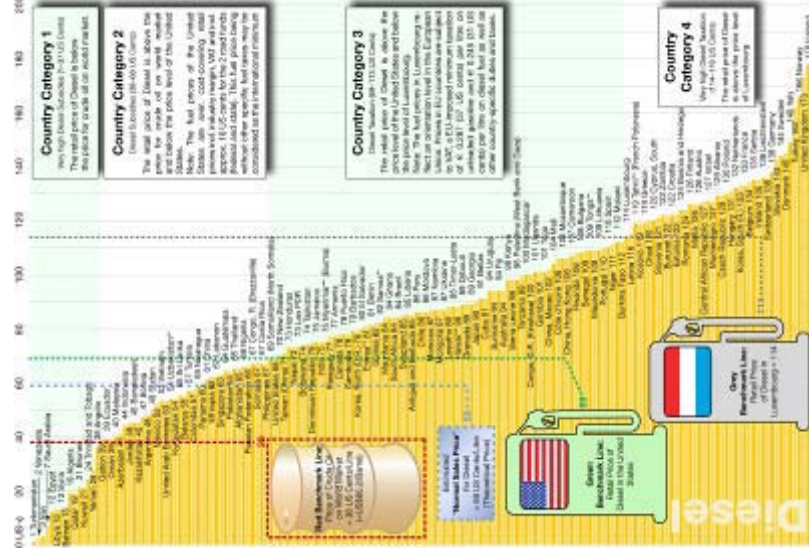




# Data needs for designing responses to rising oil prices in the transport sector

## International Fuel Prices

Armin Wagner, Geneva, 26/05/2008





## Overview

- ▶ **Previous work & Recent trends:**  
Fuel prices, taxation and the transport sector
- ▶ **Key issues:**
  - Fuel Price Components
  - Pricing Mechanisms
  - Fuel Prices & Energy Efficiency
- ▶ **The way forward**

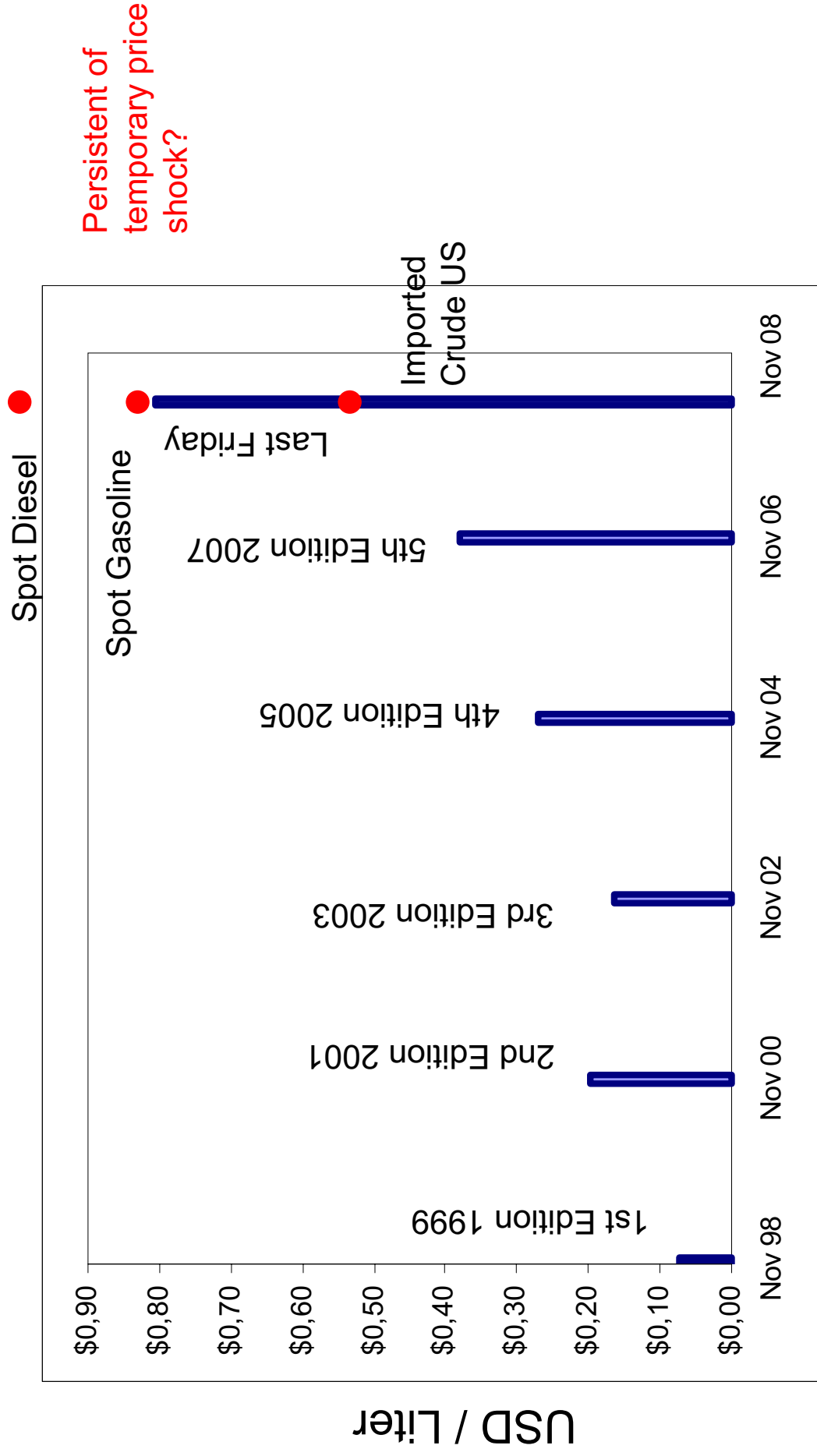


# Fuel Taxation & International Fuel Prices

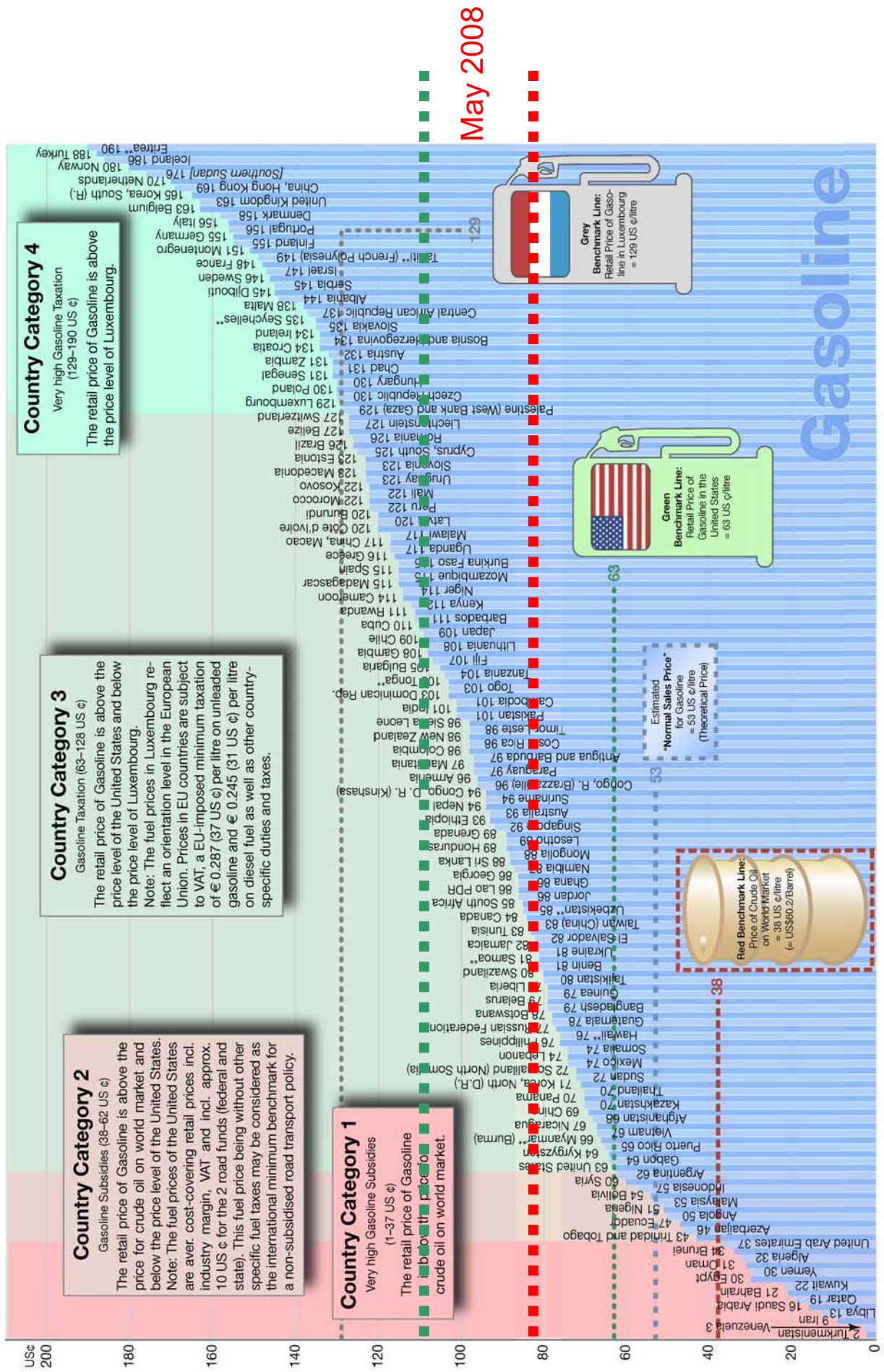
- **Background**
- Since 1991 GTZ has carried out regular worldwide Fuel Price Surveys. One of its goals is to provide a worldwide comparison of retail prices as a vehicle for highlighting energy price policies in developing countries.
- Currently, data are available for 170 countries for Diesel and Gasoline based on survey in Mid-November 2006
- Part of World Bank Indicator Set (World Development Indicators, World Road Statistics, ...)
- 2007 Survey available on: [www.gtz.de/fuelprices](http://www.gtz.de/fuelprices)



## Trend in Oil Prices (BRENT) – International Fuel Price Perspective

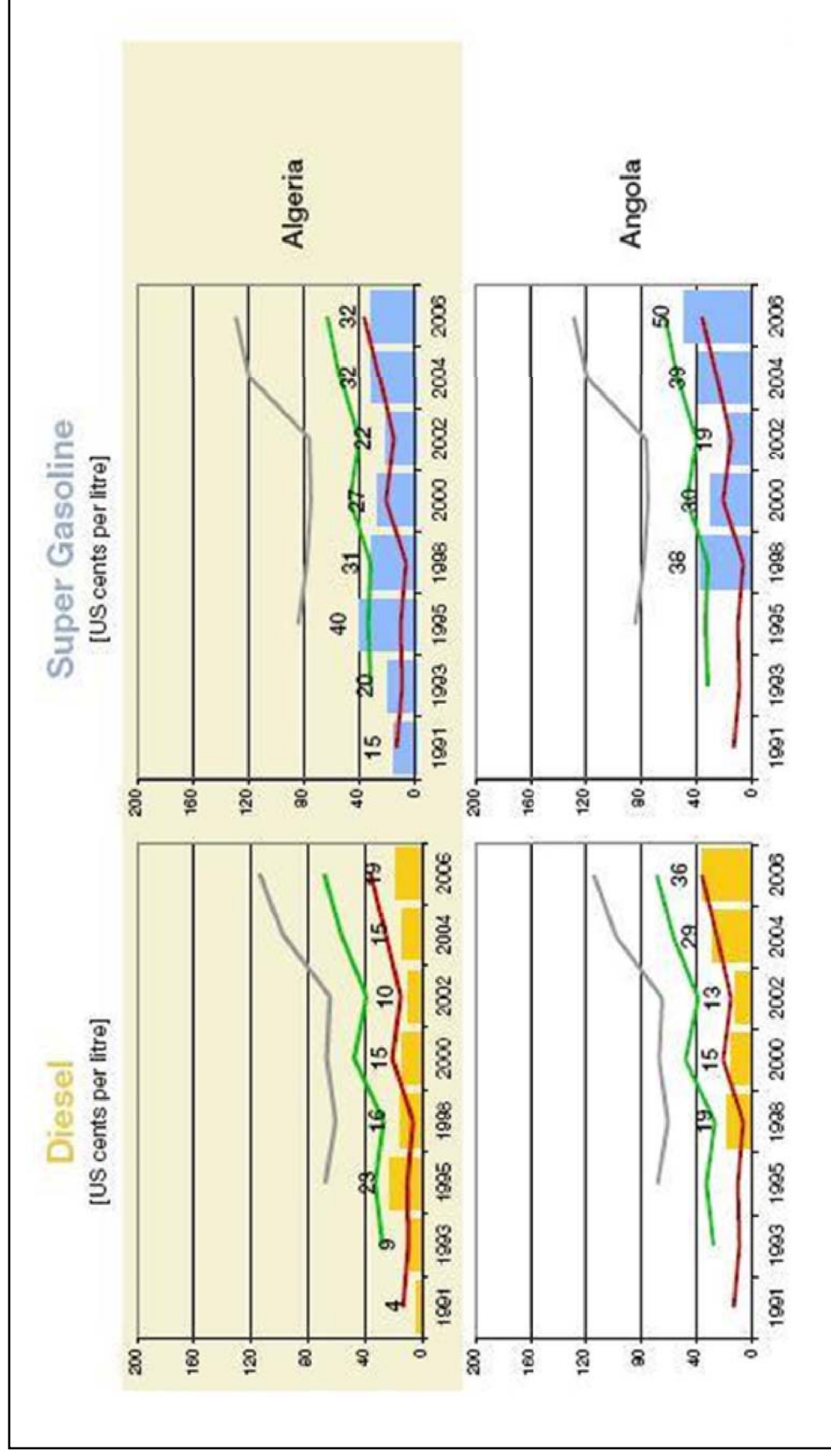


# A global perspective on fuel prices 2007



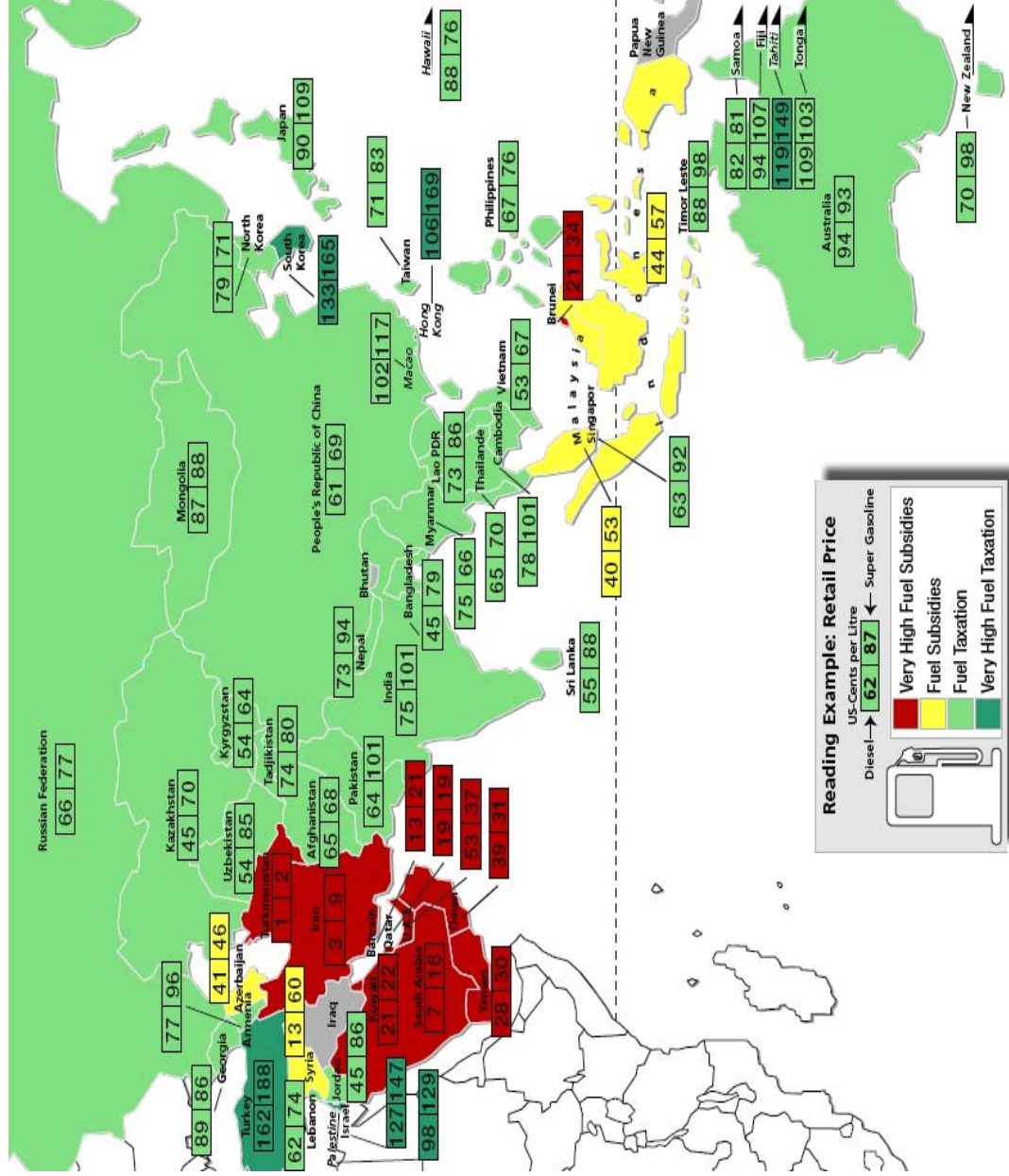


## Time series from 1991 to 2006





# Regional Comparisons



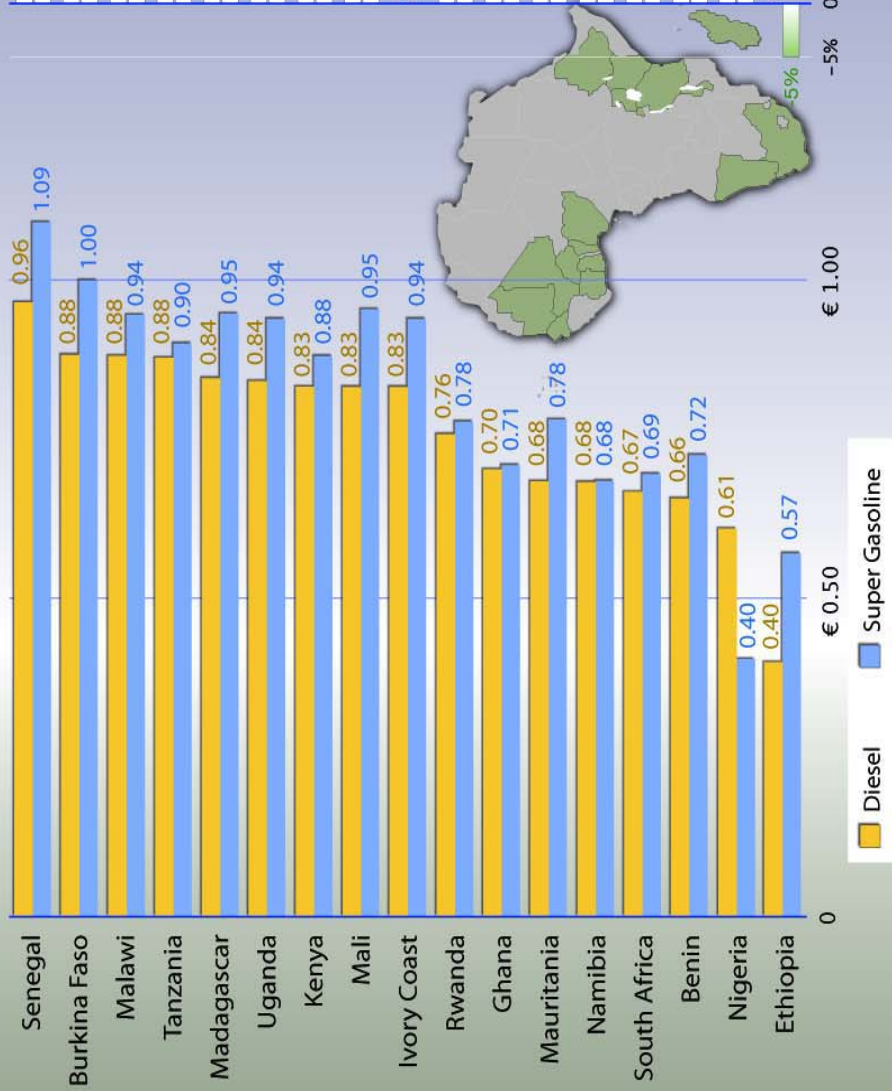
## Regional comparisons as indicators for:

- Smuggling potential
- Good governance
- Regional Transport Sector Dialogue

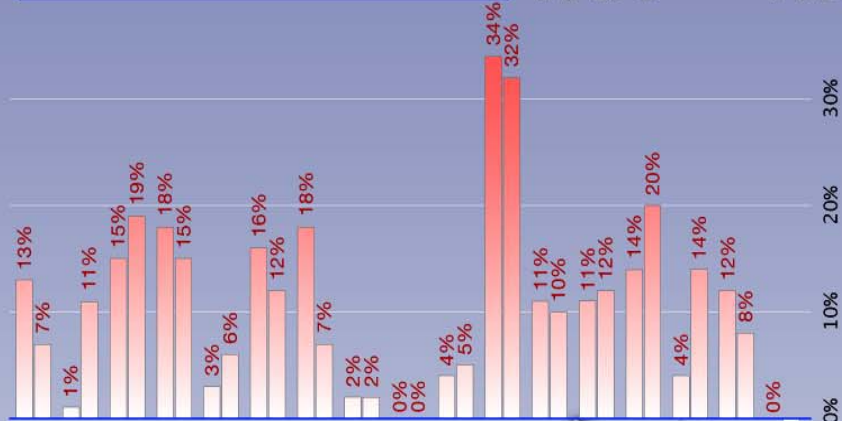
# Flash Survey Africa November 2007

## TREND IN FUEL PRICES 2006 – 2007 IN SELECTED SUB-SAHARAN AFRICAN COUNTRIES

RETAIL PRICES GASOLINE / DIESEL IN NOVEMBER 2007 (€ PER LITRE)



% CHANGE ON ONE YEAR / NOV. '06-NOV. '07, LOCAL CURRENCY TERMS



### 1 BARREL CRUDE

+57% in US-\$  
+40% in €



US\$ 58.92  
€ 44.72

US\$ 92.61  
€ 62.61

2006 2007  
Crude oil prices have risen substantially in the past year. Converted from the barrel price, a price increase per litre of 11 €-€ (US-€ 21) was registered.

Remark:  
For information on methodical issues please refer to our publication "International Fuel Prices 2007" on <http://www.gtz.de/fuelprices>

Source:  
GTZ - Flash Survey in November 2007  
<http://www.gtz.de/fuelprices>  
Armin.Wagner@gtz.de  
FEPA - Focus Group Energy Prices Africa

## Background – Political Situation



- Fuel prices are highly political
  - ▶ **Political unrest in many countries**
    - Mozambique: Riots after fuel price increases, Gov was forced to reduce fuel levy for PT operators
    - Cameroon: Riots after fuel price increases
    - Burkina Faso: Riots after increases in fuel and food prices
    - In Asian countries (Burma, Indonesia) fuel price increases triggered political unrest in the past – Indonesia in facing new unrest
    - Protests are often linked to general political instability/unrest; increases in fuel prices are rather a trigger of than actual reason of conflicts.
  - ▶ **Fuel smuggling is a major issue as foreign countries benefit from fuel subsidies that are originally intended for local population (examples):**
    - Syria → Lebanon (about 800 million US-Dollar according to UN estimates)
    - Vietnam, Venezuela, Nigeria, Iran to neighbouring countries

## Background - Subsidies



- **Key countries such as Indonesia, Egypt face severe difficulties raising fuel prices amid increasing food prices and soaring inflation.**
  - **Bangladesh:** Implicit subsidy for diesel and kerosene is estimated at US \$1.2 billion
  - **Cambodia:** Annual energy price subsidies of about USD 120 million
  - **China:** State price regulation leads to bottlenecks in supplies, since the fuel producing and distributing businesses do not bear the losses that can be expected
  - **Indonesia** now expects to spend nearly \$14 billion on fuel subsidies in 2008 (situation before current fuel price hike), more than double last year's \$6 billion bill,
  - **Iran:** Rationing of fuel and the sale of additional quantities at higher prices
  - **Jordan:** Fuel subsidies in 2007 totalled about USD 350 million
  - **Burma:** Price rises led to unrest at the beginning of 2007



## Overview

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  - Fuel Price Components / Principles
  - Price Adjustment Mechanisms
  - Fuel Prices & Energy Efficiency
- ▶ **The way forward**





...Price  
Adjustment  
Mechanisms

...Fuel Price  
Components  
/ Principles

...Energy  
Efficiency



## Fuel Taxation and Good Governance – 3 Principles

### ► Sector financing: “Transport finances transport”

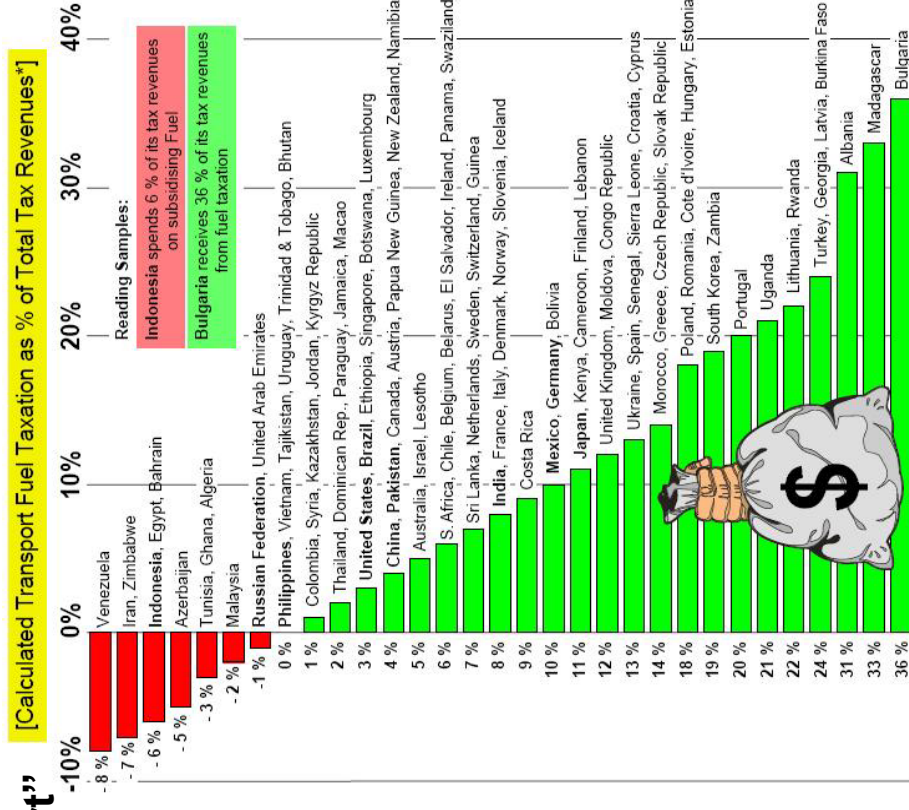
- Road infrastructure financing
- Road maintenance financing  
(rule of thumb: minimum of 10 US cents for road maintenance)
- Road safety cent

### ► Internalisation of external costs

- Directly related to fuel consumption and CO<sub>2</sub> emissions
- Proxy for other social costs (like accidents, congestion etc.)
- EcoTax

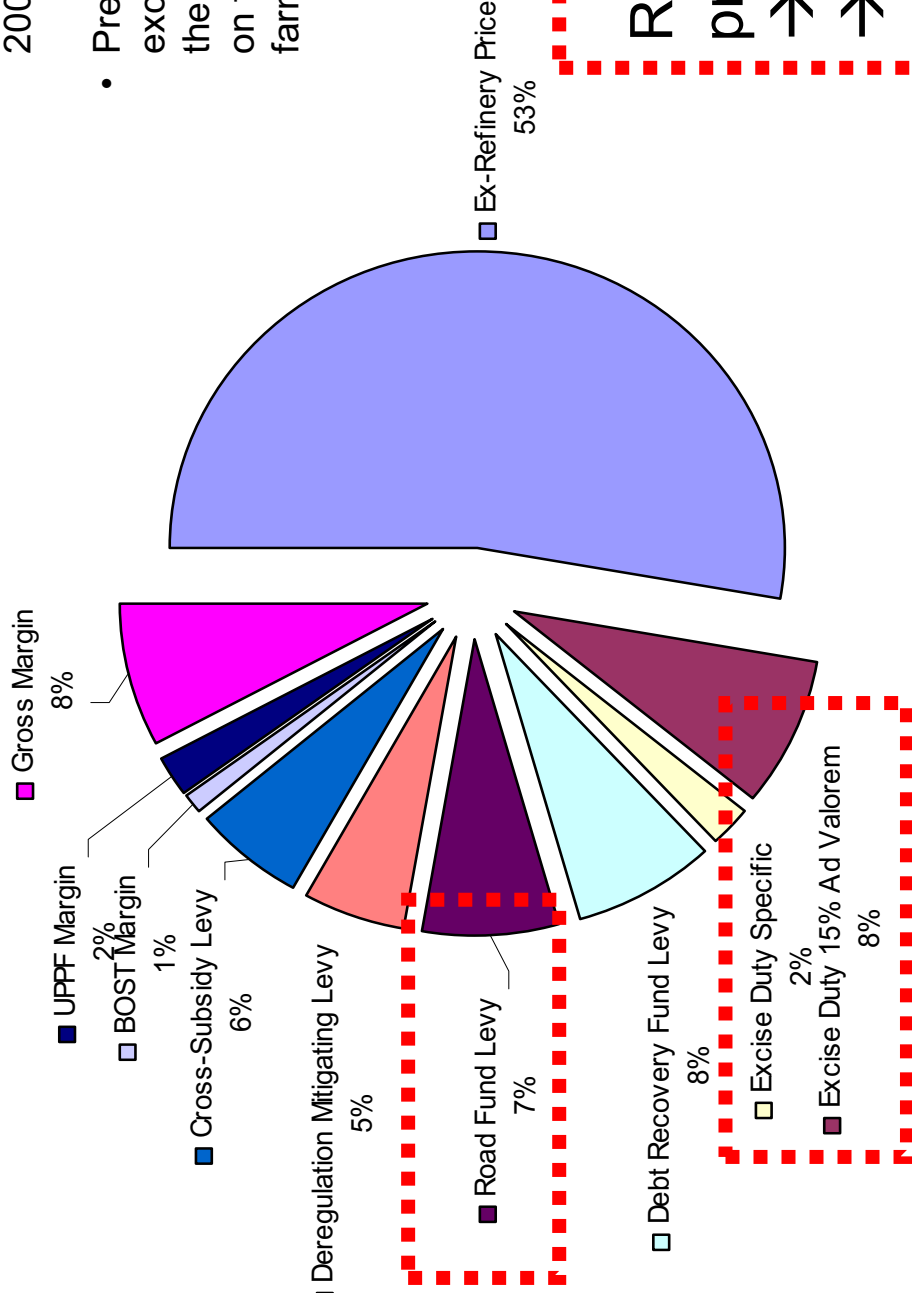
### ► Important contribution to general budget revenues

- Major contribution towards financing core state functions, such as the health services, education and security
- Easy to collect
- Major source of revenue in many countries
- Subject to full VAT as any other good



# Price components – Ghana

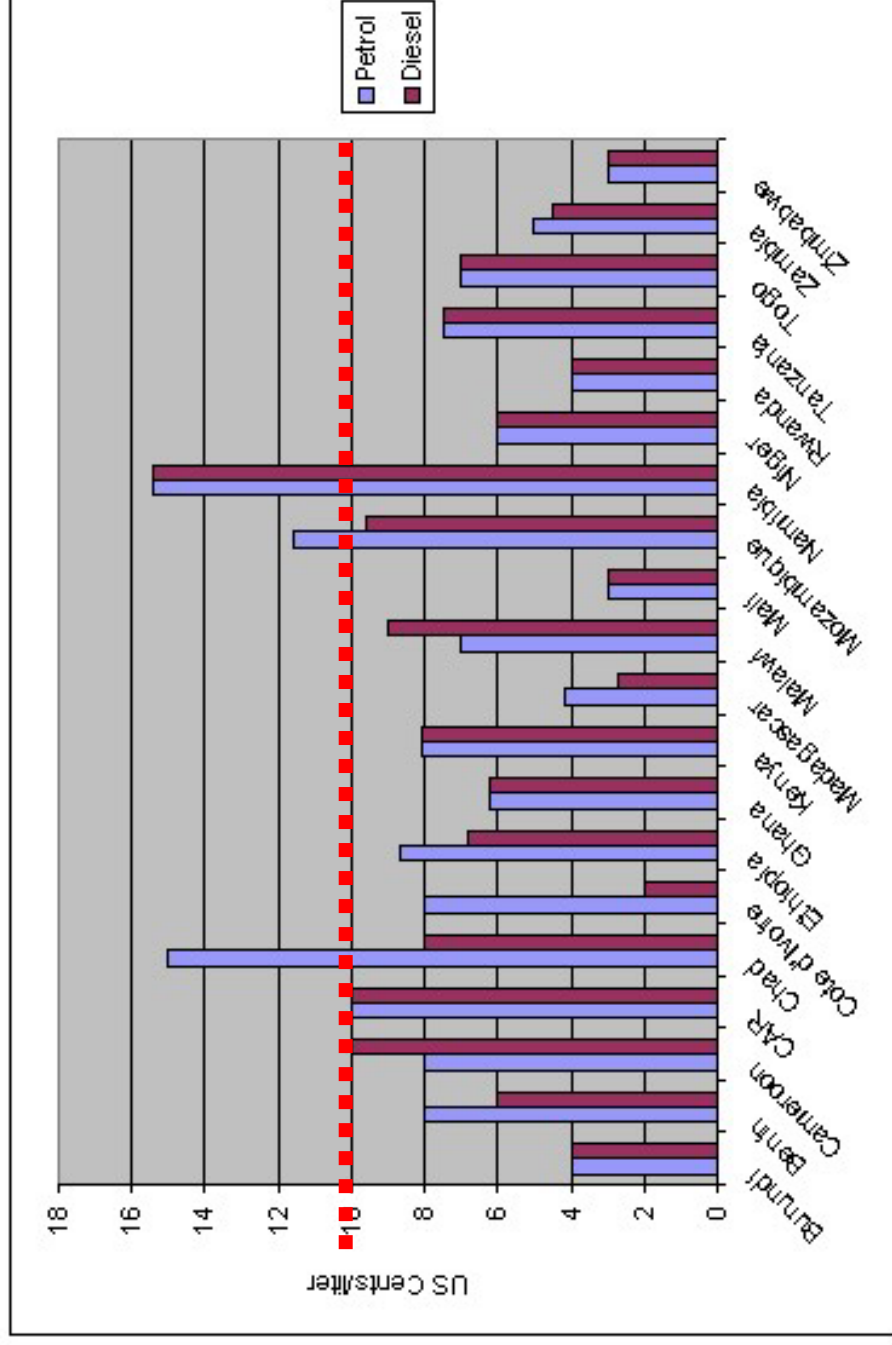
**Fuel Price Components in Ghana**  
Ex-pump Price US\$0.93/litre [May 2006]



- Ghana's expenditure on crude oil imports rose from US\$ 500 million in 2005 to US\$ 2.1 billion by the end of 2007 for the same quantity of oil.
- President announced the removal of excise duties oil and tax on fuel for the country's fishermen and subsidies on fertilizer and free tractors for farmers.

**Rationalising fuel prices increases:**  
 → **Accountability**  
 → **Transparency**

# Price components – Fuel Levy for Road Maintenance



**Key indicators:**

→ **Level of fuel taxation**

→ **Level of fuel taxation earmarked for road maintenance (min 10 US-cent)**

→ **Contribution to state finances (as %)**

Source: Benmaamar M: Financing of Road Maintenance in SSA: Reforms and Progress Towards Second Generation Road Funds, SSATP Discussion Paper No 6, September 2006



## Overview

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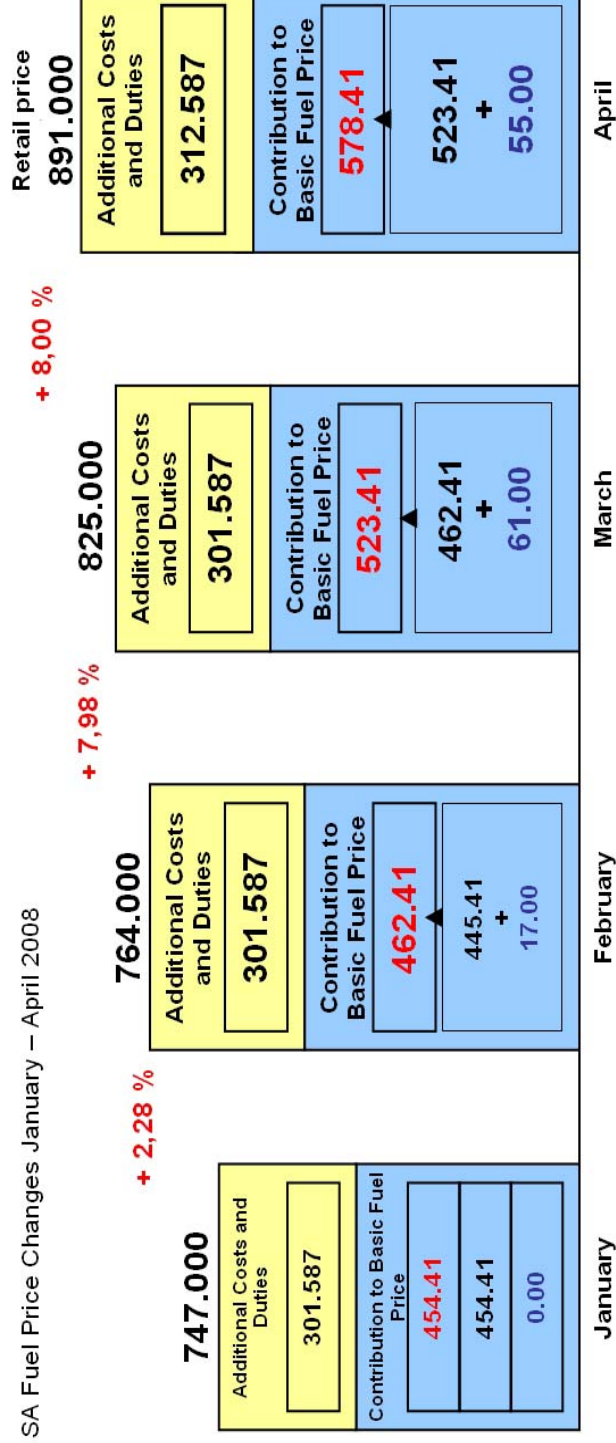
## Price Adjustment Mechanisms

Ad hoc: Indonesia, Sri Lanka, Malaysia, Egypt, Algeria  
Automatic (based on formula that reflects crude oil price): South Africa, Ghana, Senegal

Liberalized/Market-based: Most European Countries, Philippines, USA

→ Countries with ad-hoc mechanisms are prone to subsidies / are most affected by increasing fuel prices: hikes > 30 % + population not used to price changes + poor communication → political unrest (Egypt, Indonesia, Burma,...)

SA Fuel Price Changes January – April 2008

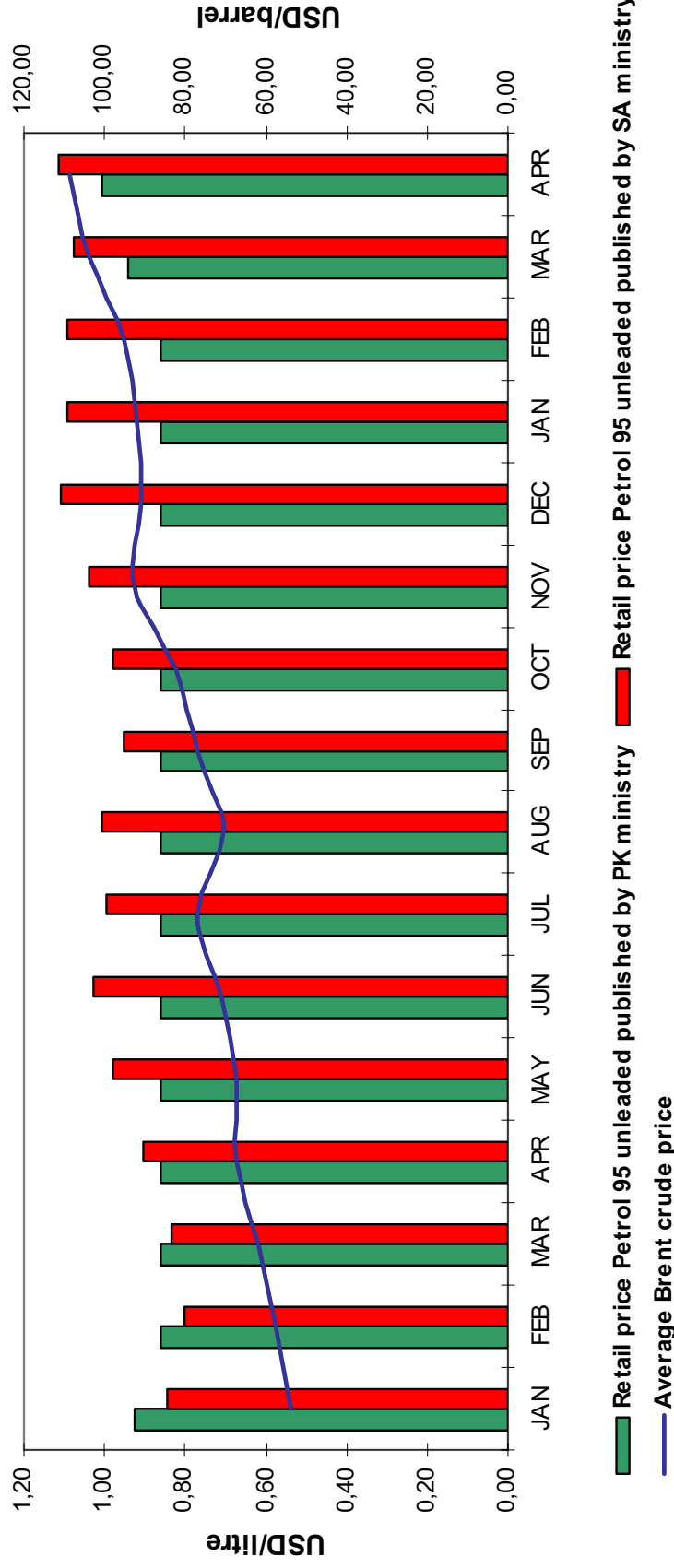


# Price adjustment mechanisms

Ad hoc – schemes tend to delay adjustment of user behaviour and are difficult to maintain in case of permanent price shocks and are prone to political interference

Automatic formulae include three main types: moving average rules, triggers and max-min → Petrol Price Smoothing should be limited in terms of time and extent

**Fuel price policy comparison - Pakistan and South Africa**  
(absolute comparison) January 2007 - April 2008



# Price adjustment mechanisms



→ Encouraging signs: Countries such as Vietnam, Botswana, Guinea start to move from ad-hoc mechanisms to automatic pricing mechanisms

### Challenges:

- Political interference (suspension of formula) are common
- More efforts are needed to raise public awareness on pricing mechanisms
- Need to know more how different formulae work in times of high fuel prices

	Temporary Shocks	Persistent Shocks
Moving average	Smooths out all shocks	Full pass through (with a lag)
Trigger (certain amount)	Smooths out only small shocks	Full pass through
Max-Min Retail Price	Smooths out only large shocks	No pass through

### Key indicators / issues:

- Level of pass through (= or > 1)
- (Political) resilience of pricing mechanism to price shocks
- Good practices (targeting/mitigation)



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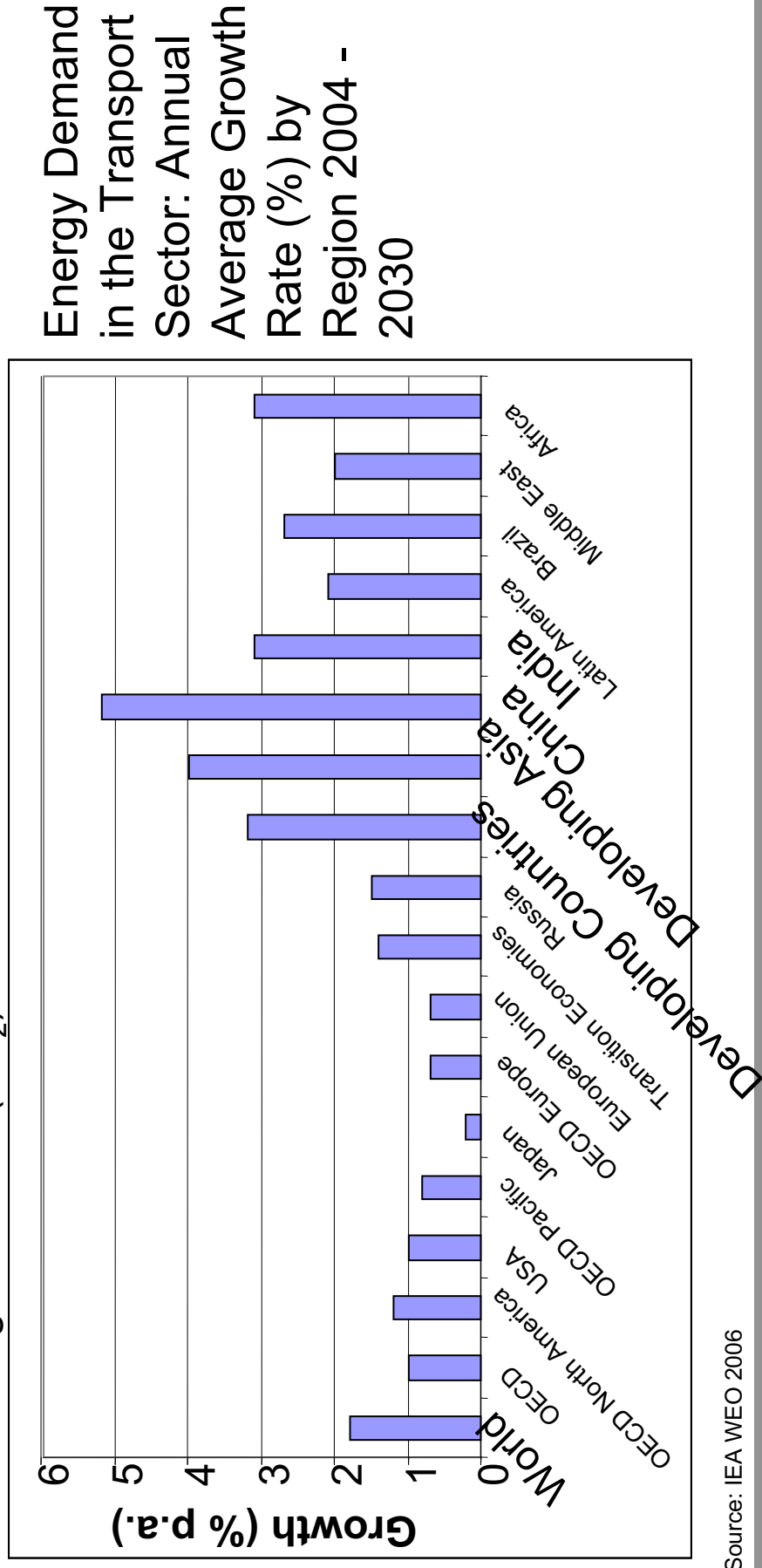
## **Tackling energy efficiency (and climate change) in the transport sector is challenging task**



## Fuel Prices & Energy Efficiency



- In addition to the revenue aspect, fuel taxes also provide a major incentive to achieve greater **efficiency in the transport sector**, since high fuel prices act as an incentive to conserve fuel. High fuel prices not only help save valuable oil resources (and foreign currency for oil-importing countries) but would also help **cut emissions** – both at the local level (e.g. SO<sub>2</sub>, particulates, etc.) and at the global level (CO<sub>2</sub>).



## Fuel Prices & Energy Efficiency

= Population **X**

### Energy Demand

= Population **X**

Trips p.a. and capita **X** km per trip

Derived freight trips p.a. and capita **X** km per trip

Energy intensity per km

Bus / Rail  
Cycling / Walking  
Car / Truck

Mode Shift

Improve Unit Efficiency

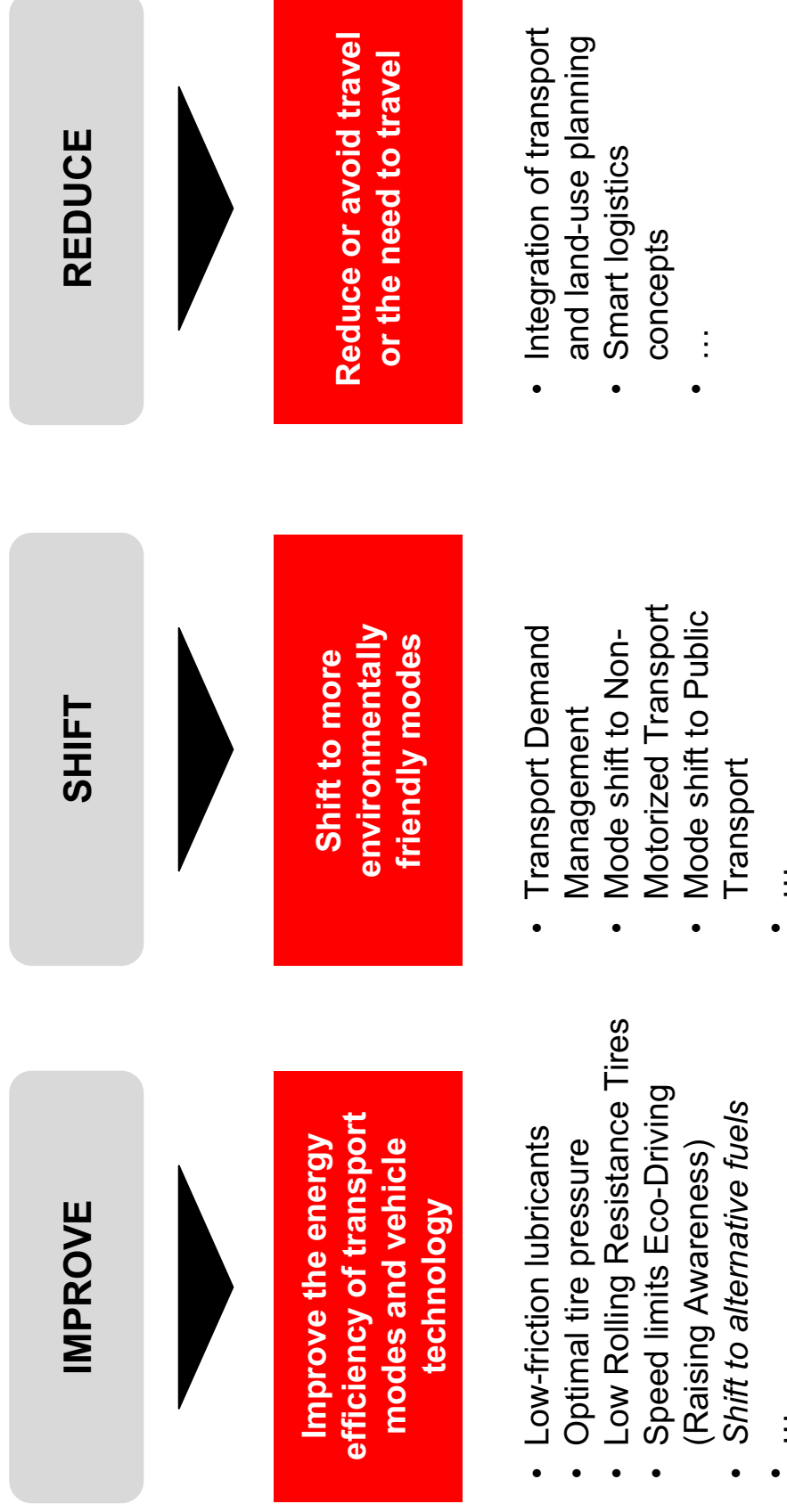
Avoid / Improve

### Aspects

- Average daily travel time per capita is relatively constant
- Strong urbanisation trends correspond with higher personal incomes and higher car ownership
- Higher car ownership means higher travel speeds
- → more mileage per capita



## The three basic routes to improve energy efficiency





## The toolbox of instruments

### PLANNING INSTRUMENTS

e.g. land use planning, planning of public transport, planning of non-motorised modes

### REGULATORY INSTRUMENTS

e.g. emissions standards, speed limits, parking regulation, physical restrictions

### ECONOMIC INSTRUMENTS

e.g. fuel taxes, vehicle taxation, road pricing, subsidies, parking fees

### INFORMATION INSTRUMENTS

e.g. public awareness campaigns, traffic information systems,  
public transport information systems

### TECHNOLOGICAL INSTRUMENTS

e.g. fuel improvement, cleaner engines

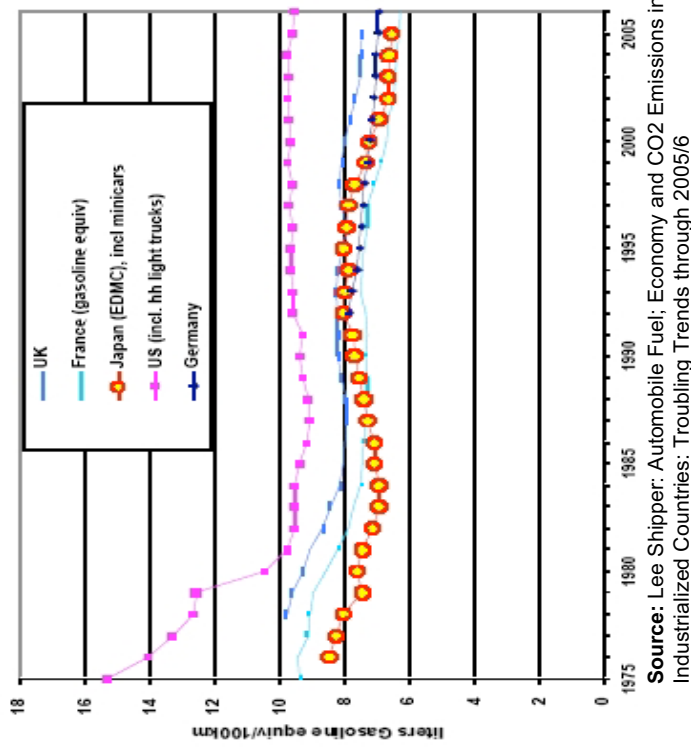


# Fuel Prices and Energy Consumption

Impact – what we do know / what we don't know

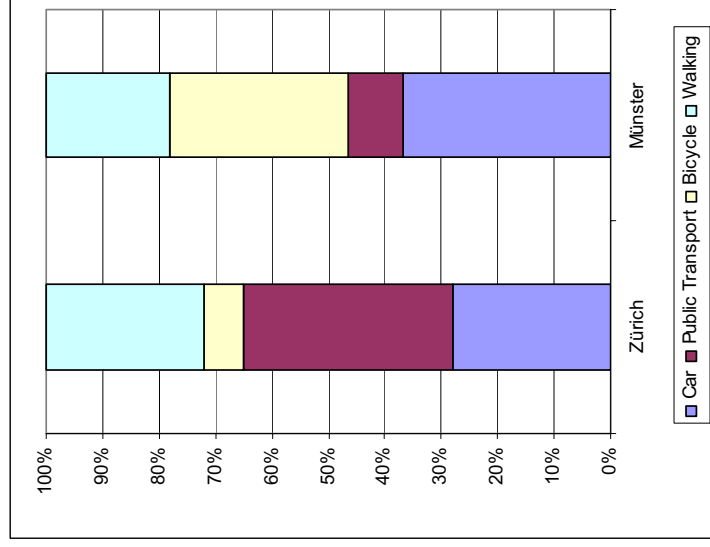
Certainty

Mileage / mode share / type of vehicle



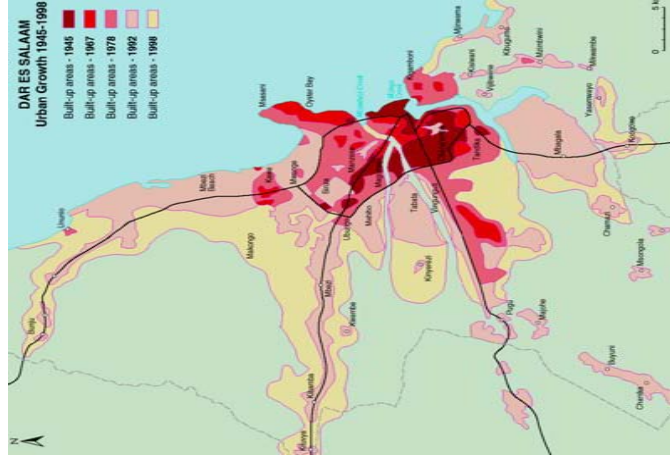
Elasticity: -0.5 to -0.7  
(fleet fuel intensity)

Mode share / mileage / type of vehicle



Elasticity: -0.2 to -0.3  
(vehicle use)

Land use / spatial development



Source: GTZ Sourcebook Module "Land use planning"

Elasticity: n/a, long term

# .....Negative effects of fuel subsidies



**In-efficient driving patterns**

**Low fuel economy**

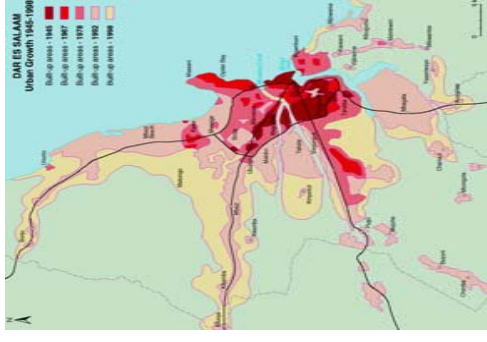
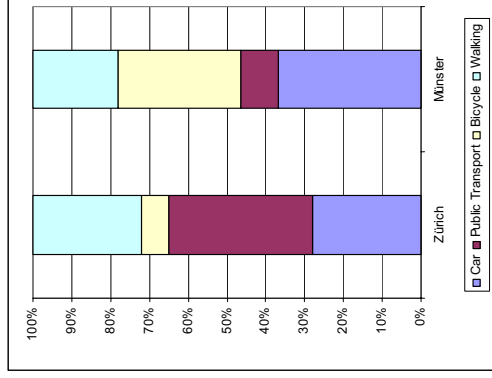
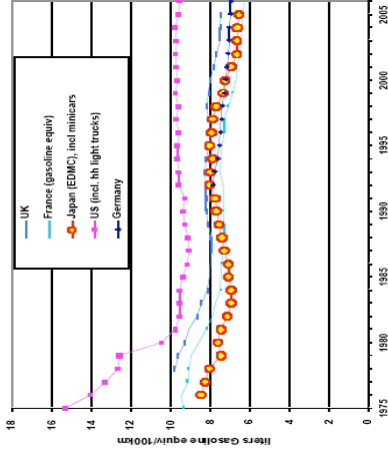
**Increasing size of vehicles**

**High share of private means**

**Low share of cycling / walking even for short distances**

**Excessive commuting**

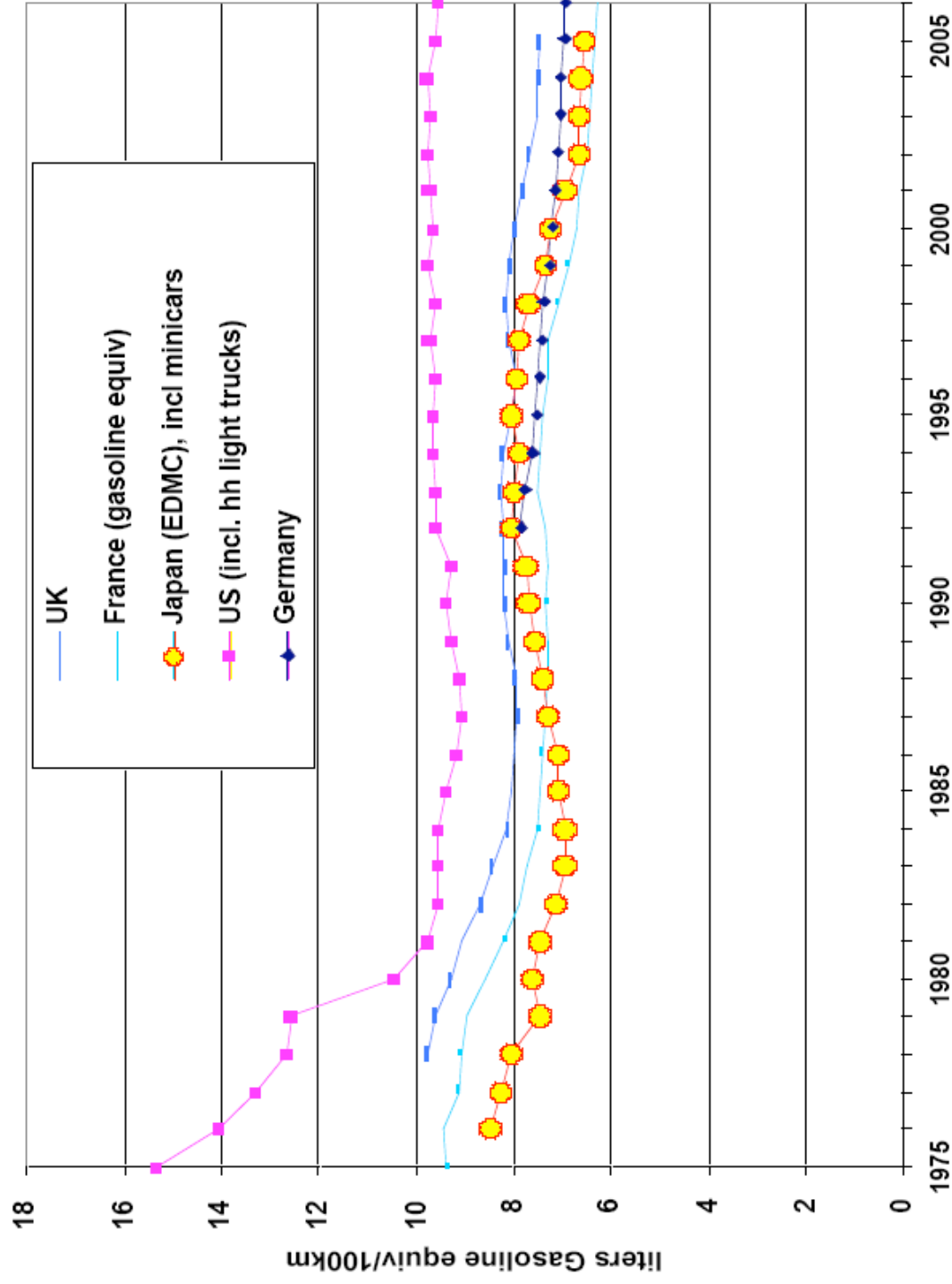
**Sprawl / Low densities**



**Mutually Reinforcing**



# ..... fuel taxes DO work



Source: Lee Shipper – Automobile Fuel; Economy and CO2 Emissions in Industrialized Countries: Troubling Trends through 2005/6: „New vehicle sales-weighted fuel economy gasoline equivalents for each year shown, using each country/region’s testing procedures, from each country’s official publications.”



## **DaimlerChrysler (DCX) CEO Tom LaSorda U.S. House Subcommittee on Energy and Air Quality (2007)**

- He called for the U.S. to adopt policies that use market forces to drive consumer demand in order to improve the fuel economy of the U.S. vehicle fleet and fight climate change.
- The European vehicle fleet gets 50% better fuel economy than the U.S. fleet because European policies leverage demand and market forces, he said. **"They've highly taxed gasoline, making the price three times higher than in the U.S., and they have incentives on diesel fuel. As a result of these policies, fuel economy is always high on a customer's list and not just when there's a spike in fuel prices."**



## **Key indicators / issues – Energy Efficiency (for political communication, design of policies):**

- **Elasticities (short-, medium-, long-term) based on current fuel price levels**
- **Type and scope of additional measures (mitigation, adaptation)**
- **Case Studies, best-/good-practices**





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  - Subsidies
  - Fuel Prices & Energy Efficiency

- ▶ **The way forward**





### **Key indicators / issues – Governance (rationalising fuel price policies):**

- Level of fuel taxation earmarked for road maintenance (min 10 US-cent)
- Contribution to state finances (as %)

### **Key indicators / issues – Pricing Mechanisms (important to overcome subsidies):**

- Level of pass through (= or > 1 in mid-/long run)
- (Political) resilience of pricing mechanism to price shocks
- Good practices (targeting/mitigation)

### **Key indicators / issues – Energy Efficiency (for political communication; design of policies):**

- Elasticities (short-, medium-, long-term) of current fuel price levels
  - Type and scope of additional measures (mitigation, adaptation)
  - Case Studies, best-/good-practices
- **WANTED: International Dialogue on Practical Solutions, Best-/Good Practices, Peer-to-Peer exchange**



- **Next Steps**
- Next Survey will be conducted in November 2008 for more than 170 countries
  - Facilitation of international dialogue: Newsgroup with fortnightly newsletter on recent trends, news and publications ← **SUBSCRIBE NOW**
  - Observation of international trends: Continuous Update Reading List + Further Sources List / Global Tracking List
  - Focus of next publication on Energy Efficiency (short-, mid- and long-term options) and Pricing Mechanisms
  - All information available on: [www.gtz.de/fuelprices](http://www.gtz.de/fuelprices)