Training Seminar

Evaluation of energy efficiency trends and potentials

Grenoble, 30 January – 10 February 2006

Energy efficiency in transport: policy measures and indicators

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Enerdata

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Energy efficiency trends

Road transport

- Cars
- Transport of goods

Overall trends

CO2 indicators

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Policy measures in transport

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Policies and measures in transport

1. **Taxes** on **motor fuels,** on **vehicles,** on the **use of infrastructure (urban tolls)**
2. **Regulations**: Directive on biofuels
3. **Economic incentives (**subsidies)
4. **Information of consumers**: mandatory information on emissions, label for new cars (EU Directive)
5. **Voluntary commitment:** ACEA/ JAMA/KAMA

- Few measures at EU level
- Sector difficult to tackle with measures (**multitude of actors; very different national measures from one country to the other)**

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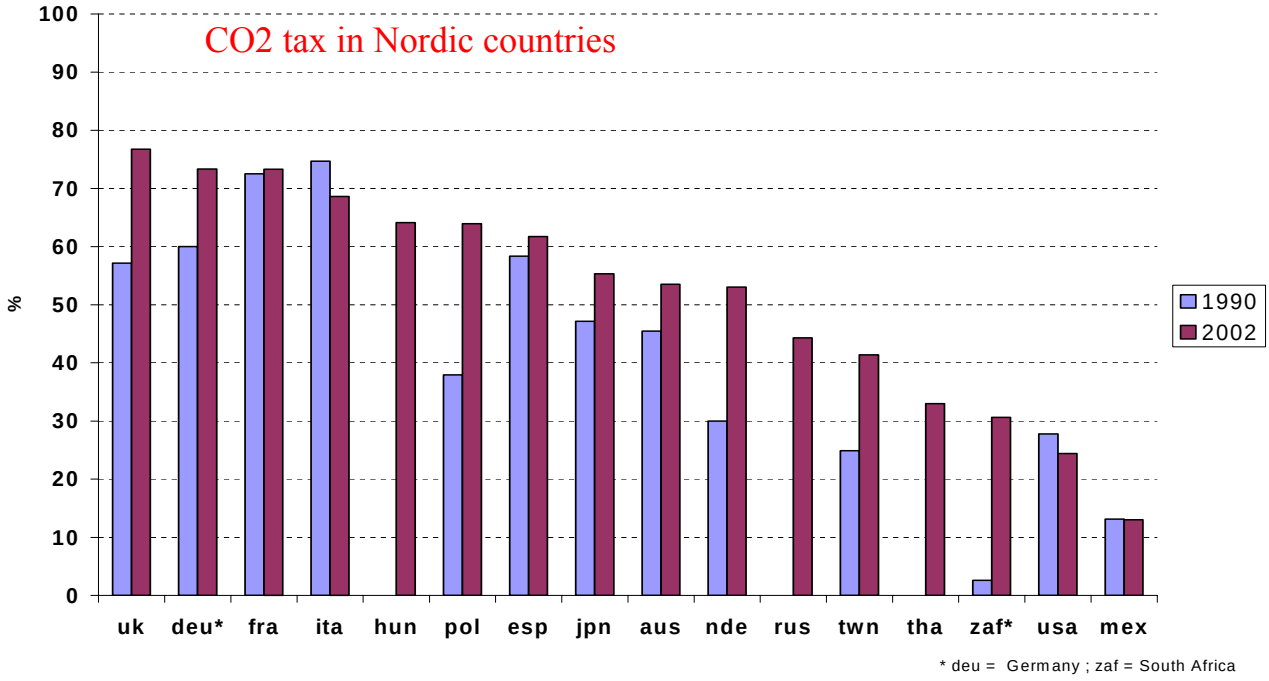
Tax on motor fuels

Large increase of tax in Germany and UK

CO2 tax in Nordic countries



* deu = Germany ; zaf = South Africa

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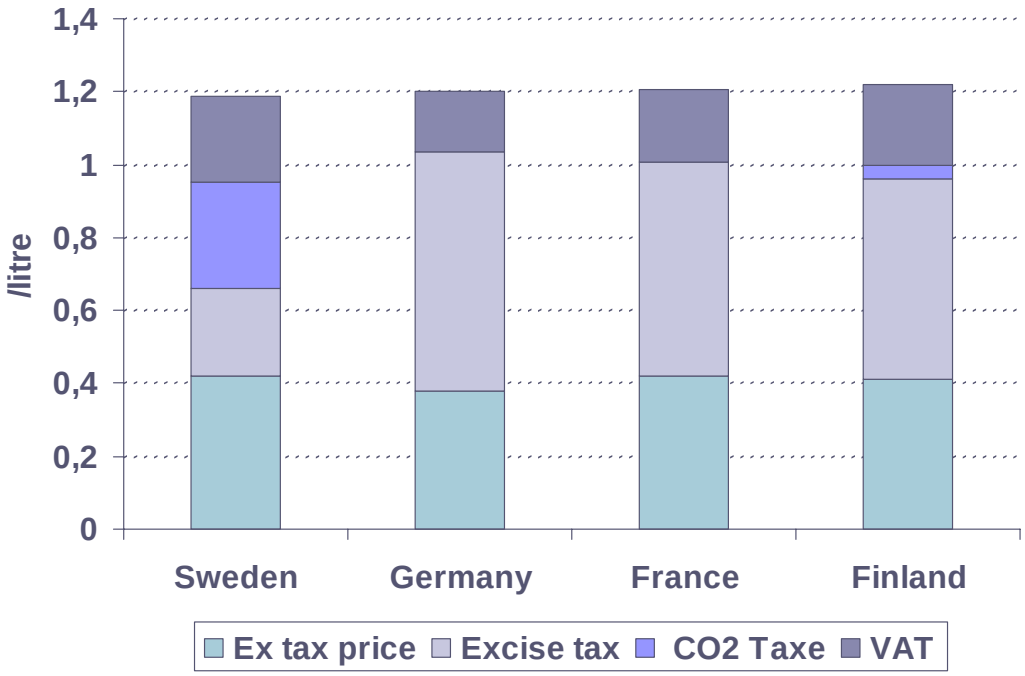
Tax on motor fuels : excises, VAT and CO2 taxes (end of 2005)



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Planned tax increase for motor fuels

1. In Germany price of motor fuels was increased during 5 years from 1998 to 2002 in steps of about 3 cents every year.

1. In UK, the fuel duty escalator (annual fuel duty increases above the rate of inflation) was introduced in 1993, first at an annual rate of 3% above inflation and then at 5%. It was increased to 6% in July 1997. Since 2000 there was no real increase in the fuel duty, and since 2001, the fuel duty was frozen in nominal prices.

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Annual vehicle tax linked to the energy or CO_2 performance of cars

In Austria (since 1991), vehicle tax of 2% for each l/ 100 kilometres > a threshold of 3 l /100 km for gasoline and 2 l /100 km for diesel cars (eg tax for a gasoline car of 10 l/100 km amounts to 14%

In Denmark (since 1999), annual fee ranges from 70 for gasoline cars <5 l /100 km up to ~ 2500 for cars >22 l/km ; annual fee raised every year by a percentage that is set 1 ½ % points above inflation

In UK (since 2001), vehicle excise duty from ~ 80 to a maximum of 250 ; tax depends on the CO_2 emission class: class AAA < 100g CO_2/km, class AA(101- 120g), class A (121-150g) up to class D (> 186 g CO_2/km) and the fuel (e.g. for class A from 143 for an alternative fuel to 158 for petrol and 173 for Diesel).

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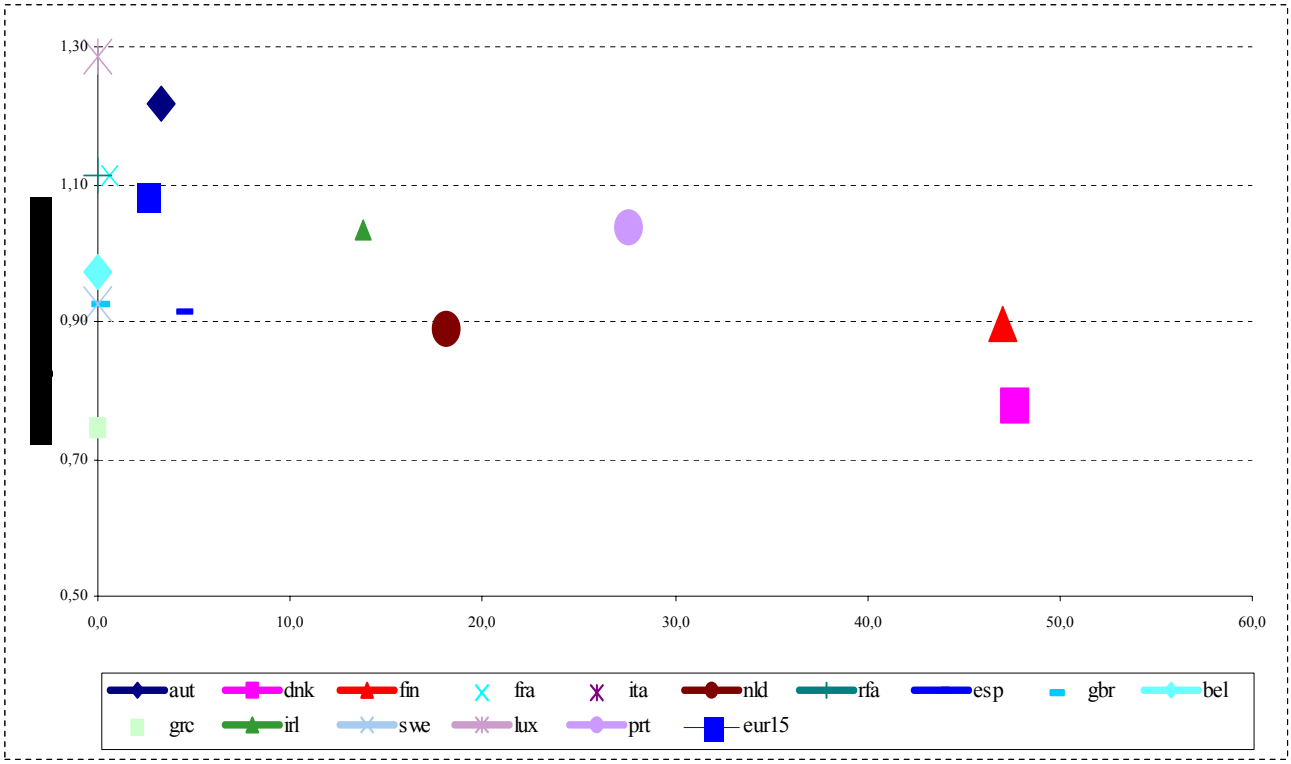
Tax on car purchase (without VAT)



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Directive on biofuels (2003/30)

- May 2003
- Minimum rate of biofuels in motor fuels
- At least 2% of biofuels in 2005 (not reached) and 5.75% in 2010
- Annual report on actions taken, quantities sold and produced

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Economic incentives in transport

Subsidies for new vehicles (eg hybrid cars or electric cars in France
Subsidies for scrapping old cars (early replacement)

Subsidies for combined rail road transport infrastructures

Subsidies for transport plans:
for cities (eg long term urban transport plan were made mandatory for all large cities in France)
for companies (new measure quite popular in France or Austria)

Subsidies for audits for transport companies

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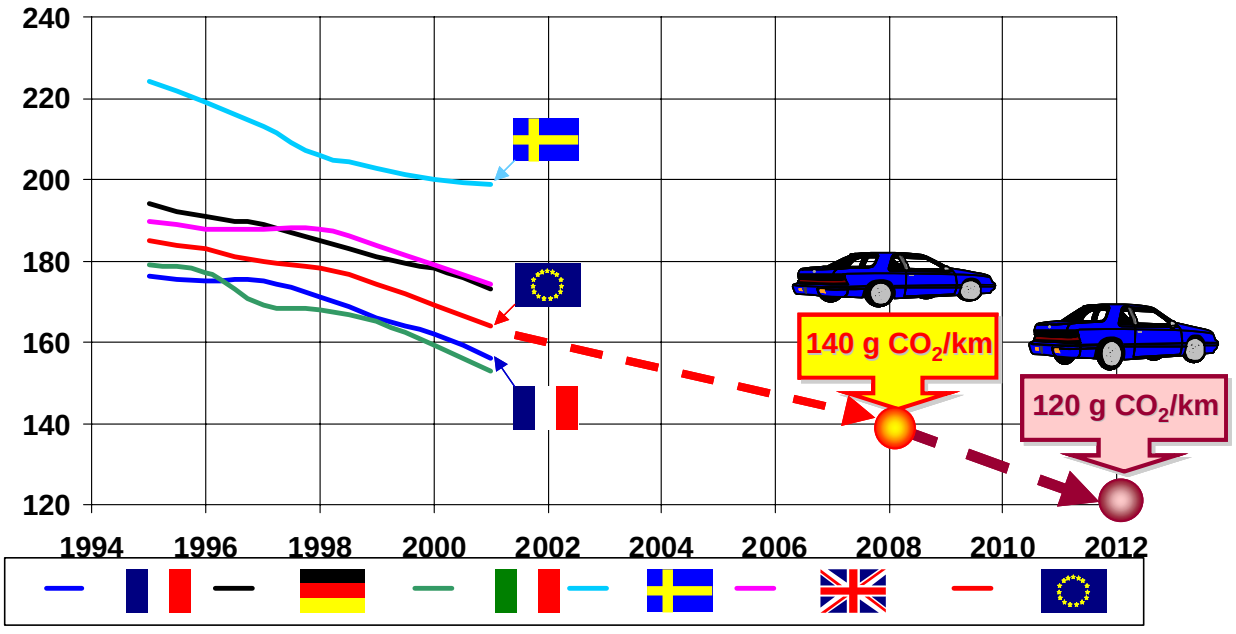
ACEA/JAMA/ KAMA commitment :
specific emission of new cars (gCO2/km)



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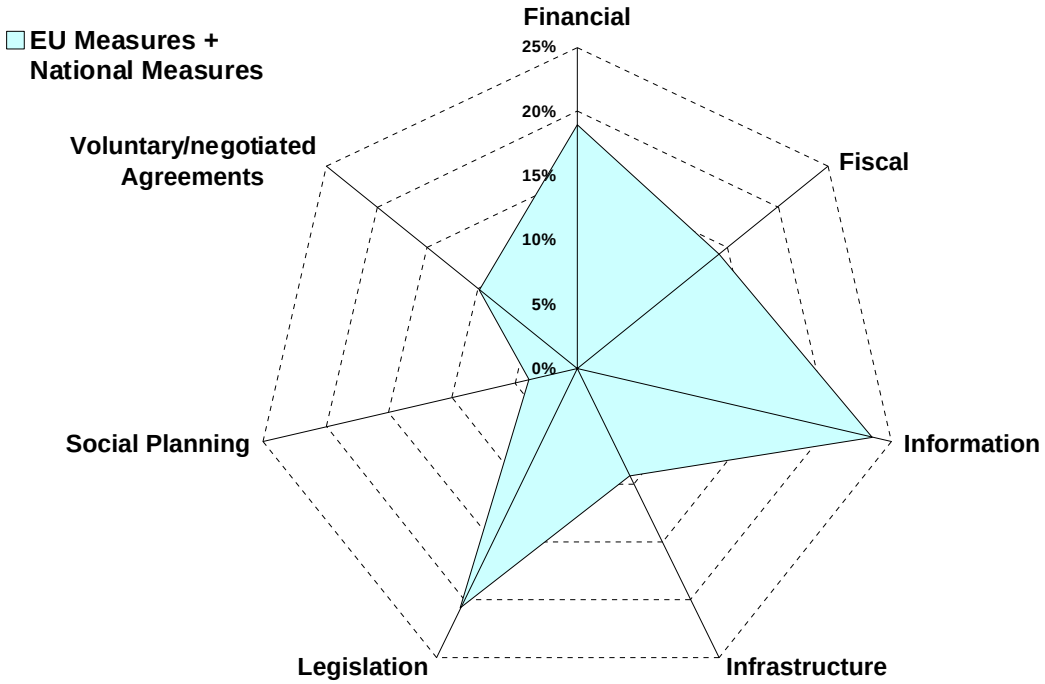
Policies and measures in transport:distribution for the EU-15 of measures by type (Source MURE)



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Transport measures in France

Stricter control of speed regulations

Car labelling

Company mobility management plan : target = 500

-On going evaluation : car 73%=> 49%, average decrease of pollution and consumption by 30%

Financial support for combined rail/road transport

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Trends in energy consumption, traffic and CO2 emissions

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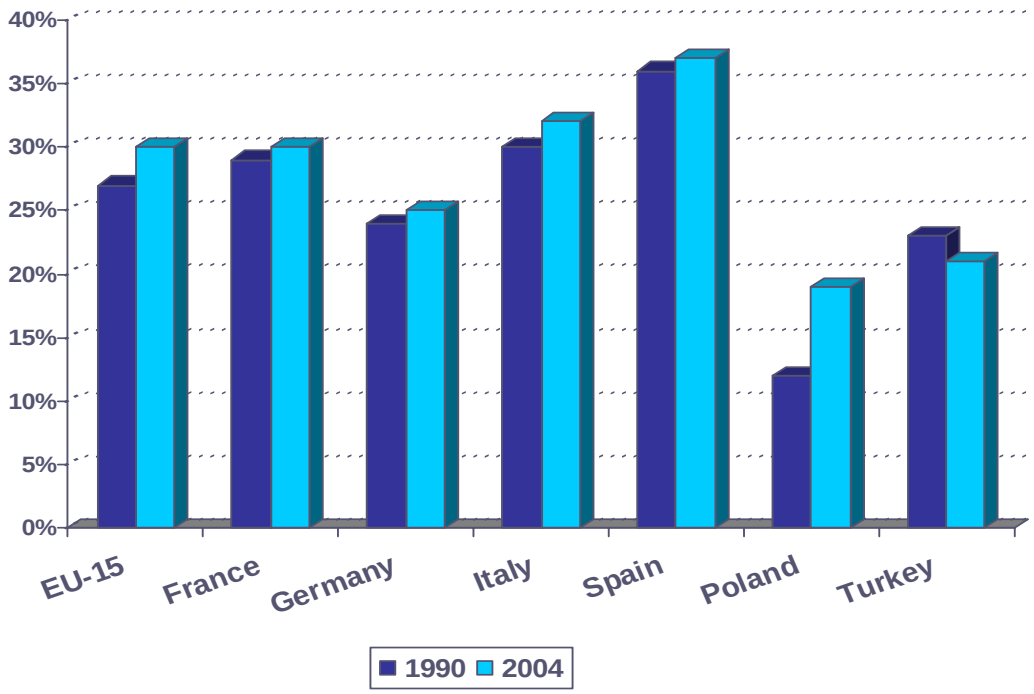
Share of transport in final energy consumption

Transport plays an increasing role in most countries



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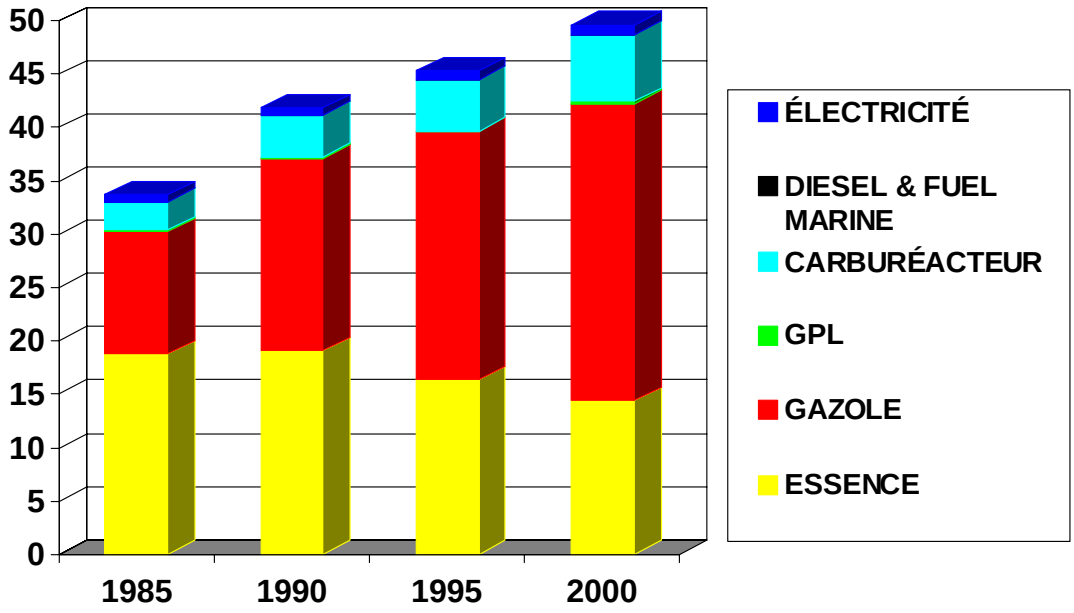
Great dependence on oil and increasing role of diesel : transport consumption by fuel (France)



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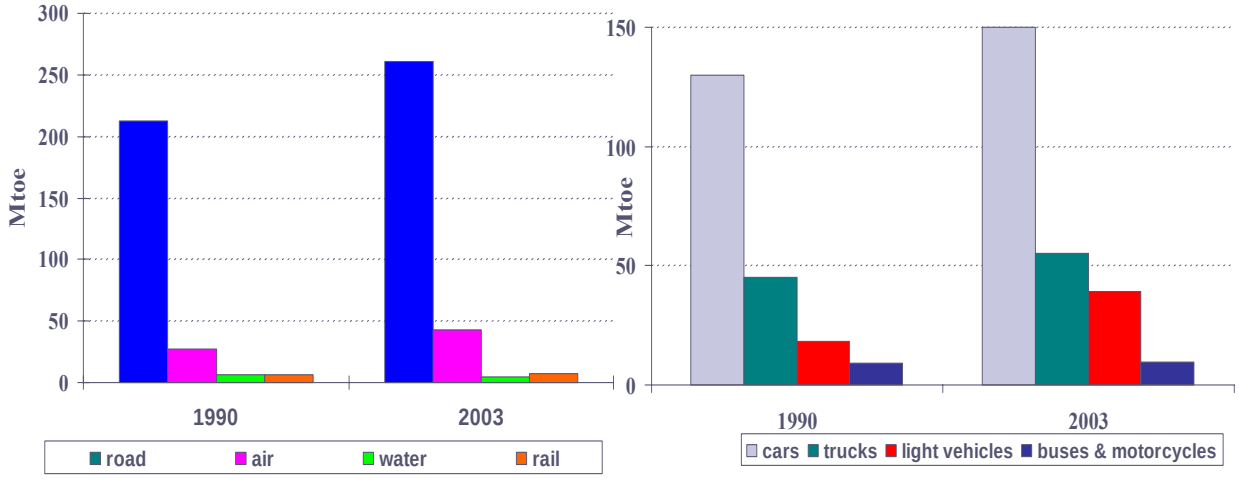
Energy consumption by mode (EU-15)

Slight decline of road transport (from 84% in 1990 to 82% in 2003); air up (from 11 to 14%) ; cars about half of total (declining from 52 % in 1990 to 47% in 2003) ; increase for goods transport (from 25% to 30%); passenger transport : about 2/3



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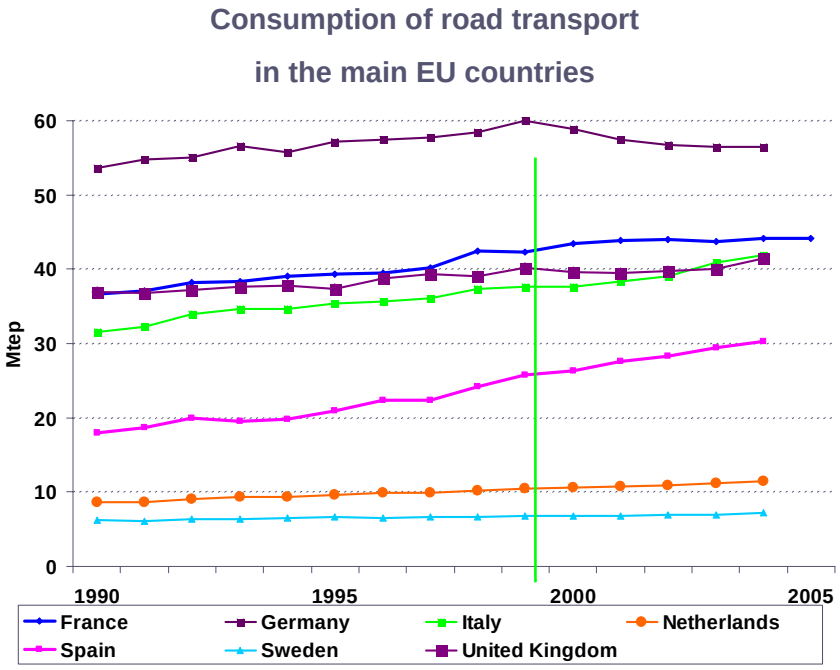
The growth of the transport consumption of road transport has strongly slowdown since 1999



Stabilisation since 2000 in France and United Kingdom and drop in Germany

Impact of the large oil price in 2000 (+80% compared to 1999), pushed in certain countries by national measures (fuel tax increase in Germany and United Kingdom, speed meters setting in France…).

This trend will continue due to the strong motor-fuels price increase in 2005

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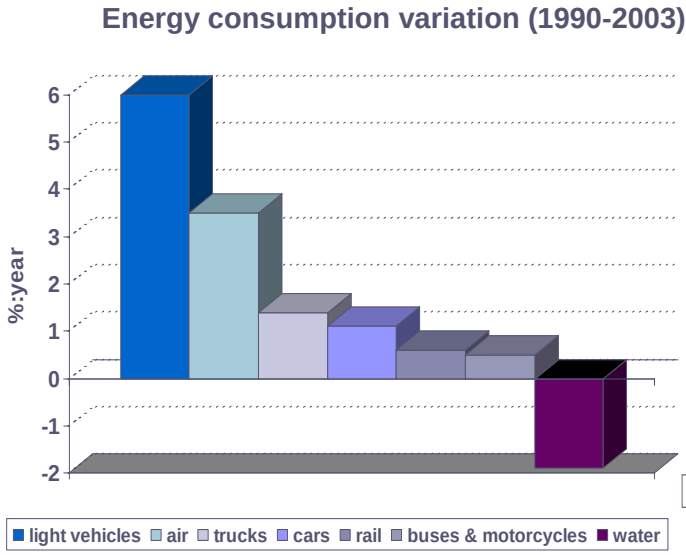
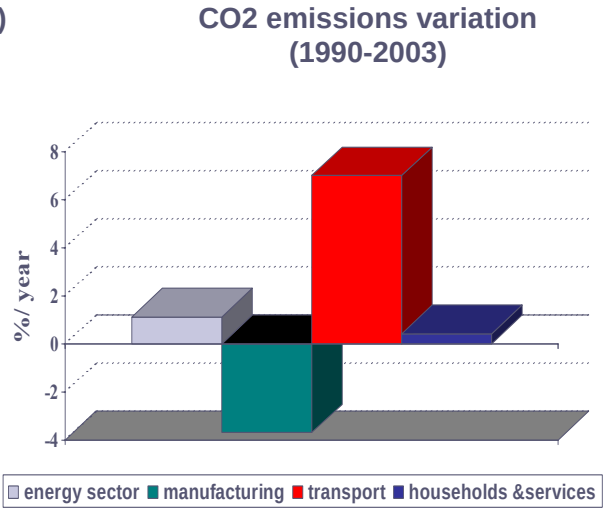
Energy consumption/ CO2 trends (EU-15)

Rapid growth of energy use for light vehicles (6%/year) and air transport (4.7 %/ year until 2000 but 3.5% for 1990-2003); moderate growth for cars (1.1%/ year). CO2 emissions from transport keep on growing… very rapidly





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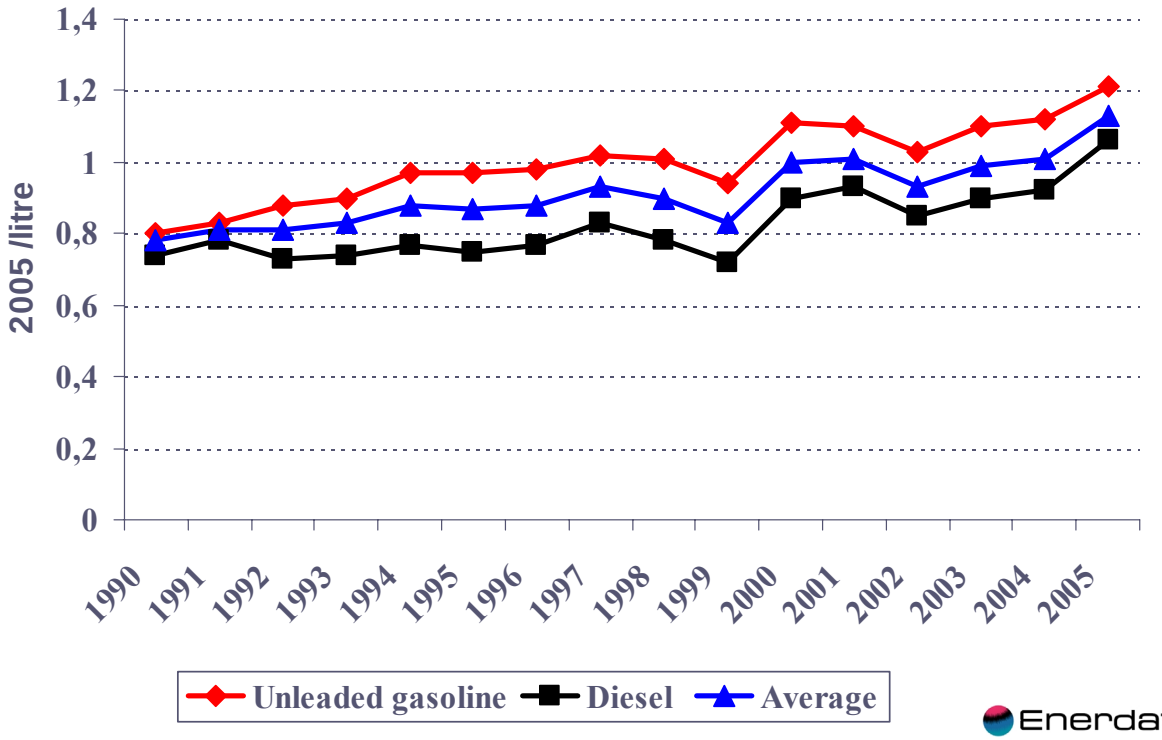
Trends in motor fuel prices (EU-15)

Prices are 45% higher in 2005 than in 1990 (+ 51% for gasoline and 44% for diesel); rapid increase since 1999: 36% (30% for gasoline and 50% for diesel)



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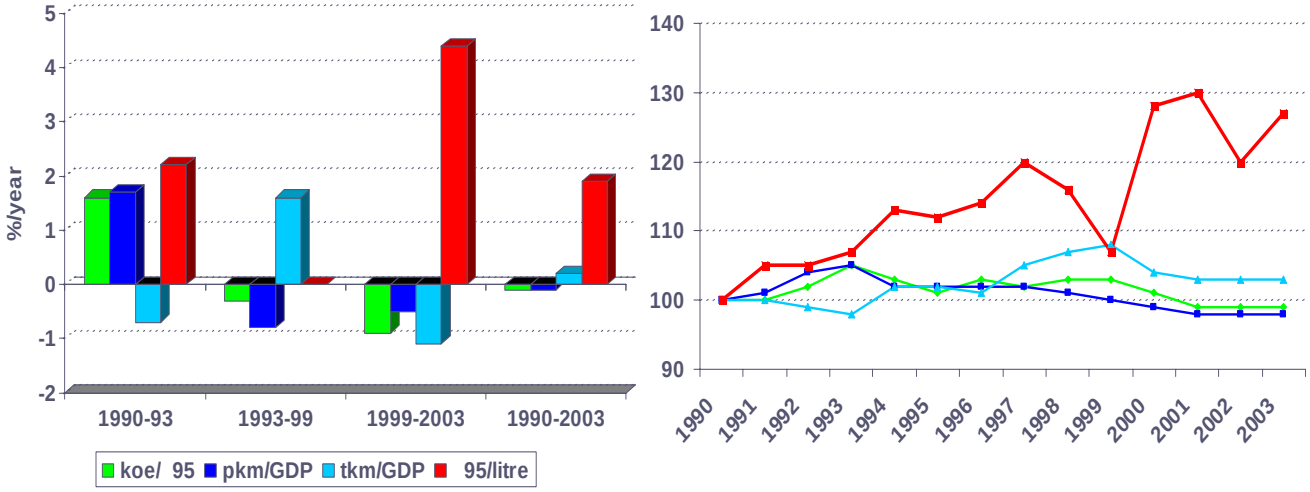
Transport consumption and GDP (EU-15)

Transport consumption grows slower than GDP since 1993, because of a slowdown in passenger traffic ; traffic of goods increase faster than GDP until 1999 (impact of price increase and economic slowdown?)



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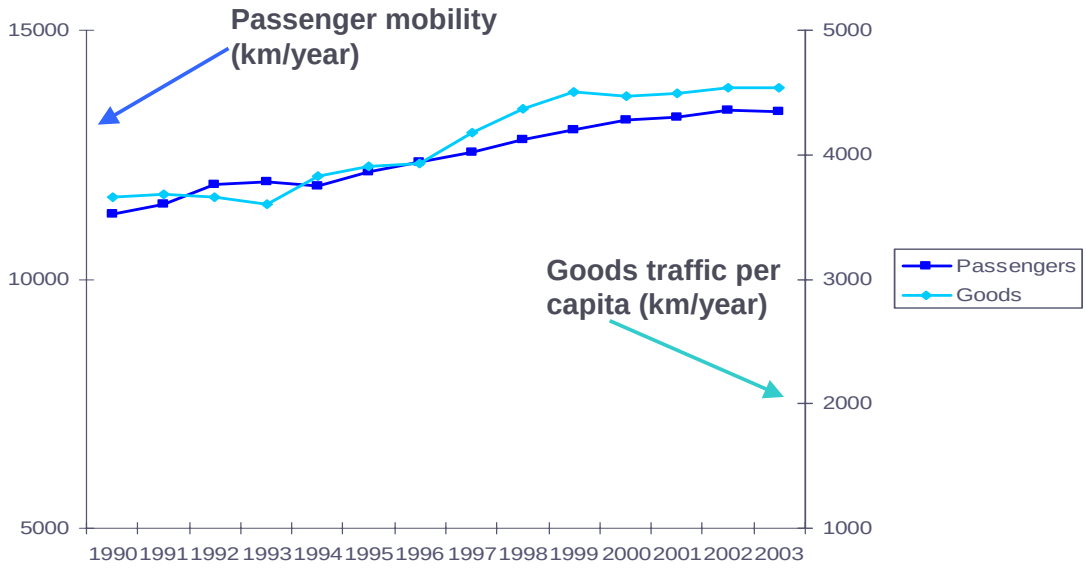
Traffic of goods and passengers in the EU-15

Slowdown in traffic of goods and passenger since 1999



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Energy efficiency of road transport

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Consumption of road transport per car equivalent

Most countries do not have data breaking down the consumption of road transport by type of vehicle

Calculation of a unit consumption of road transport per equivalent car that relates the total consumption of road transport to a fictitious stock of vehicles, measured in terms of numbers of equivalent cars.

Converting the actual stock of vehicles into a stock of equivalent cars is based on a coefficient reflecting the difference in the average yearly consumption between each type of vehicle and a car. If, for instance, a motorcycle consumes 0.2 toe/year on average and a car 1 toe/year, one motorcycle is considered to be equivalent to 0.2 cars. In the same way if light vehicles and trucks consume on average 5 toe/ year each vehicle for road transport of goods is equivalent to 5 cars

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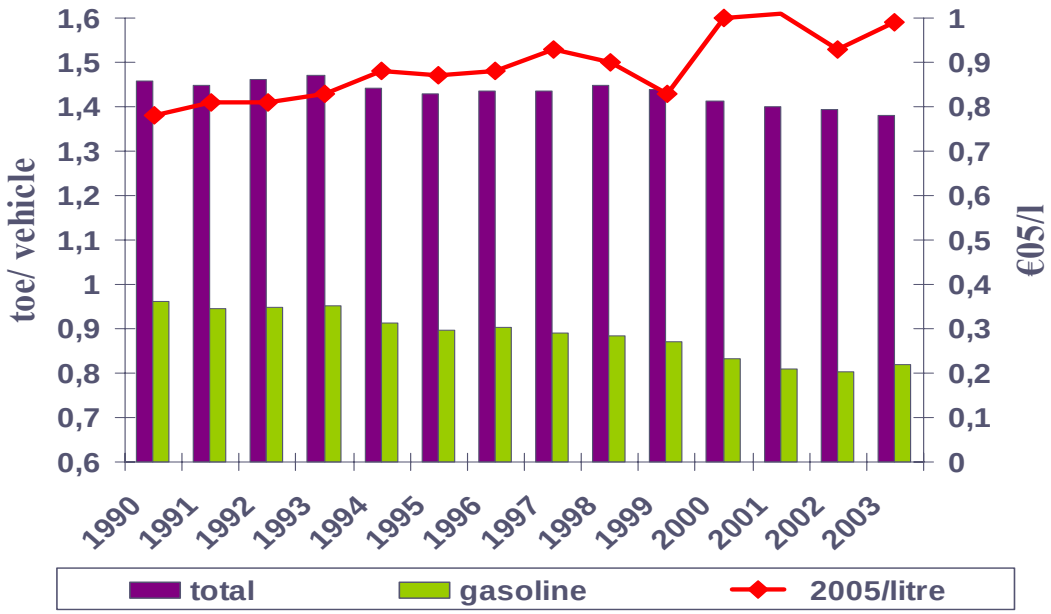
Consumption per road vehicle (EU-15)

Stability of the average consumption per vehicle until 1999 and rapid decrease since; regular decrease for gasoline vehicles



Number of vehicles measured in equivalent cars

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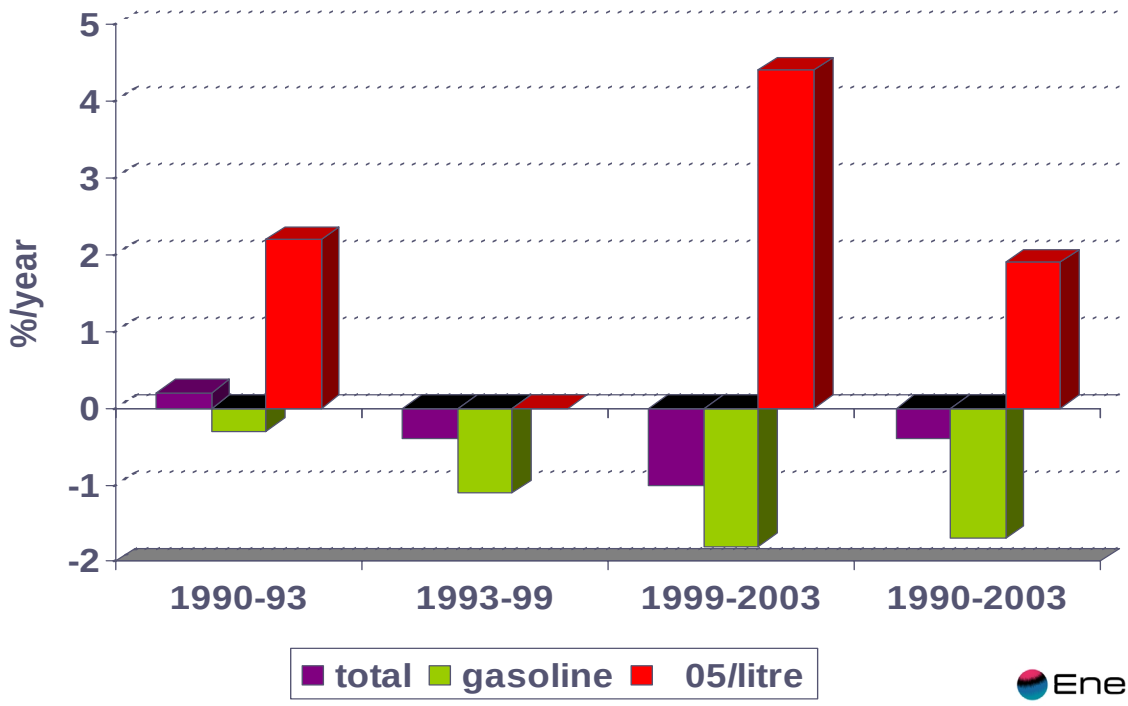
Consumption per road vehicle and motor fuel price (EU-15)

Impact of motor fuel price increase mainly visible since 1999



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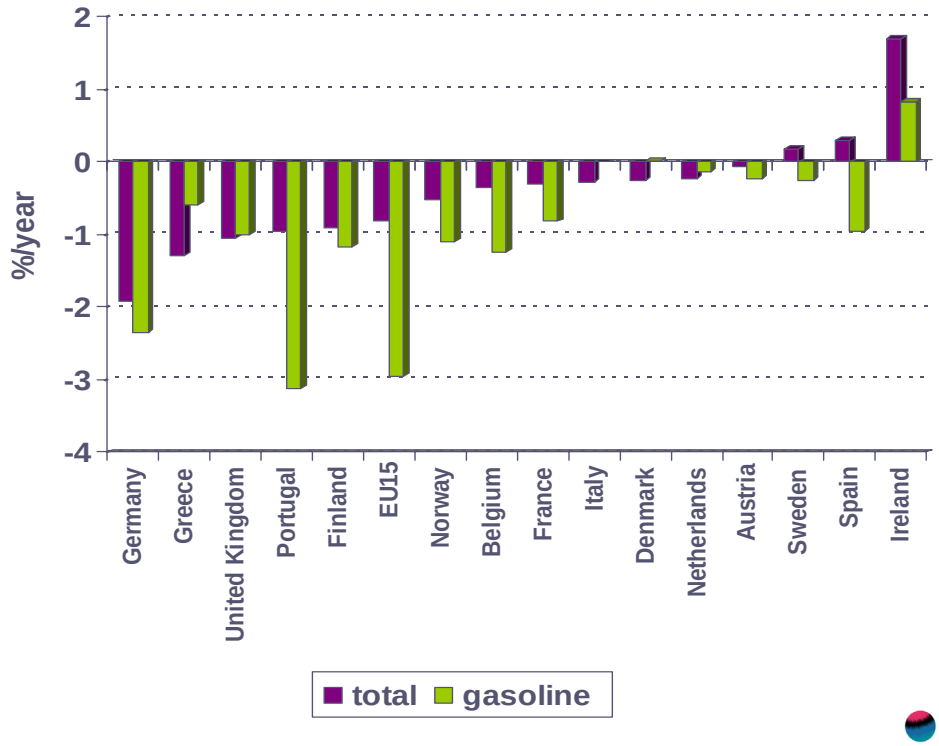
Consumption per road vehicle by country

Reduction in most countries of the average consumption of road transport per vehicle



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Energy efficiency of cars

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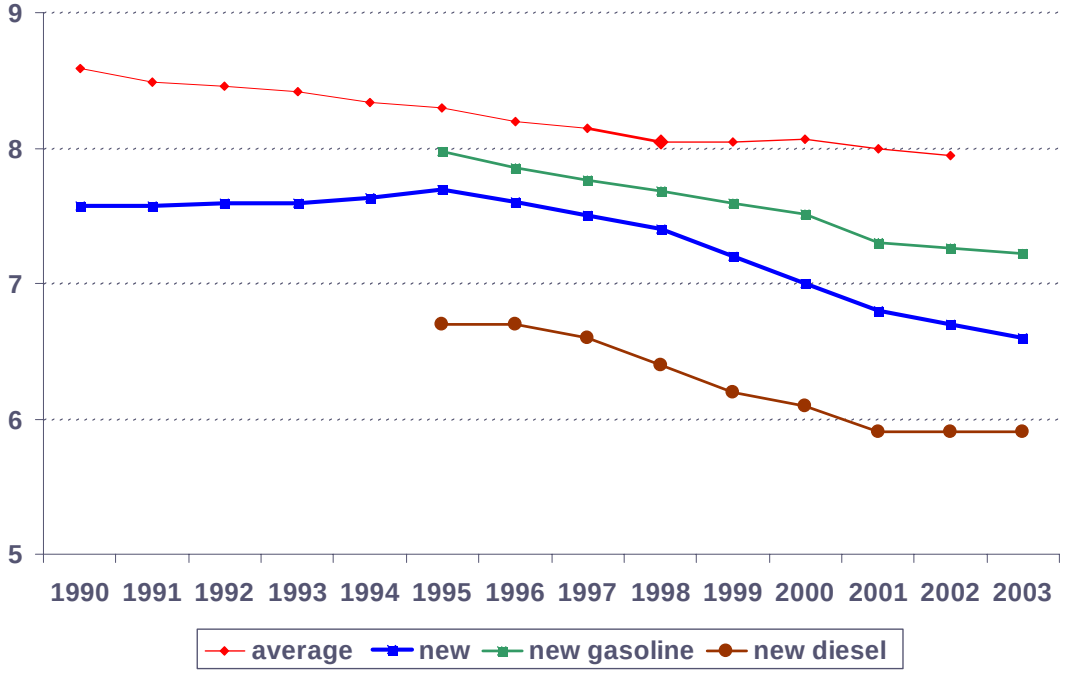
Specific consumption of cars (l/100km) (EU-15)

Regular decrease for the car stock from 8.6 l/100km in 1990 to around 7.9 presently ; for new cars rapid reduction since 1995 (from 7.6 to 6.6 l/100km);



24% of new cars in 2002
below the target of 140 g/km

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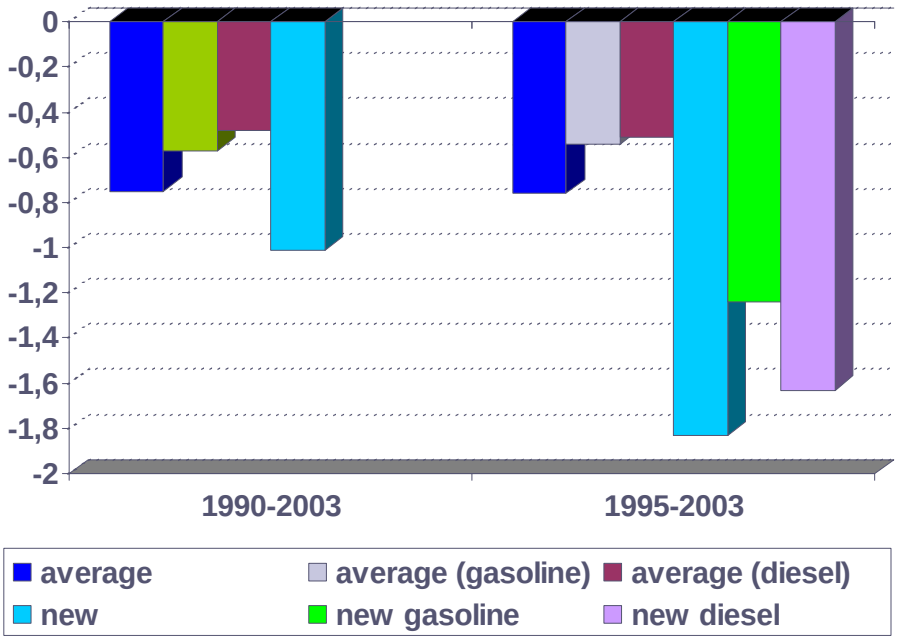
Variation in the specific consumption of cars (l/100km) (EU-15)

-0.75% / year since 1990 for the car stock and -1.8%/yr for new cars since 1995 although engine power and weight increased (+14% and :+8%)



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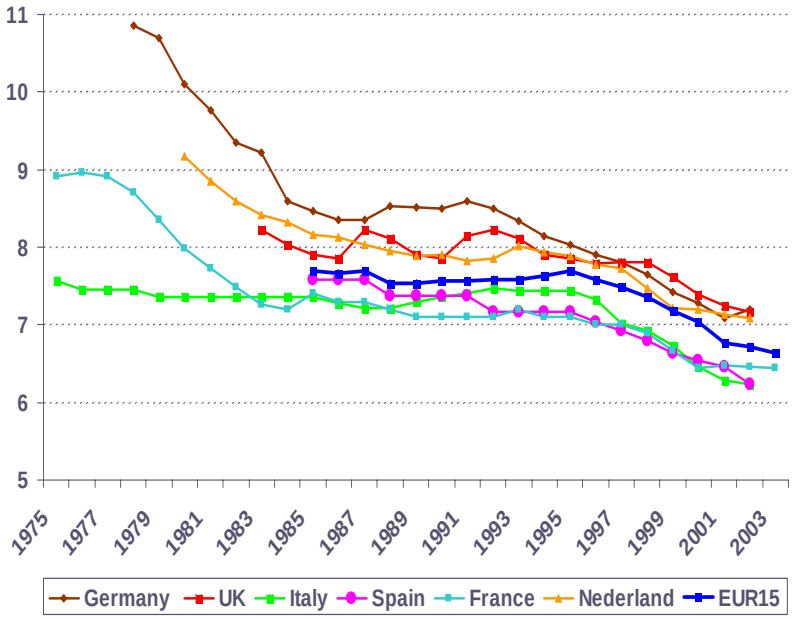
Specific consumption of new cars by country

Regular decrease since 1995 in all countries => ACEA agreement



Sensible drop from 7,6 up to 6,7 l/100 km between 1995 and 2003, related to the voluntary agreement between the European Commission and the three associations of car-producers (ACEA, JAMA et KAMA)

Part of the technical progress has been offset by the growing penetration of more powerful and bigger cars.

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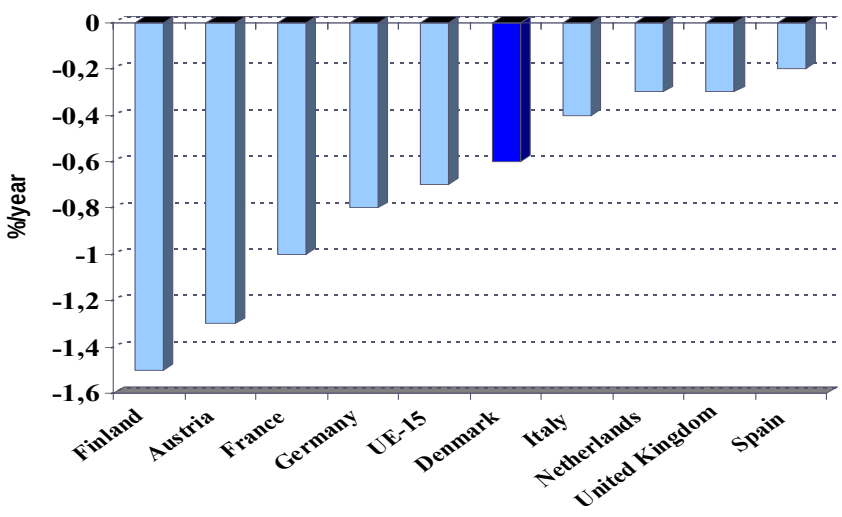
The average specific consumption of the car fleet in the UE-15 has decreased of 0,7 l/100km between 1990 and 2002

Variation of the average specific consumption of the car fleet between 1990 et 2002



Regular decrease of the average specific consumption of the car fleet in all countries, with different trends across countries (between 0.5 and 2.5%/year; 0,7%/year for the UE-15)

This consumption varies from 6,9 l/100 km up to 9 l/100 km in 2002 according to the countries (7,9 l/100km for the EU-15)

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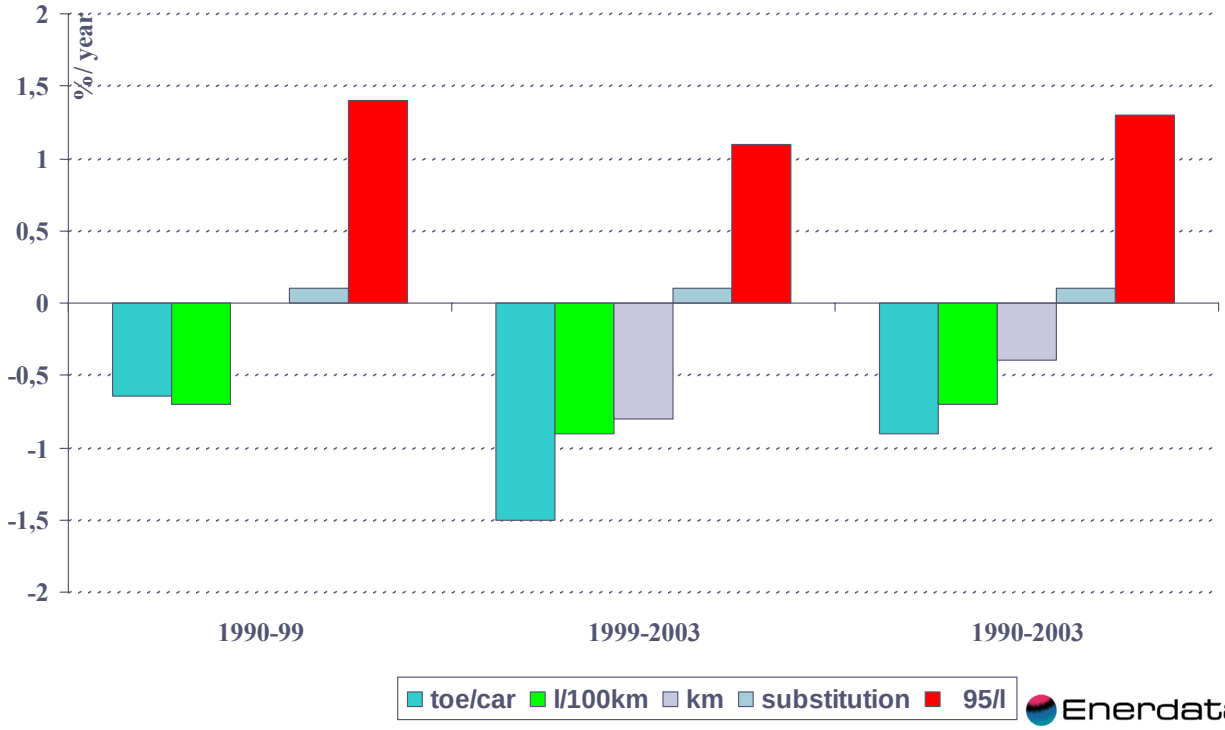
Annual consumption per car (EU-15)(toe)

More rapid reduction of the specific consumption of cars in litre/km since 1999 (-0.9% / year instead of –0.7%/yr before 1999) ; relative stability in distance travelled until 1999; significant decrease afterwards linked to price increase



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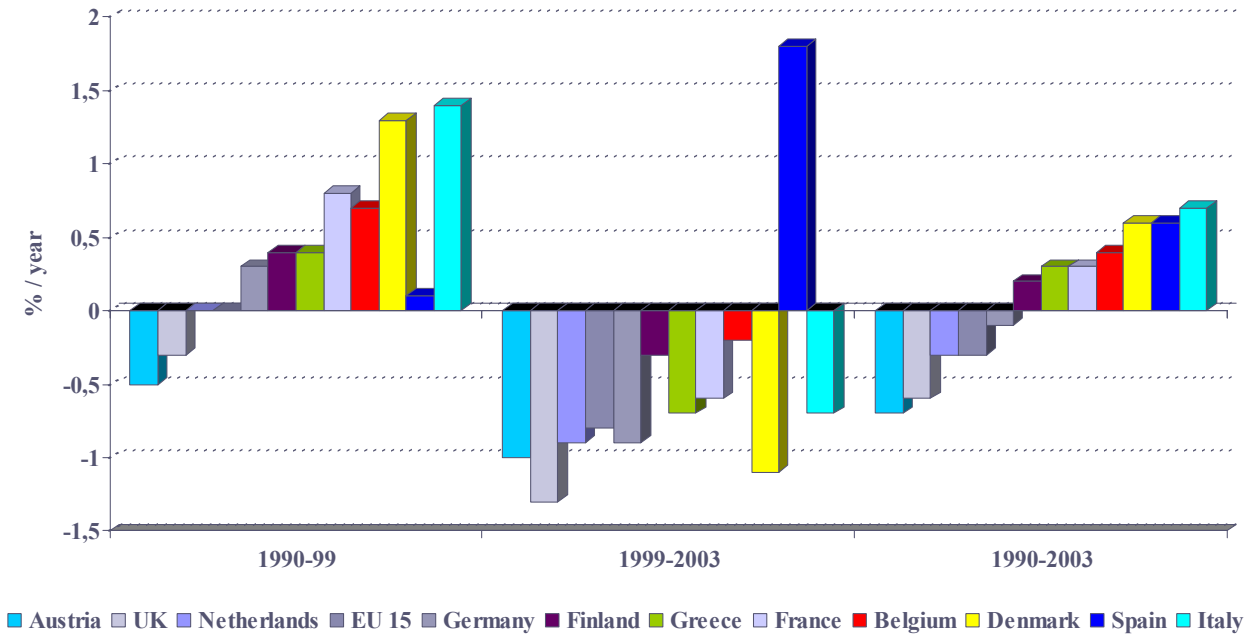
Change in distance travelled by car: decrease in almost all countries after 1999, as a result of the sharp increase in motor fuels prices



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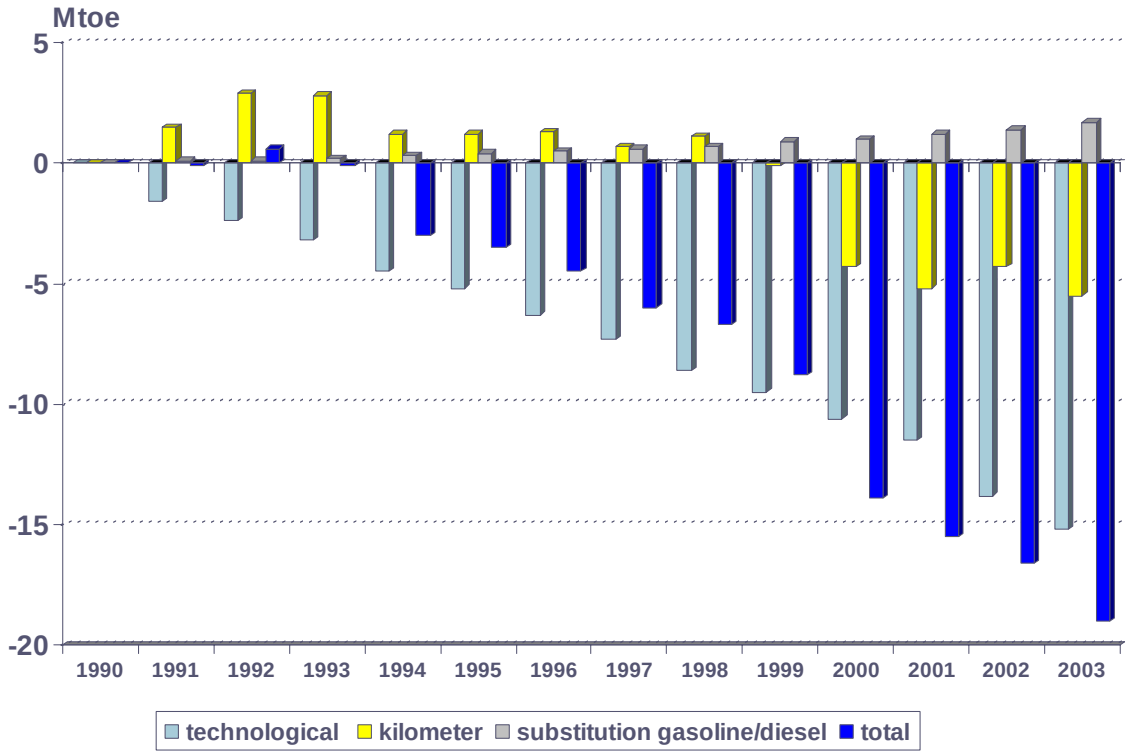
Energy savings for cars (EU-15)



<0: energy savings

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Energy efficiency of road transport of goods

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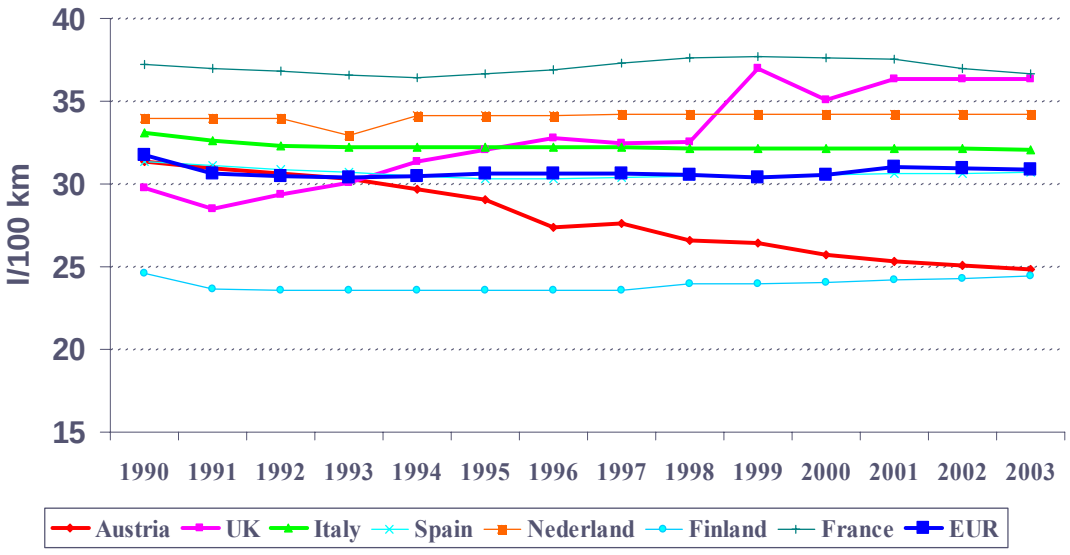
Specific consumption of trucks by country

On average stable and great disparities across countries



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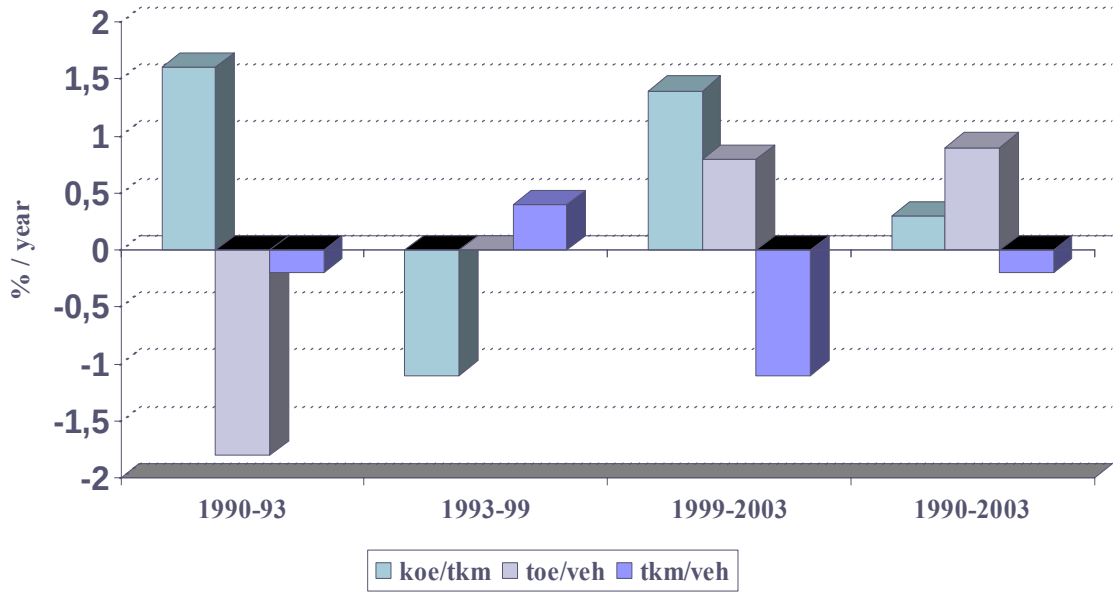
Unit consumption of road transport of goods

Decrease between 1993 and 1999 of the consumption per ton-km because of better management (increase in ton-km/veh); increase before 1993 and after 1999



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Overall energy efficiency trends

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Energy efficiency index for transport

- Calculated on 7 modes: cars, trucks & light vehicles, air (domestic),
- rail, water, motorcycles and buses
- Indicators used:
  - **cars**: specific consumption in litres/km
  - **trucks & light vehicles** : unit consumption per ton-km
  - **air** : unit consumption per passenger-km
  - **rail ,water** : unit consumption/pkm or tkm
  - **motorcycles, buses**: toe/vehicle

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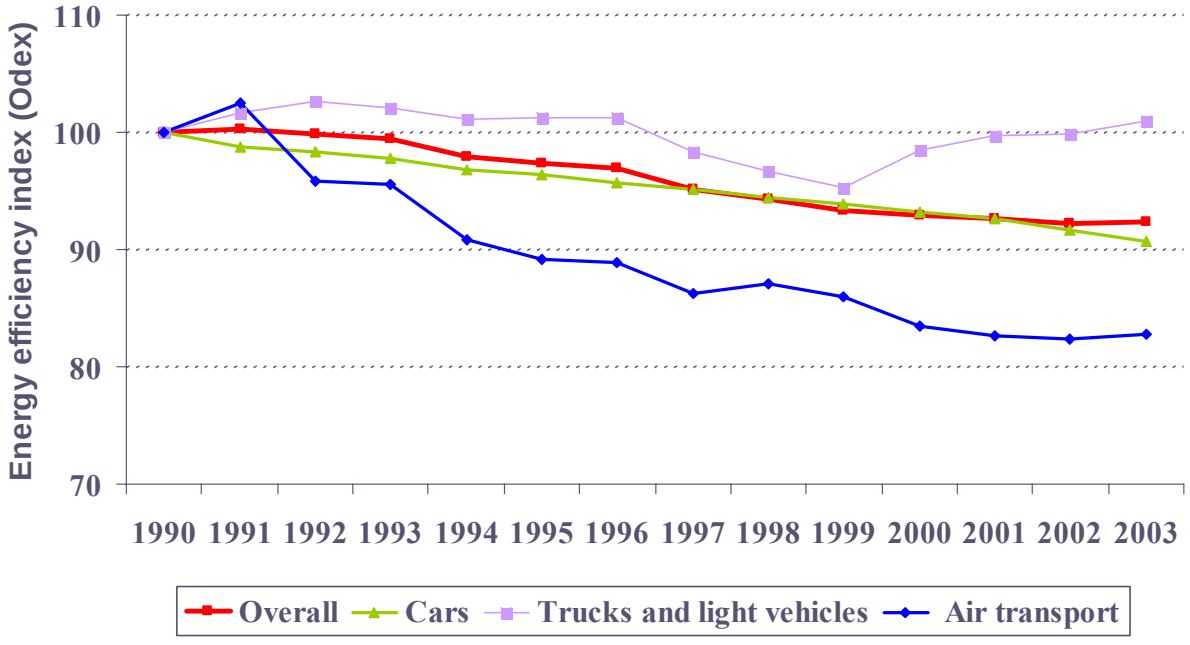
Energy efficiency index for transport EU-15)

Regular improvement of the energy efficiency of transport in the EU until (8%): no progress for road transport of goods



Calculated on 7 modes: cars (litres/km), trucks & light vehicles (toe per tkm), air (toe per passenger); rail ,water (toe/ tkm or pkm); motorcycles, buses (toe/vehicle)

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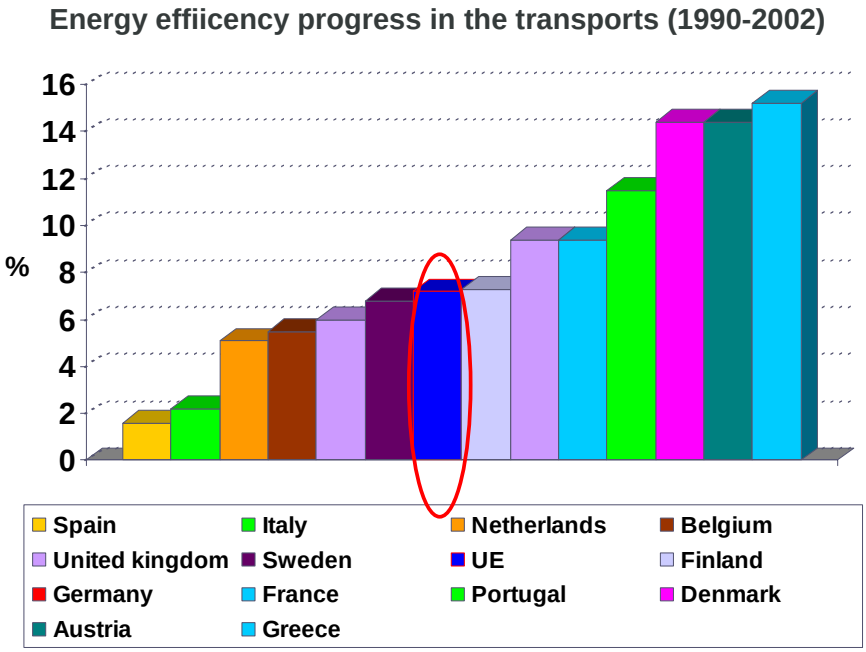
Energy efficiency in transport has improved by 8% in the EU-15 since 1990



Most of the gains come from cars

Few efficiency gains since 1993 for the road freight transport, mode with a very rapid energy demand growth.

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CO2 indicators

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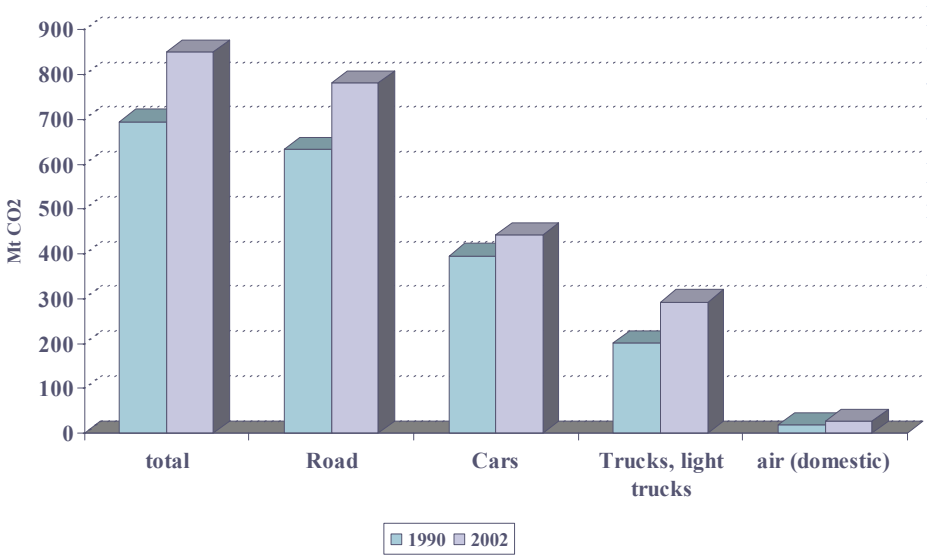
Transport sector is the unique consuming sector where CO2 emissions still increasing : (+23% compared with 1990 in theUE-15 .

Variation of CO2 emissions in transport



Emissions from road freight traffic increase the fastest (+46 % for the UE-15)

Emissions from cars increase at a more slower rate (+ 12 % inUE-15)

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