

Associazione Nazionale Coordinamento AG 21Locali Italiane

Il Clima delle Città

Politiche dei trasporti per la riduzione delle emissioni di CO2

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- *Study objectives: Energy and environmental aspects of the transport policy*
- *EU Transport demand and impacts*
- *EU target and standard*
- *Policy and measures recommendations*



Objective of the study

Identify economic and politically feasible measures able to significantly enhance energy efficiency and to reduce negative impacts of transport activities, particularly land transport

Approach

Review the recent studies, projects, and scientific literature, statistics, notes etc., in order to:

- estimate the impacts of the emissions caused by different transport modes
- present advantages and disadvantages of the identifies measures and of the suggested recommendations



Key facts

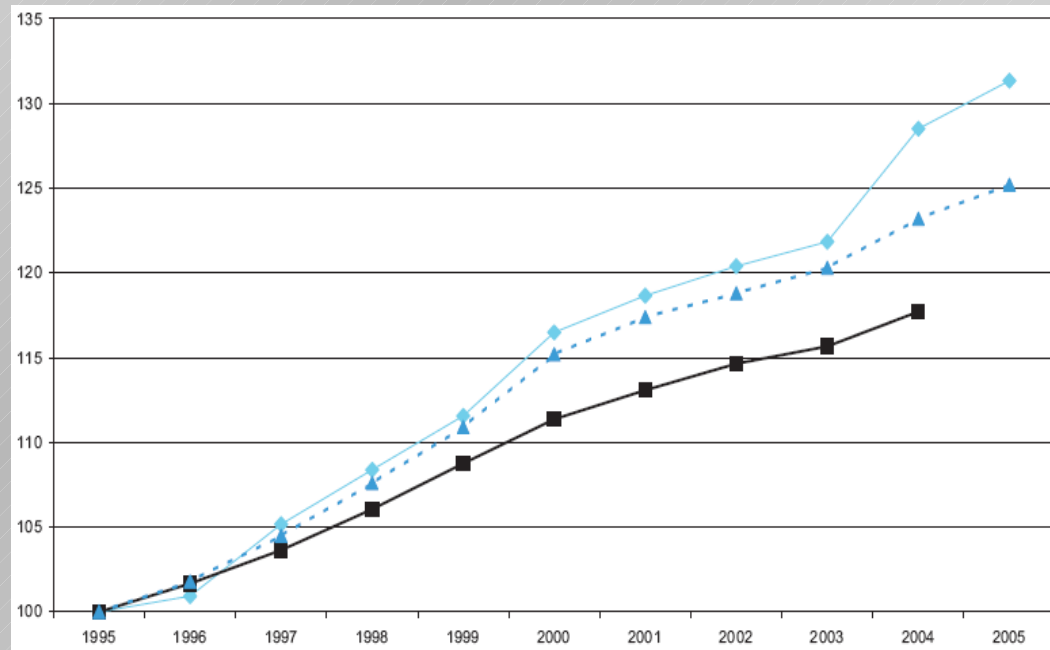
- About **one third** of the final energy consumption in the EU-25 is related to transport (excluding maritime transport and pipelines)
- **Road transport** is by far the dominating sector consuming nearly **83%** of the energy used for transport purposes.
- The **transport market** today is almost entirely dependent upon **oil-based fuels** and is responsible for about **70%** of the final oil demand in the EU-25
- Transport sector contribute to EU overall **GHG** emissions (CO_2 , CH_4 , N_2O) in the EU-27 for a **24,1%**
- Transport contribution to air pollution is also significant



Trends in transport demand

Evolution of freight and passenger transport compared with growth in GDP, 1995-2004/5 (1995=100)

- GDP Growth 2,3 %
- Freight transport 2,8 %
- Passenger transport 1,8%

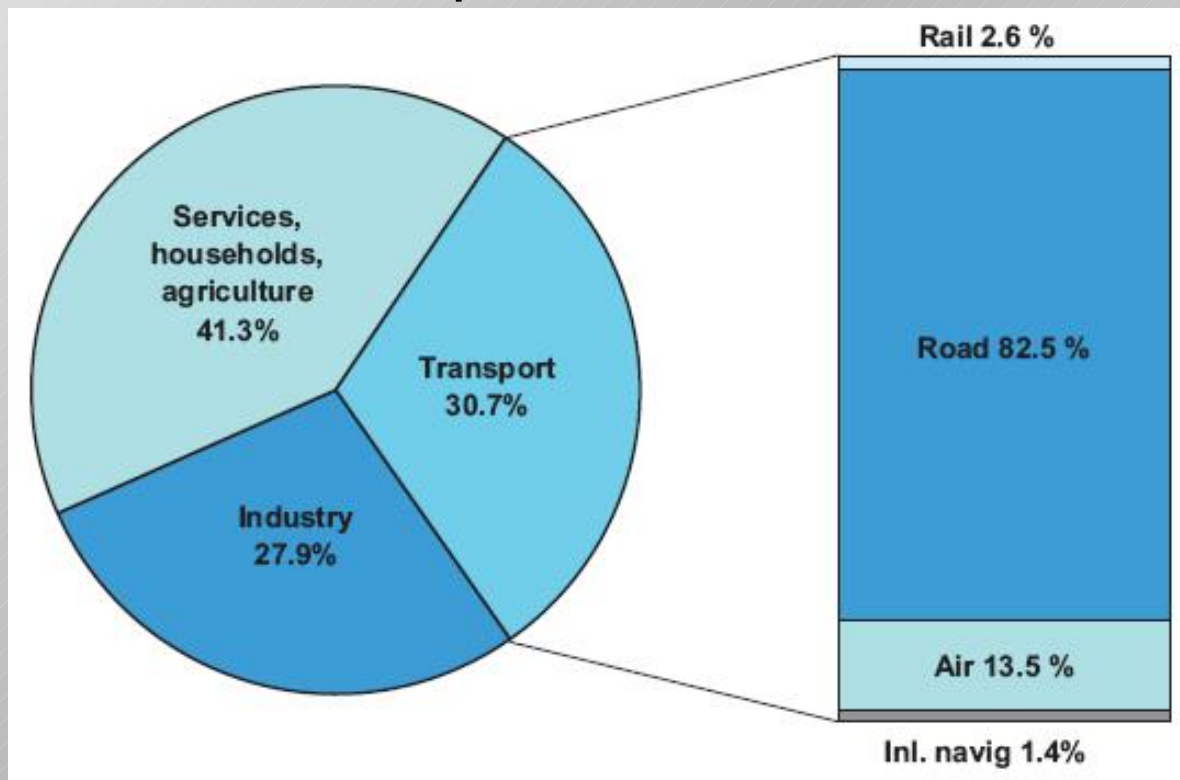


Source: DG Energy and Transport, reported in Eurostat, *Panorama of transport* (2007)



Transport impact: Energy Consumption by sector

The share of transport in total final energy consumption increased between 1990 and 2004 in EU-25 to reach 352 mtoe (million tonnes of oil equivalent) in 2004, almost 31% of total final energy consumption. This was 4% points more than its share in 1990.

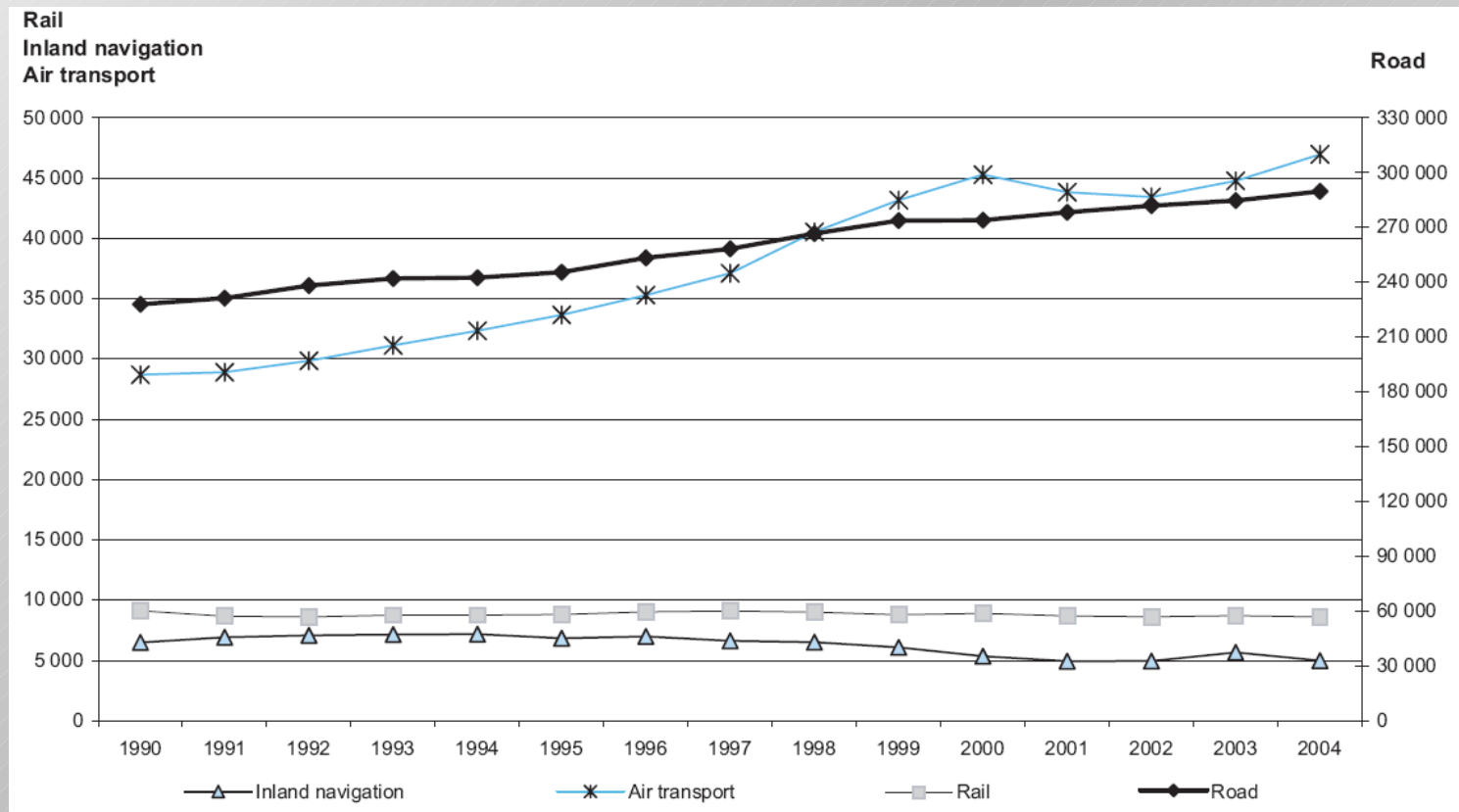


Source: Eurostat, Panorama of Transport, 2007



Transport impact: Energy Consumption by mode

Between 1990 and 2004 in EU-25 energy consumption rose by 67 % in aviation, 27 % in road transport, 1 % in rail transport, -23 % in inland navigation. In absolute terms however, road transport consumed an extra 62 million toe (mtoe), rising from 228 mtoe to 290 mtoe.



Source: Eurostat, *Panorama of Transport*, 2007



Transport impact: Energy Consumption

The transport sector exhibited the highest growth in energy demand between 1990 and 2004 (2.0% per annum). Improvements in fuel efficiency were offset by increases in passenger and freight transport demand.

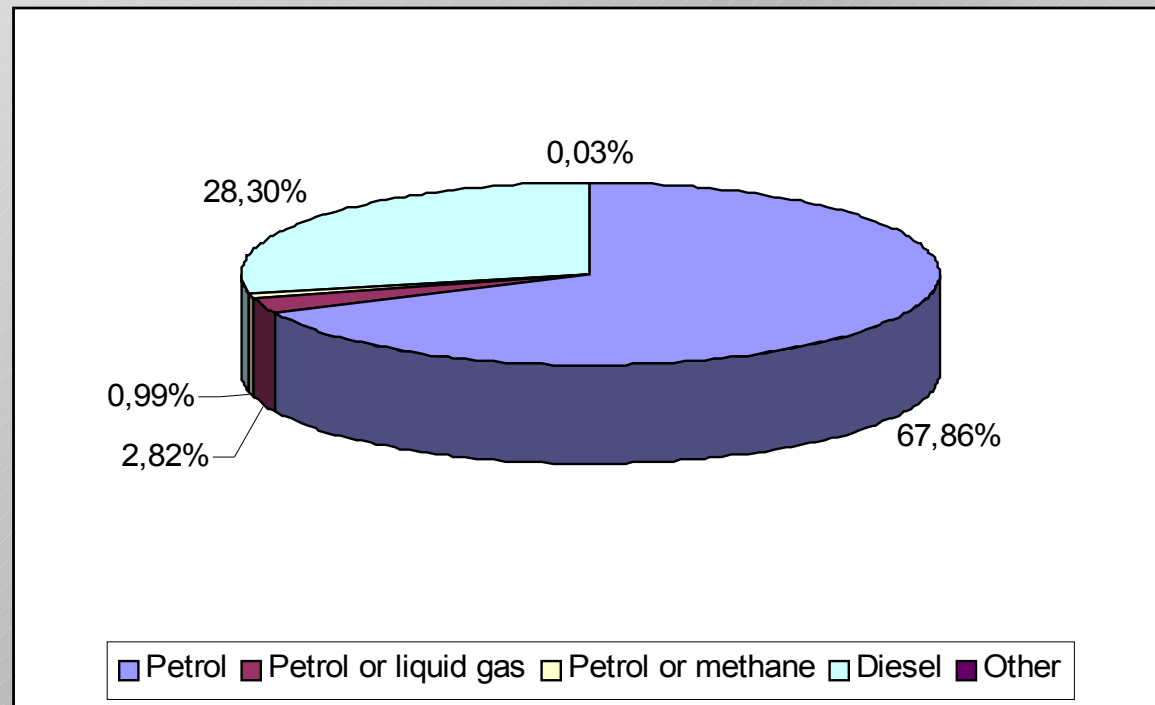
	1990	1995	2000	2004	% change 1990-2004
Transport	272	295	334	352	29%
Rail	9.1	8.8	9.2	9.3	
<i>% share</i>	3.4%	3.0%	2.8%	2.6%	1%
Road	228.0	245.5	274.0	290.0	
<i>% share</i>	83.8%	83.3%	82.1%	82.5%	27%
Air	28.4	33.7	45.3	47.4	
<i>% share</i>	10.4%	11.4%	13.6%	13.5%	67%
Inland and Coastal Shipping	6.6	6.7	5.4	5.0	
<i>% share</i>	2.4%	2.3%	1.6%	1.4%	-23%

Source: Eurostat, *Panorama of Transport*, 2007



Transport impact: transport dependency by non renewable fuels in Italy

Non renewable-powered cars in Italy accounted for 99,97%. The remaining part categorized as "other" by the Italian vehicle register includes however not only vehicles powered purely by alternative fuels, but also hybrid models that can function on both traditional and alternative fuels.

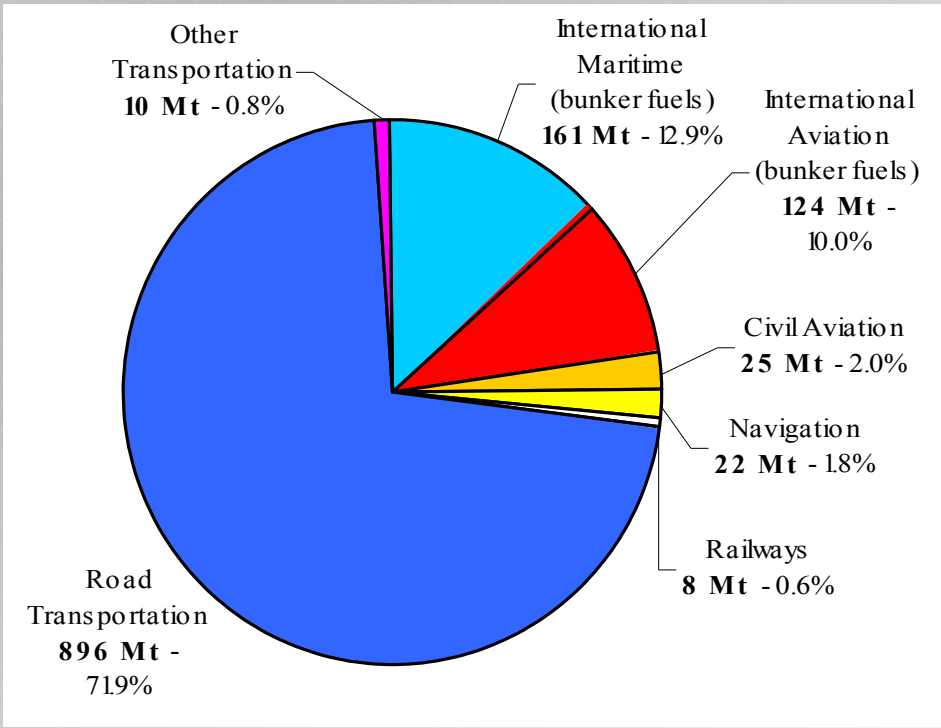
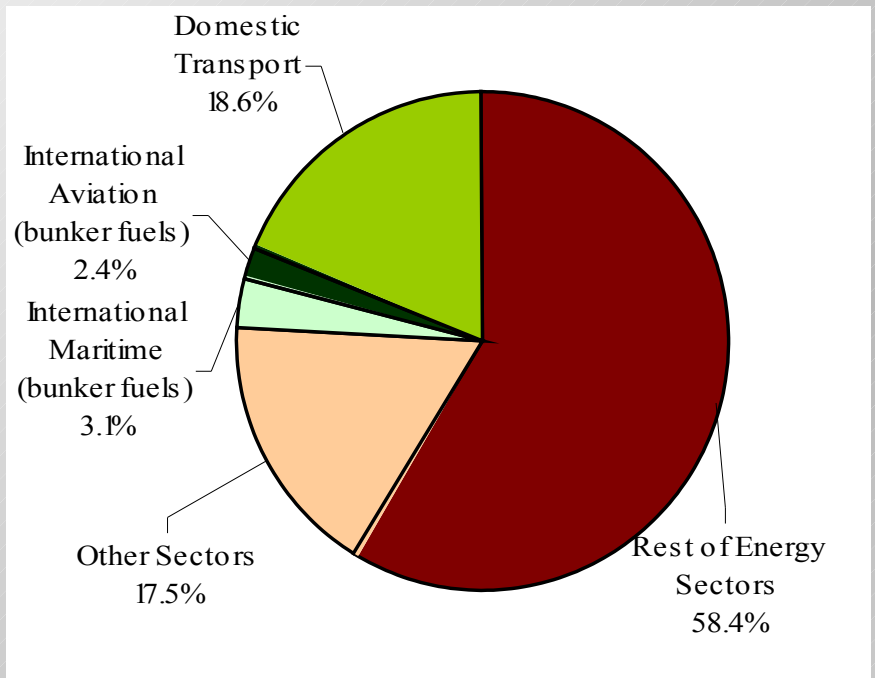


Source: *Autoritratto Aci*, 2005



Transport impact: GHG Emissions

Share of transport sources on total EU-27 GHG emissions and contribution of the different modes (in MT of CO2 equivalents and %) to total transport emissions in 2005

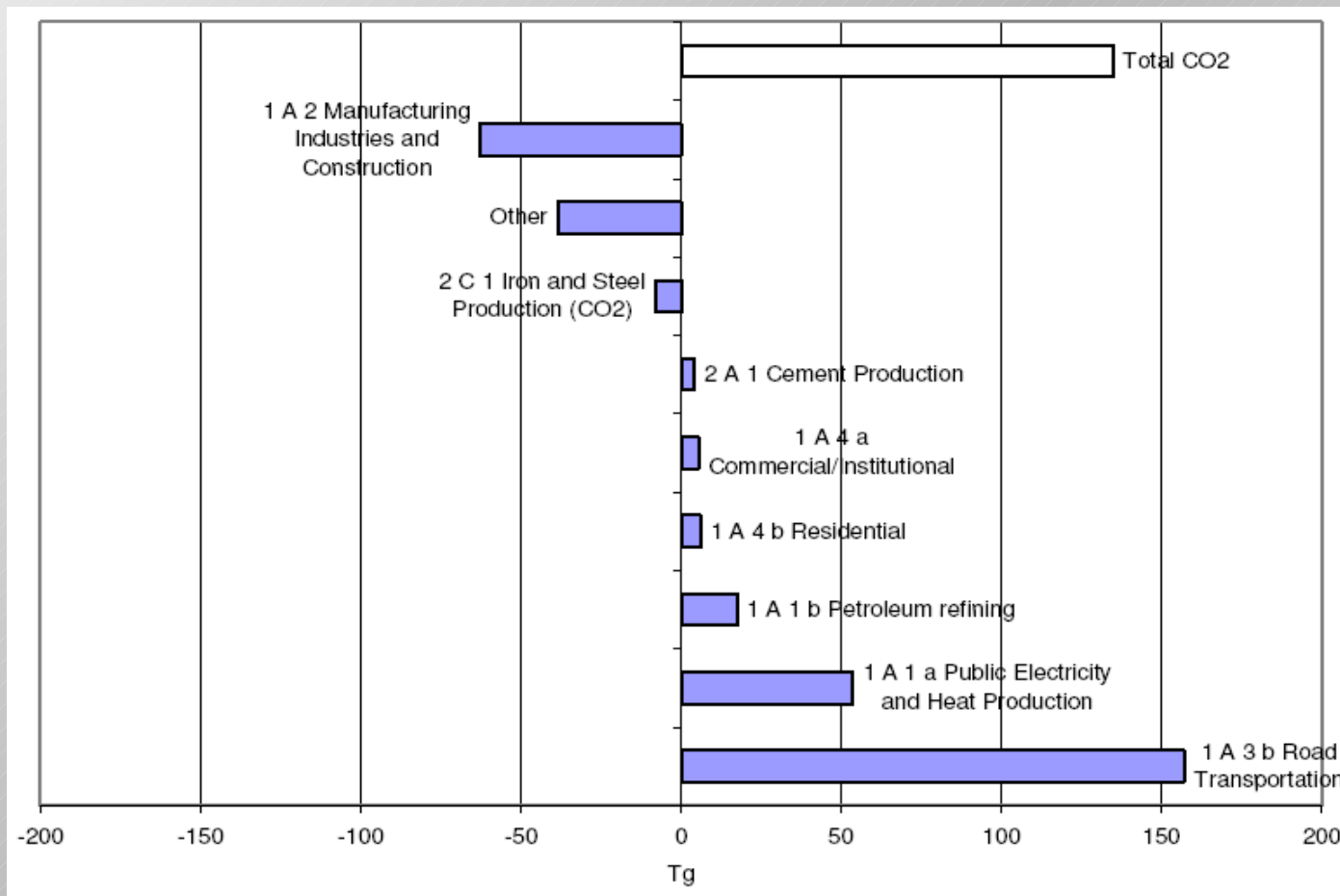


Source: Directive 2001/81/EC



Key facts: Trend of CO₂ emissions

Absolute change of CO₂ emissions by large key source categories 1990 to 2005 for EU-15.



in CO₂ equivalents (Tg)

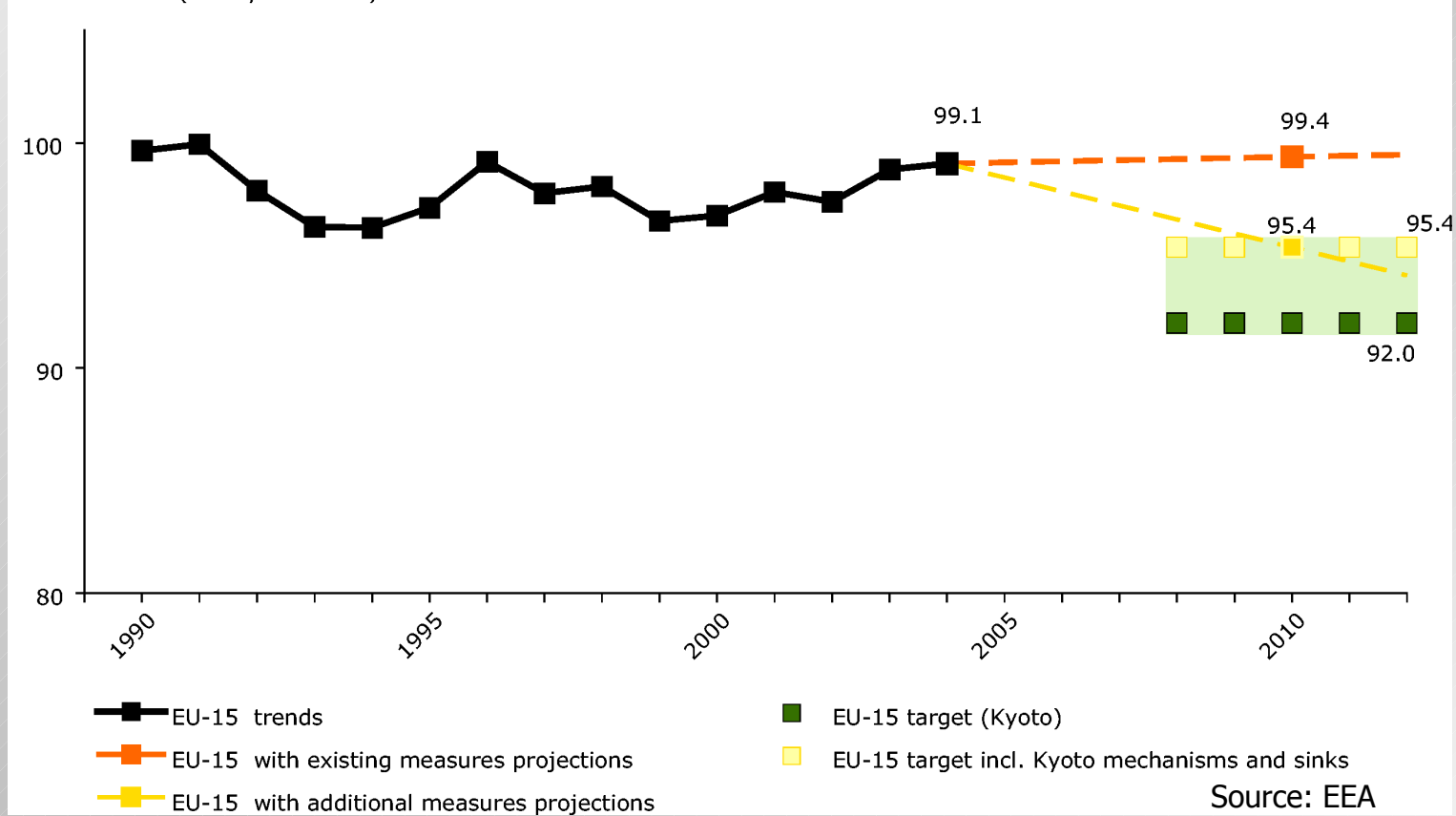


EU Target - Greenhouse Gases (GhG)

The EU Kyoto protocol target for 2008–12: reduction of 8% of GhG emissions from 1990 levels

No overall targets for transport have been agreed in the EU.

GhG emissions (base year = 100)



EU Target – Air quality (emissions)

The Air Quality Framework Directive (Council Directive 96/62/EC)

Pollutant	Concentration threshold (mg/m ³)	Legal nature	EU reference
SO ₂	human health (average 1h ≤ 350 + 120 not more than 24 times/year)	Limit value enters into force 1.1.2005	Council Directive 1999/30/EC
NO ₂	human health (average 1 h ≤ 200+90 not more than 18 times/year)	Limit value enters into force 1.1.2010	Council Directive 85/203/EEC
NO _x	ecosystem health (yearly and winter average ≤ 30)	Limit value enters into force 1.1.2010	Council Directive 1999/30/EC
PM ₁₀	human health (average 24h ≤ 50+20 not more than 35 times/year)	Limit value enters into force 1.1.2005	Council Directive 1999/30/EC
	human health (yearly average ≤ 40+6.4)		
CO	human health (max average 8h ≤ 10+6)	Limit value enters into force 1.1.2005	Directive 2000/69/EC
C ₆ H ₆	human health (yearly average ≤ 5+5)		
O ₃	human health (max average 8h ≤ 120 not more than 20 days/year(1))	Target value enters into force 1.1.2010	Directive 2002/3/EC
	vegetation health (AOT40 May-July ≤ 18(2))	Target value enters into force 1.1.2010	Directive 2002/3/EC
Benzene	0.5 µg/m ³ - 1 year of averaging period	Limit value enters into force 1.1.2010	Directive 2000/69/EC
PM _{2.5}	only establishes monitoring requirements		Council Directive 1999/30/EC

Source :EU directives quoted in the table



Energy efficiency

- Energy savings objective in the transport sector is -26% by 2020 (Europe Energy Action Plan COM (2006)545 final)

Biofuels

- Increase the use of biofuels to 5.75% by 2010 (Directive 2003/30 EC)
- By the end of 2007 expected revision of Directive (mandatory target of 10% biofuels by 2020, Energy Package 2007)



Numerous potential measures for air pollutants and GHG emissions reduction in the transport sector are currently discussed in the scientific literature and policy documents

- Technological improvements
- Pricing and taxation
- Long distance travel
- Liveable cities (urban policy)
- ICT
- Eco-friendly
- Logistics
- Air and Maritime



The need of a consistent mix of policies

To reduce GHG, energy consumption and air pollution in the European transport sector a coordinated combination of individual policies is necessary

The policy mix should cover all modes of transport and should include

- ambitious fuel-efficiency targets
- improved emission standards for vehicles and fuels,
- the right price signal for all modes,
- supports to behavioural changes



The need of a consistent mix of policies

The pillars of this mix of mutually supporting policies are:

- Technological development (use of new vehicles technologies and alternative fuels),
- Pricing (reform of taxation in the transport sector to full account for environmental impacts, Carbon tax, Eurovignette),
- Accompanying measures to optimise the use of vehicles, infrastructures as well as to promote behavioural changes.



Policy packages



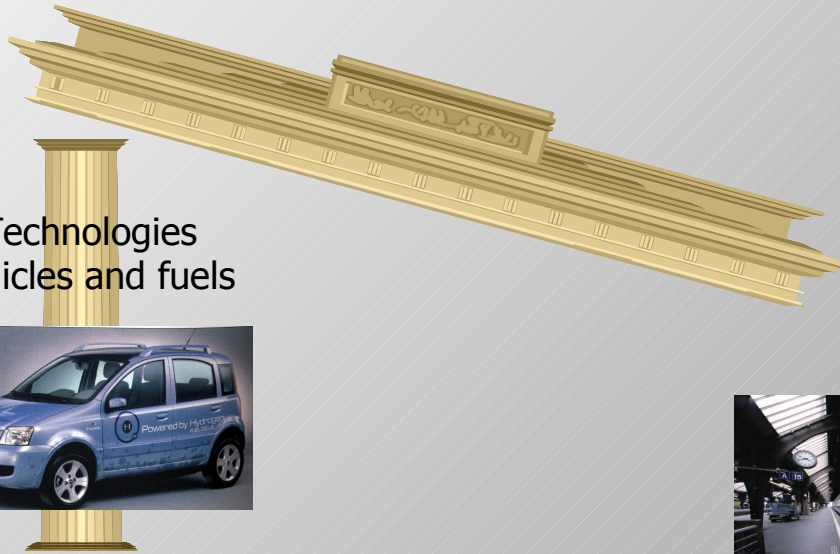
Policy packages

Only one...

Policy mix

- Taxation
- Pricing
- Accompanying measures

Technologies
vehicles and fuels



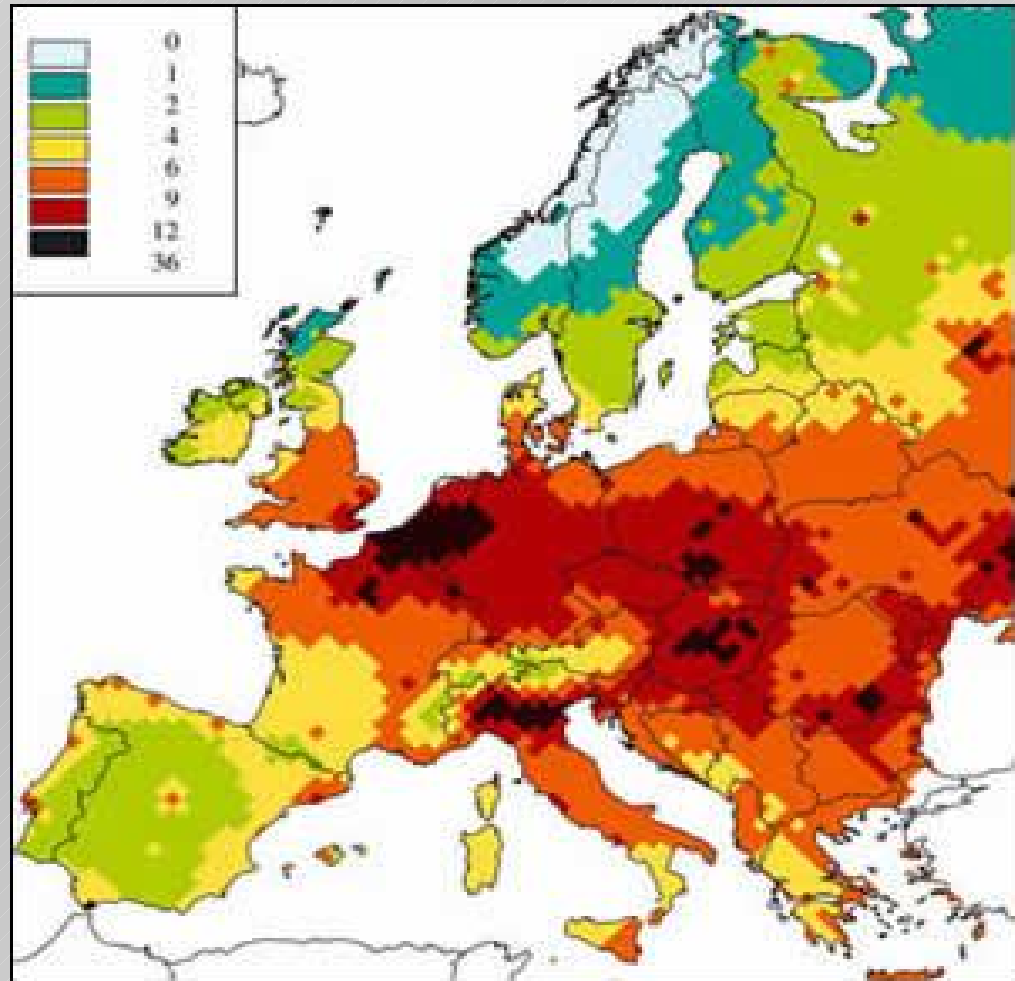
Recommendations

- *Concentrate on the most critical areas*
- *Give priorities to measures that can produce benefits in the short term*
- *Increase fuel efficiency for all modes of transport*
- *Get the prices right (innovative measures based on the "emission trading" approach)*
- *Support modal shift through pricing policies and soft measures*
- *Induce a more efficient organisation through pricing policies and soft measures*
- *Promote more responsible behaviour of road users*



Concentrate on the most critical areas

- Urban areas (congestion, pollution, social impacts,...)
- Interurban corridors where intra EU and international trips take place
- Environmental sensible area (Alpin, Baltic See,....)



Source: European Environment Agency, 2006



Increase fuel efficiency for all modes of transport

Focus on increasing fuel efficiency for all modes of transport, especially air and road transport

Reduce the emission target for passenger car fleet to 120 g CO₂ per vehicle kilometre by 2012 and to 100 by 2020 and extend such an approach to cover trucks, aircraft, vessel

Concentrate on policies that produce results in the short term, including incremental improvements of the current technologies, use of electric and hybrid vehicles, train, vessels



Get the prices right

Passengers and freight should face the full cost of travel and feel the consequence of their decision

General reform of taxation in the transport sector, clearly based on CO₂ emission and other environmental emissions

Congestion charge in urban areas and congested corridors

Pricing and taxation policies designed to provide strong incentives to shift toward better performing vehicles in all transport modes (pay as you drive)



Introduce innovative measures based on the "emission trading" approach

On the supply side through the introduction of the Carbon Allowance Reduction System (CARS)

Manufacturers and importers will be required to pay financial penalties in proportion to any exceeding of the emissions limits per car sold, which may be offset by redeemable credits awarded to newly registered passenger cars of the same manufacturer with emission below the limit value curve



Introduce innovative measures based on the "emission trading" approach

On the demand side through "tradable mobility credits" that are differentiated according to several dimensions like the vehicle type (size, emission class), but also the supply of alternative modes, which can be used both for private car driving in the tolled areas and for riding public transport.



Support modal shift through pricing policies and soft measures: passengers

Urban and metropolitan areas suffer of high levels of pollution and at the same time alternatives modes to private transport are already available (public transport, cycling, walking).

A combination of pricing policies (congestion charging) and improvements in the public transport supply can significantly reduce emissions, particularly if public transport service enhancements are achieved through short-term measures, fleet renewal, bus priority, information technologies etc.



Induce a more efficient organisation through pricing policies and soft measures: freight

For long distance freight transport, truck-km charges have shown to be able to induce a process of rationalisation of distribution systems and logistics organisation, and thus to reduce distances optimise routing, load factors and occupancy rates



Promote more responsible behaviour of road users

Develop **eco-drive** procedure in the road transport sector (freight and passenger) to reduce emission and consumption

De-marketing of cars, support to car sharing and car pooling initiatives, support to green logistics, promoting eco drive ITS are all soft measures that might play a highly positive role in strengthening the positive impacts of other hard measures and in some cases in mitigating the negative ones

