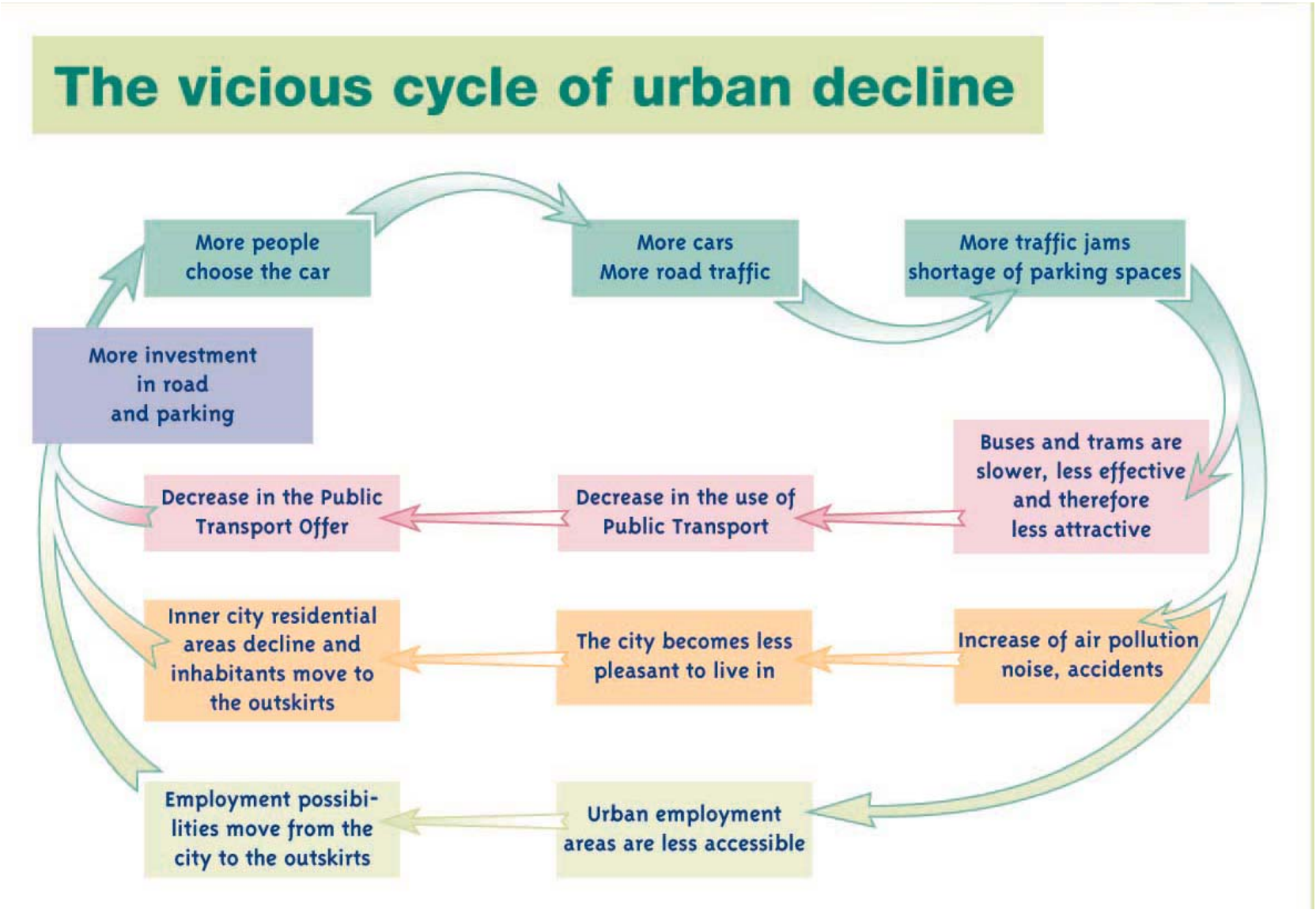


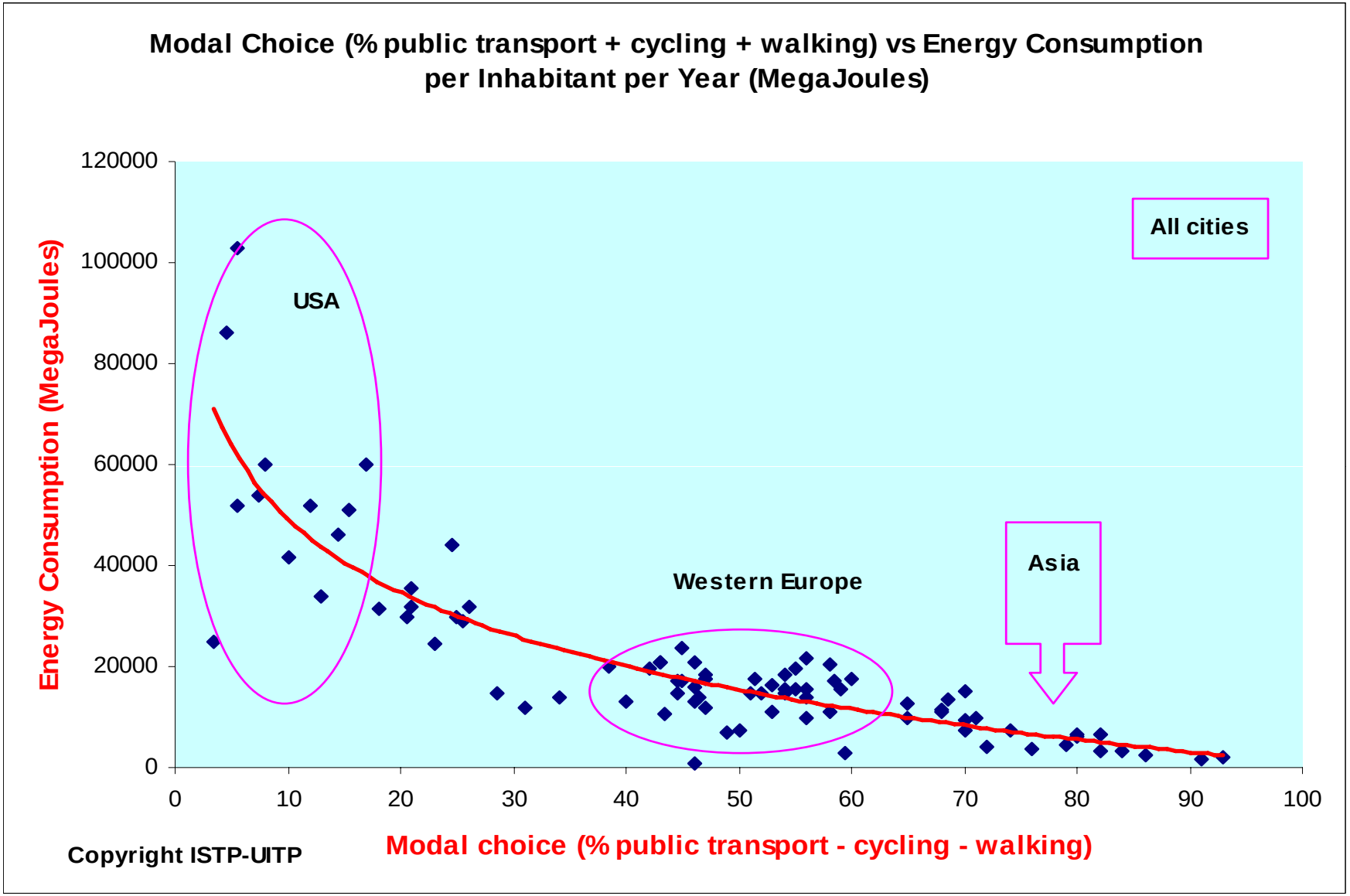
Three pillars for a balanced traffic system in urban areas

Only a combination of solutions is successful

Promote the concept of “compact” city




The vicious cycle of urban decline
More people choose the car
More cars More road traffic
More traffic jams shortage of parking spaces
More investment in road and parking
Buses and trams are slower, less effective and therefore less attractive
Decrease in the Public Transport Offer
Decrease in the use of Public Transport
Inner city residential areas decline and inhabitants move to the outskirts
The city becomes less pleasant to live in
Increase of air pollution noise, accidents
Employment possibi-lities move from the city to the outskirts
Urban employment areas are less accessible


Modal Choice (% public transport + cycling + walking) vs Energy Consumption per Inhabitant per Year (MegaJoules)
Energy Consumption (MegaJoules)
120000
100000
80000
60000
40000
20000
0
0
10
20
30
40
50
60
70
80
90
100
All cities
USA
Western Europe
Asia
Modal choice (% public transport - cycling - walking)
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Density, modal choice, energy consumption and urban transport spending in % of GDP

Cities	Population (million of inhabitants)	Density of urbanized area (inhabitants/ hectare)	Share of mechanized trips by public transport (%)	Energy consumption for annual urban travel (Mjoule/ inhabitant)	Urban transport spending (private and public modes) in % of GDP
Paris	9.4	60	30%	13,000	9%
London	7.0	75	38%	12,500	9%
Vienna	1.7	75	47%	12,000	6%
Budapest	1.9	55	66%	7,000	11%
Melbourne	3.1	14	8,5%	32,000	14.5%
Denver	2.0	14	1,5%	60,000	12%
Bangkok	6.6	140	43%	13,000	13.5%
Hong Kong	6.3	300	72%	6,500	5%

Modal practices depending on parking availability at the workplace

City	Automobile	Public Transport	Other Mode	Total
Besançon				
Guaranteed parking	90%	6%	4%	100%
No guaranteed parking	46%	29%	25%	100%
Toulouse				
Guaranteed parking	99%	1%	0%	100%
No guaranteed parking	41%	24%	35%	100%
Geneva				
Guaranteed parking	93%	3%	4%	100%
No guaranteed parking	36%	25%	39%	100%
Lausanne				
Guaranteed parking	94%	3%	3%	100%
No guaranteed parking	35%	35%	30%	100%

The example of TRANSMILENIO, Bogota

- Development since December 2000 of a bus rapid transit system: 41 km of exclusive bus lanes, 62 high platform stations, 470 articulated buses for trunk lines, 300 buses for feeder lines
- Restriction of car use
- Improved bus operation (mix of express lines and local services)

The example of TRANSMILENIO, Bogota (2)

- Increase of capacity to 45,000 pax/hour/direction
- About 800,000 pax/day
- 32% reduction in travel time for users
- Up to 40% reduction in air pollutants
- 93% reduction in road fatalities
- Fight against fraud
- Level of acceptance : 98%

The example of Curitiba

- Implementation of the bus rapid transit network started in 1974 with a continuous development: special high floor stations, high capacity articulated and bi-articulated buses, signal priority
- Part of an integrated land use and transport masterplan developed since the 1960s

The example of Curitiba (2)

- 15 to 19 seconds dwell times
- Around 20,000 pax per hour
- Reduction in 27 million car trips
- Curitiba uses 30% less fuel compared to 8 Brazilian cities

Other examples

In France, at constant rates of traffic, each 1% rise in rail passengers converted from the road represents a saving of around 37,000 tonnes of oil equivalent, and a saving of 60,000 tonnes if this 1% is taken away from air transport.

In Canada, passenger travel by automobile is responsible for about 42% of transport sector emissions (11% of the national GHG) whereas Passenger travel by public transit buses, school buses and intercity buses is responsible for about 1.1% of transport sector emissions (0.3% of the national GHG)

If one in ten Americans used public transport on a regular basis it would reduce US oil imports by 40%. This would also reduce carbon dioxide emissions by more than 25% of the limits set by the Kyoto agreement, without introducing any other measures.

Fuel saving equipment for trucks

Area of modification	Energy savings
Aerodynamics (air foils, streamlining)	4% to 8%
Rolling resistance (radial tyres)	6% to 10%
Power train (e.g. variable drive fans)	2% to 10%
Speed control (e.g. governors, tachographs)	4% to 20%

Rational driving

Thanks to training lorries and coaches drivers and supervising their performances, fuel consumption can be reduced by 10% or more. In France, a national programme including training of 10 000 lorry drivers led to a 12% decrease of fuel consumption, 8% on tyre consumption and 15% on maintenance expenses.

In Mexico, a project financed by the European Commission and the World Bank included training of trainers who have trained 4 500 bus and coach drivers. This project induced a 15% saving in fuel consumption.

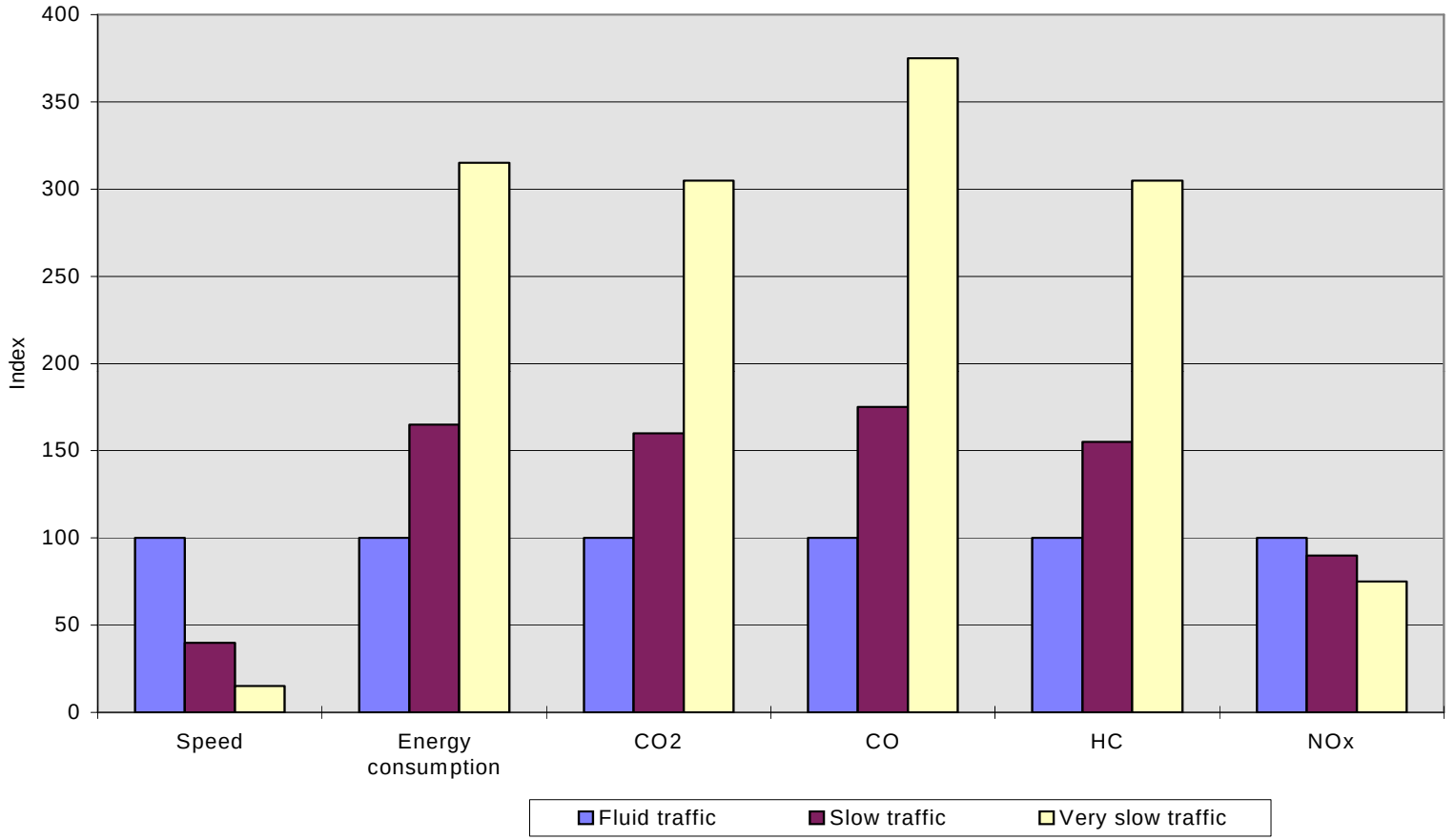
In several Eastern and Central European countries, bus and lorry driver training carried out in the framework of the European Commission Thermie programme led to an energy saving which has reached 12%.

Follow-up of fuel diagnosis in large transport fleets

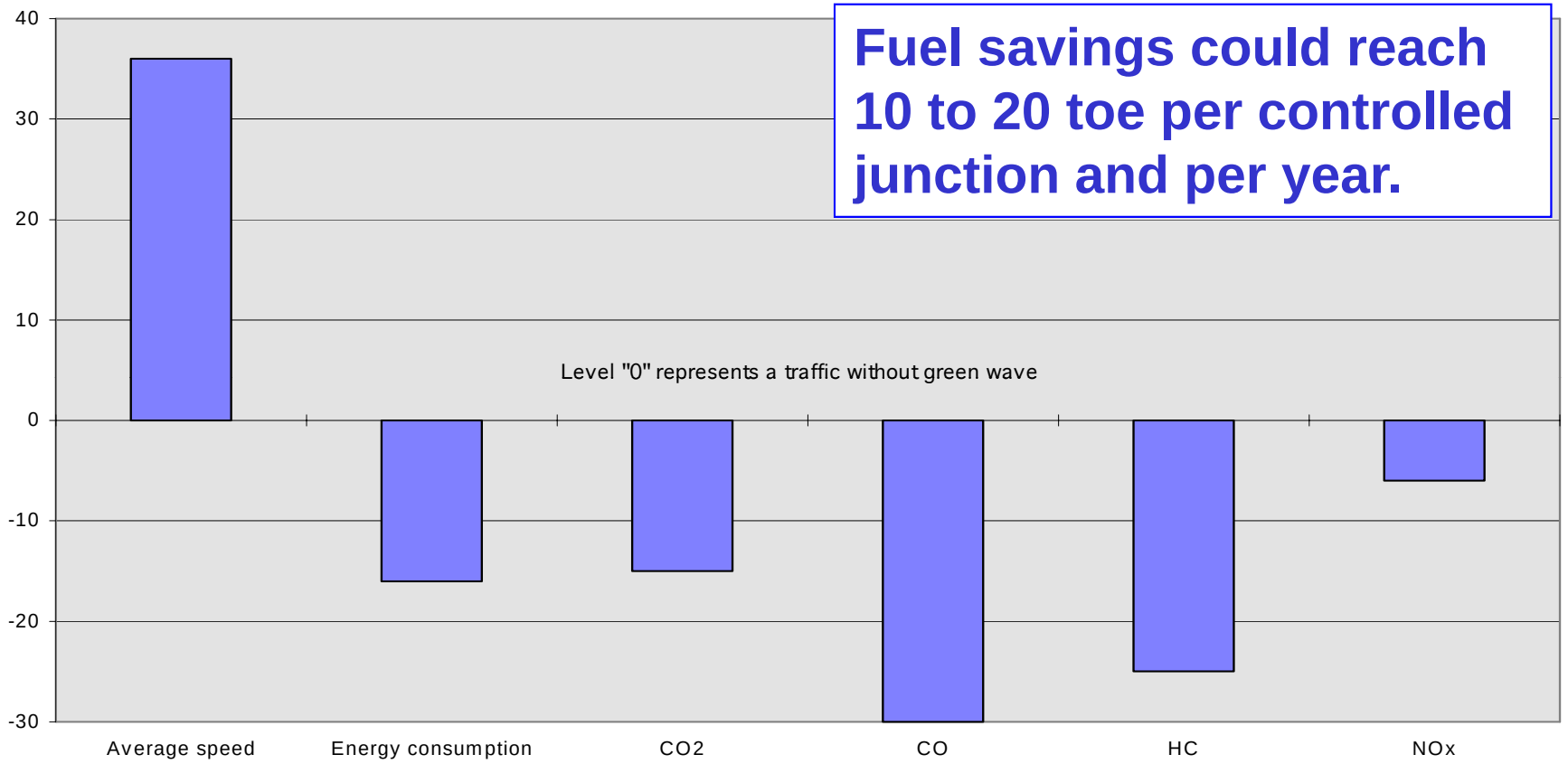
Pilot projects carried out in 1992 and 1993 in Eastern and Central Europe (Russia, Ukraine, Belarus, Poland, Bulgaria, Estonia, Kazakhstan and Armenia) and financed by the European Commission Thermie Programme have resulted in energy saving and expense decreasing rates, through driver training and engine fine tuning:

- Energy saving: up to 13%.
- Maintenance expenses decrease: up to 10%.

Energy consumption and pollutant emissions according to traffic conditions



Effects of a “green wave”



Fuel savings could reach 10 to 20 toe per controlled junction and per year.

Sometimes it is helpful to find other arguments

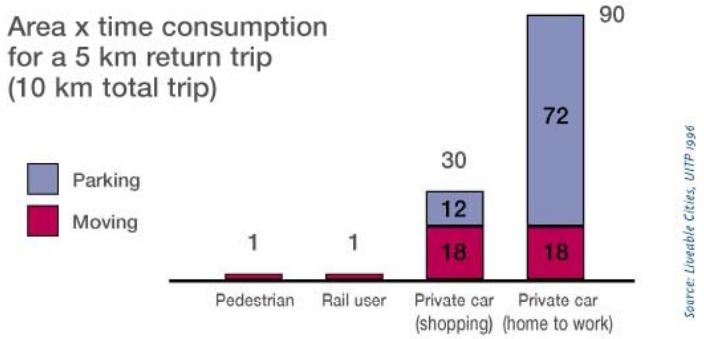
75 people are carried either by 60 cars

Urban space is limited

or, only 1 bus.

Congestion costs amount to 2% of GDP in the EU: it is 4 times what is spent for public transport.

For example a journey home/work by car consumes 90 times more space than if the same journey was taken by metro and 20 times more if it was taken by bus or tram.



Cars use enormous quantities of valuable urban space uneconomically.

Towards the “Polluter pays” model

Those who cause a problem compensate for the cost imposed on the community. The compensation paid may then be used to fund alternative, less polluting modes of transport. E.g.:

- German mineral oil tax (“Mineraloesteuer”)
- Congestion charging in London

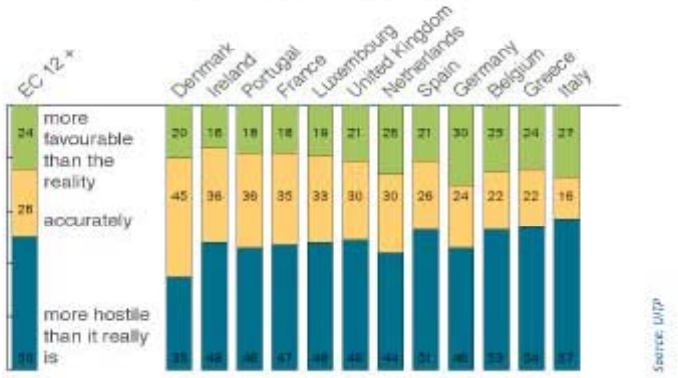
Politicians' commitment is essential

Where citizens can make decisions on transport, as in some US States or in Switzerland, they generally approve investments in public transport and restrictions of private traffic in urban areas.

A large-scale population survey in 12 European countries has shown that:

- Car traffic is the most important local problem.
- 59% of the population say car traffic has already reached unbearable or hardly bearable levels.
- 84% of the population would opt for priority for public transport, even if it conflicts with private traffic needs.

How politicians evaluate the opinion of the public towards public transport



Half of the political decision-makers underestimate the wish of their electorate to give buses and trams priority.

"Transport is not a technical, but a political issue. Technically and economically it is possible and simple to structure high quality bus based transit systems, as long as other vehicles be removed from a few lanes in main arteries"

Enrique Peñalosa
Former Mayor of Bogotà

Conclusions

- It is urgent to develop adequate policies to slow down the trend. It is all the less difficult that car ownership rates are still relatively low in most MEDA countries.
- There is a need for an integrated approach combining policy measures and technology improvements.
- Restrictive measures must be accompanied by compensatory measures
- Cultural or mentality differences are not a justification for not acting
- Political commitment is the key for success