

# Sustainable Logistics in Europe: *the Carbon Agenda*

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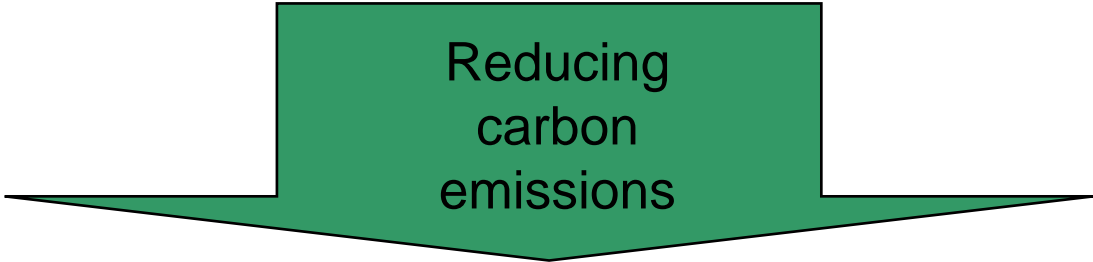
ETTAR Dialogue Forum  
Brussels

9<sup>th</sup> September 2008

# Dilemma for the EU

Reconciling economic and environmental objectives

Environmental sustainability



Reducing  
carbon  
emissions



Improve vehicle utilisation




Shift mode to rail and water



Increase energy efficiency



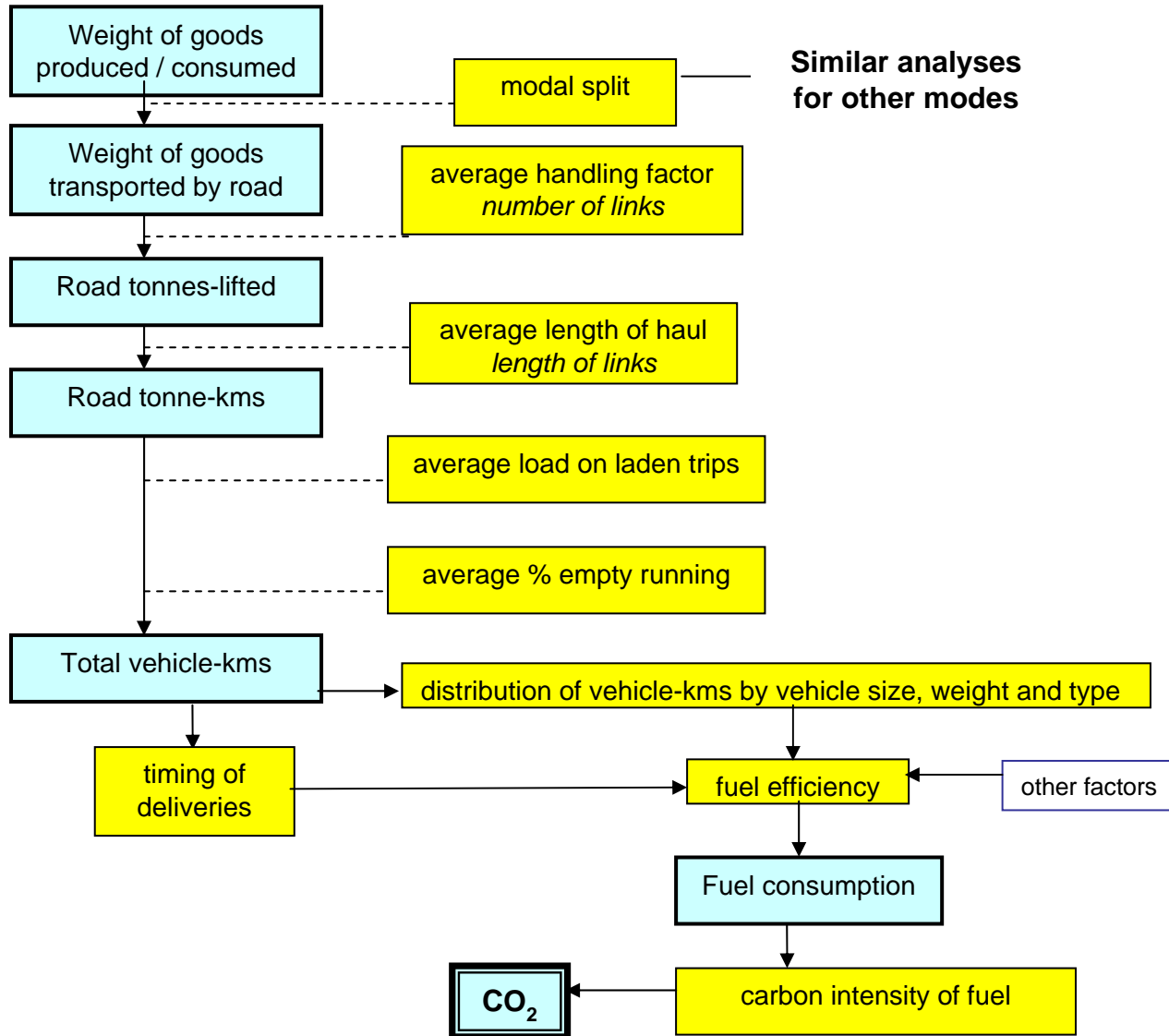
Reduce carbon intensity of energy



Increasing  
freight transport  
intensity

Greater prosperity  
Economic Integration  
Social Cohesion

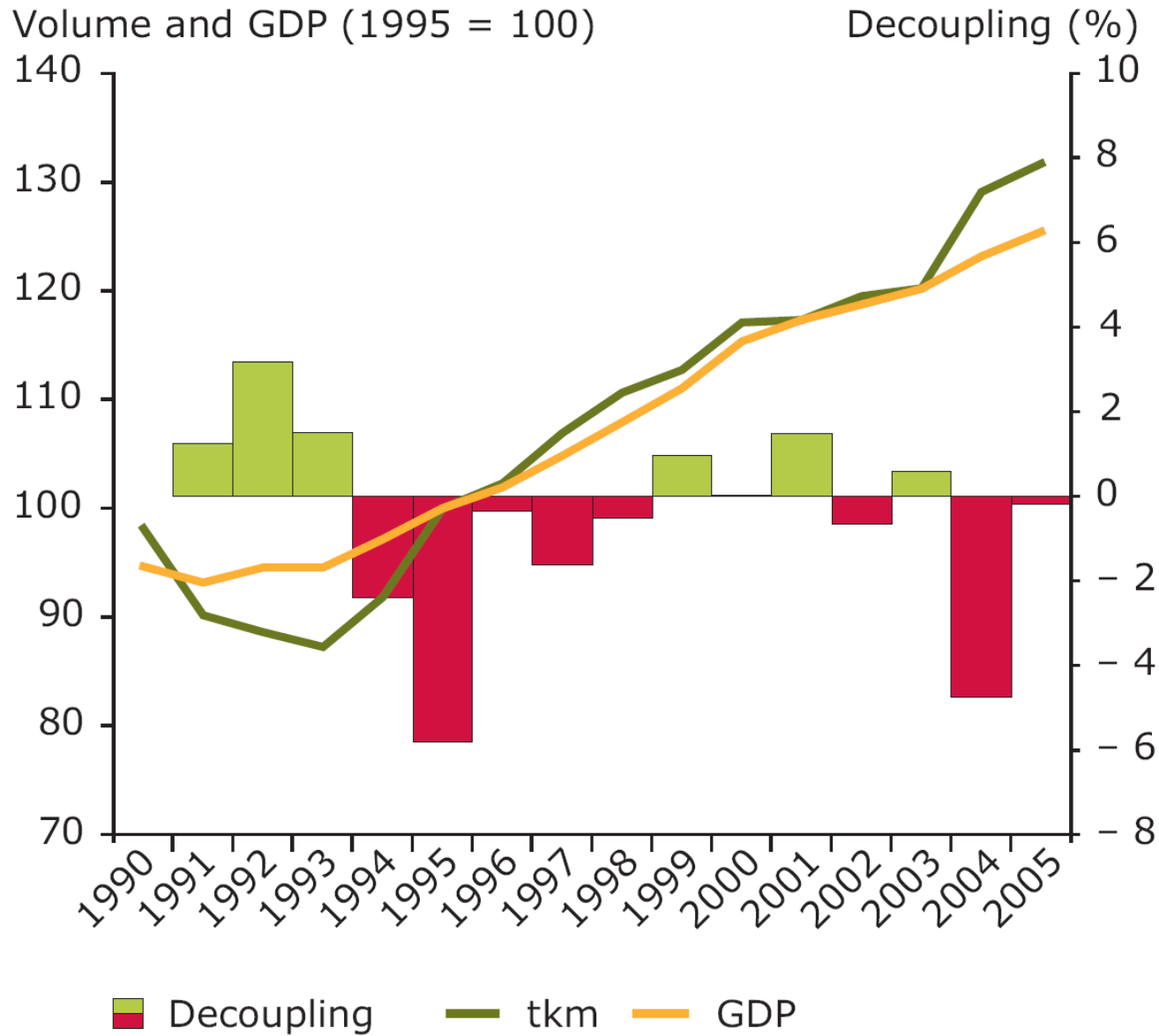
# Decarbonisation Framework for Freight Transport ('9-lever model')



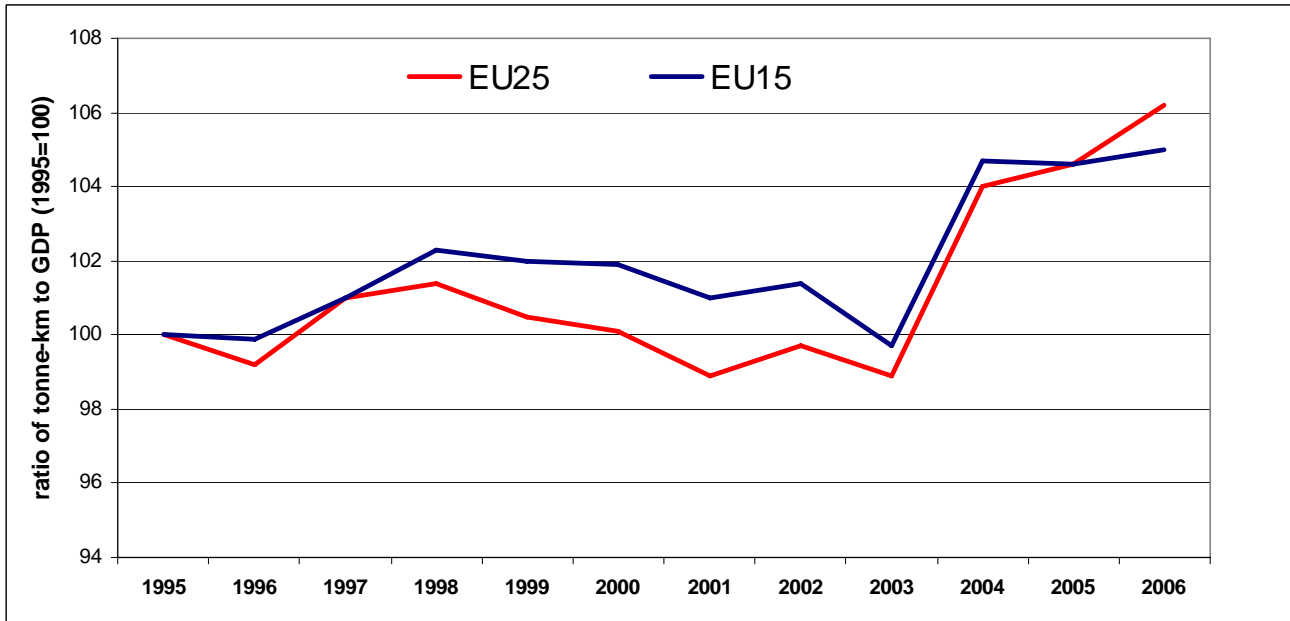
aggregate

key parameter - lever

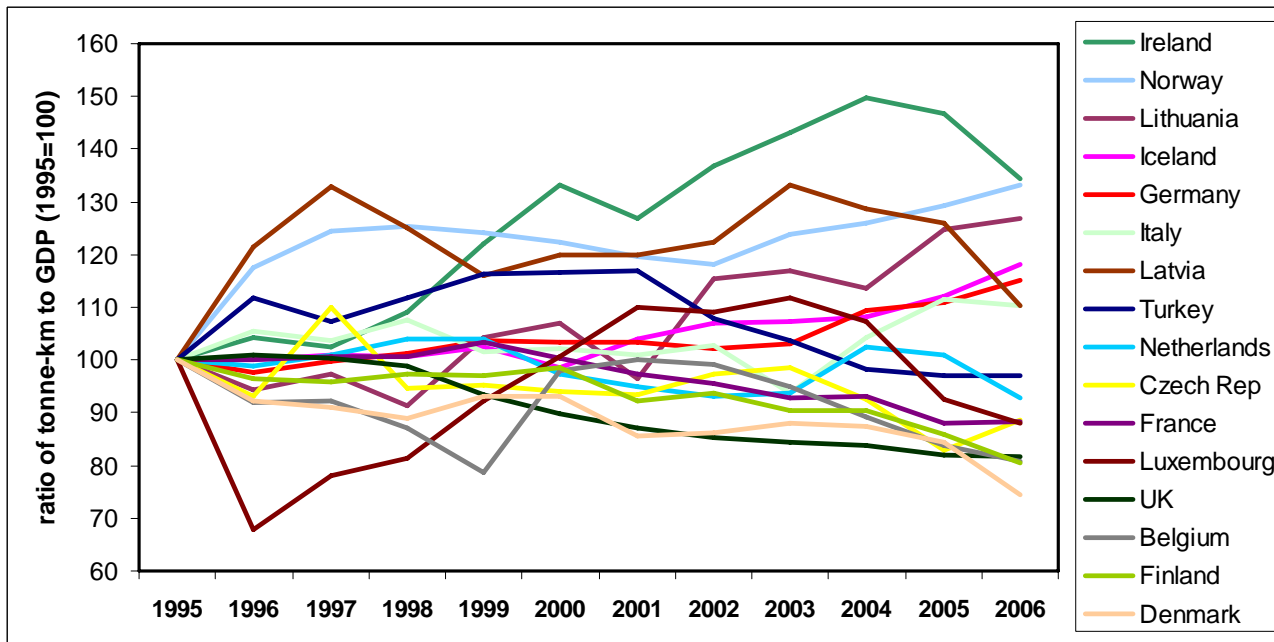
# Relationship between Tonne-kms and GDP (EU15)



# Freight Intensity of the EU Economy

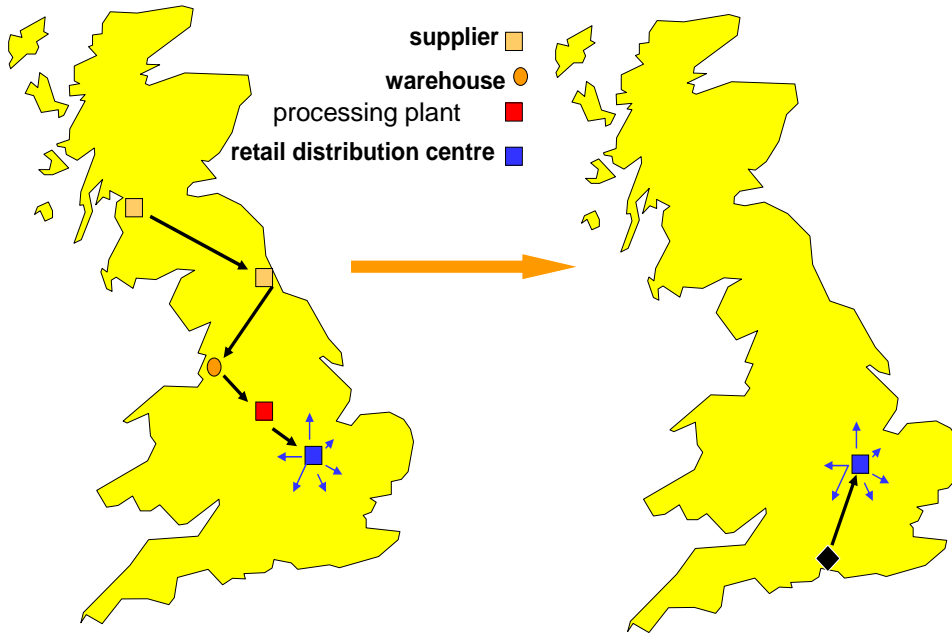


Source: Eurostat



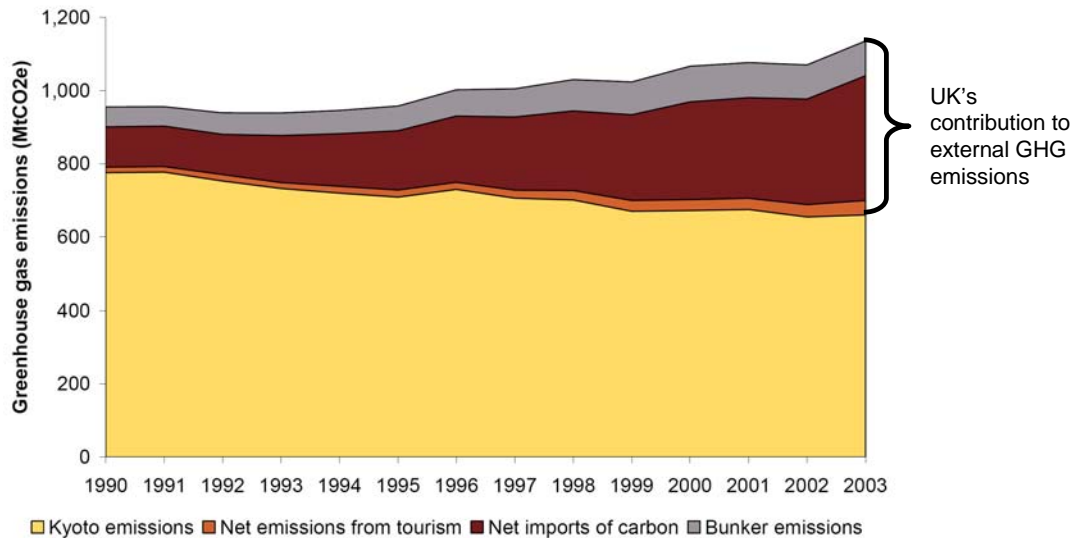
Why do the freight intensity trends vary so much between EU countries?

# Off-shoring of Manufacturing and the Upstream Supply Chain



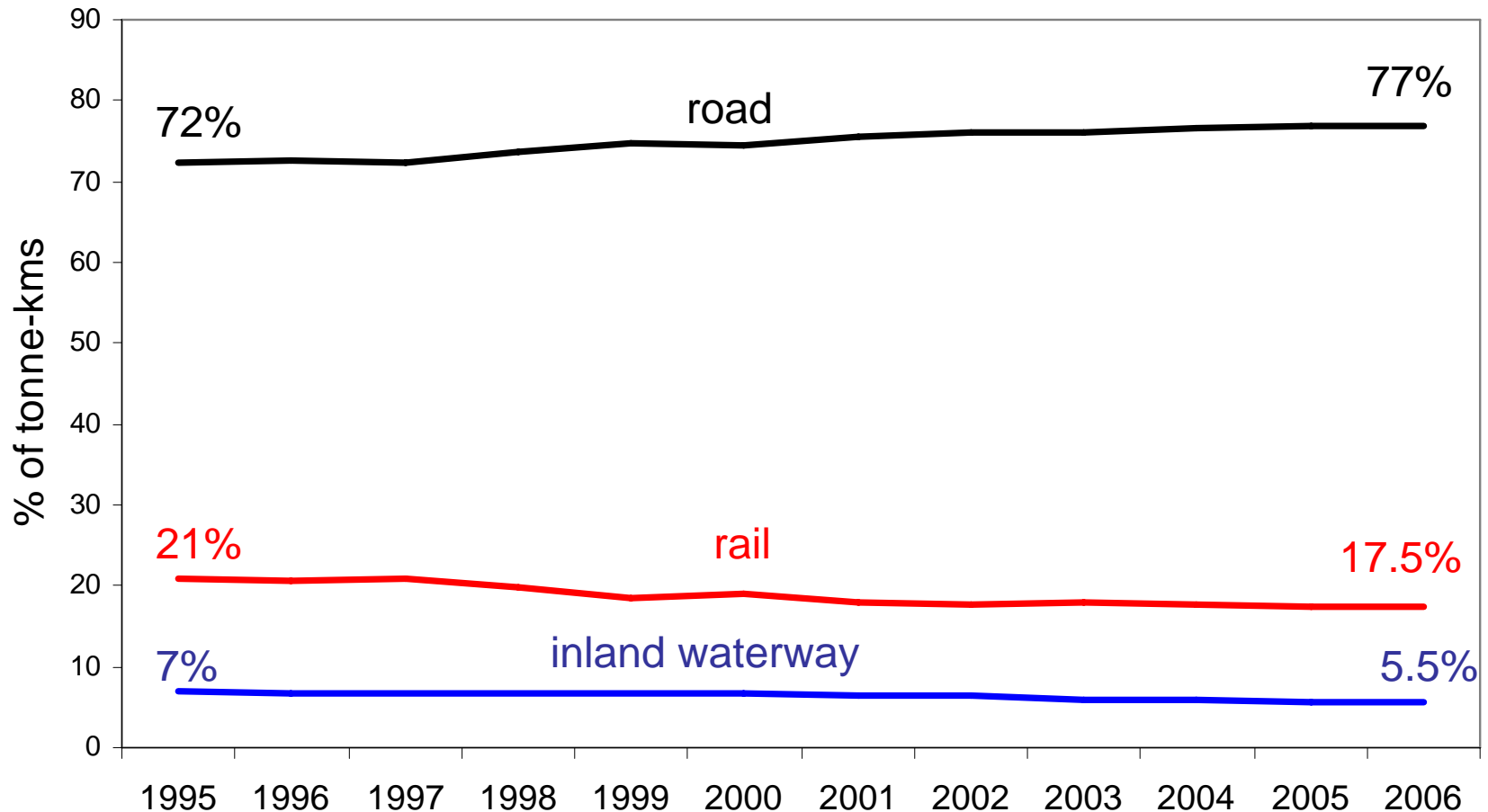
Export of carbon-generating activities reducing UK's 'carbon footprint'

Embedded carbon in imported products



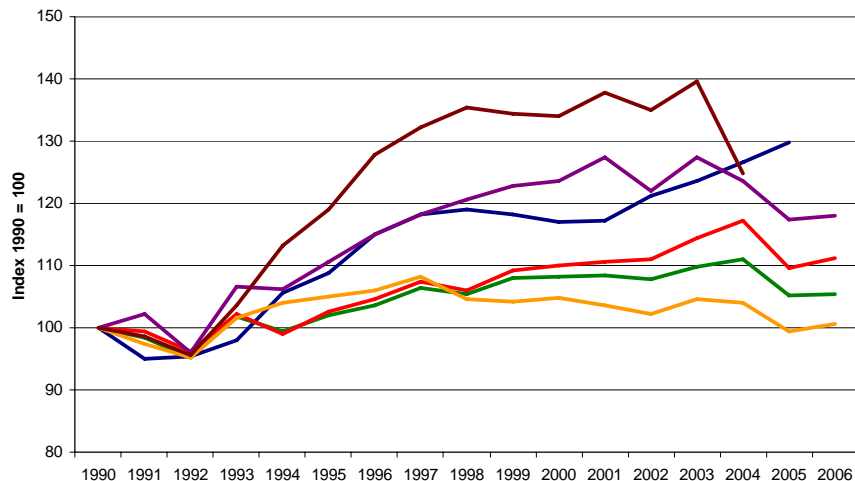
# Modal Shift to Road (EU25)

% of total inland freight tonne-kms



# Analysis of Business-as-Usual Trends

- Some BAU trends going in the wrong direction - reverse
- Some BAU trends heading in right direction - reinforce
- Uncertainty about the direction and strength of some trends - analysis / validation



Estimates of the trend in CO<sub>2</sub> emissions from UK road haulage

- Difficult to forecast future BAU trends – given recent trend breaks

Delphi survey to assess expert opinion on future BAU trends in the UK

Projected change in key freight / logistics parameters 2006-2020

Source: Piecyk and McKinnon 2008

total tonne-kms + 25%

average length of haul -1%

average no. of links in supply chain: no change

average load factor: +12%

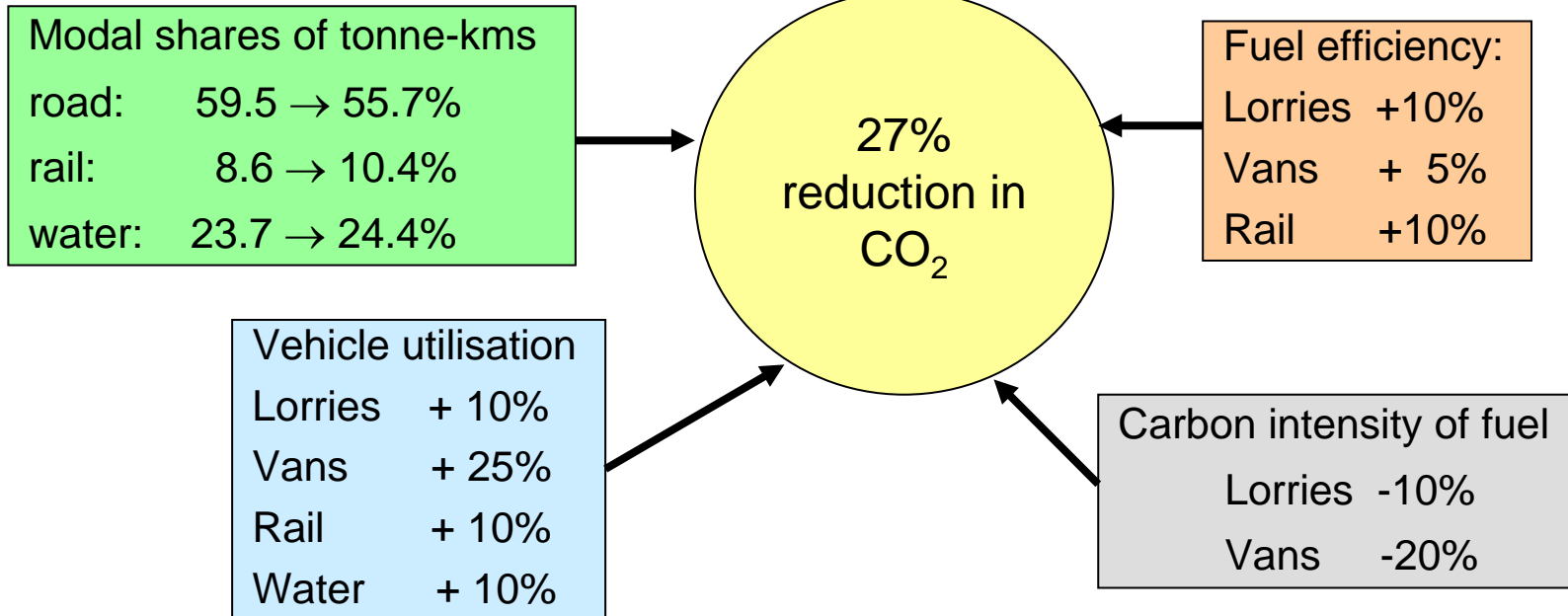
empty running -18%

rail freight share +27%

# Freight Transport CO<sub>2</sub> : Aspirational Scenario for UK 2015

*Baseline 2004*

Volume of freight movement (tonne-kms) + 7%



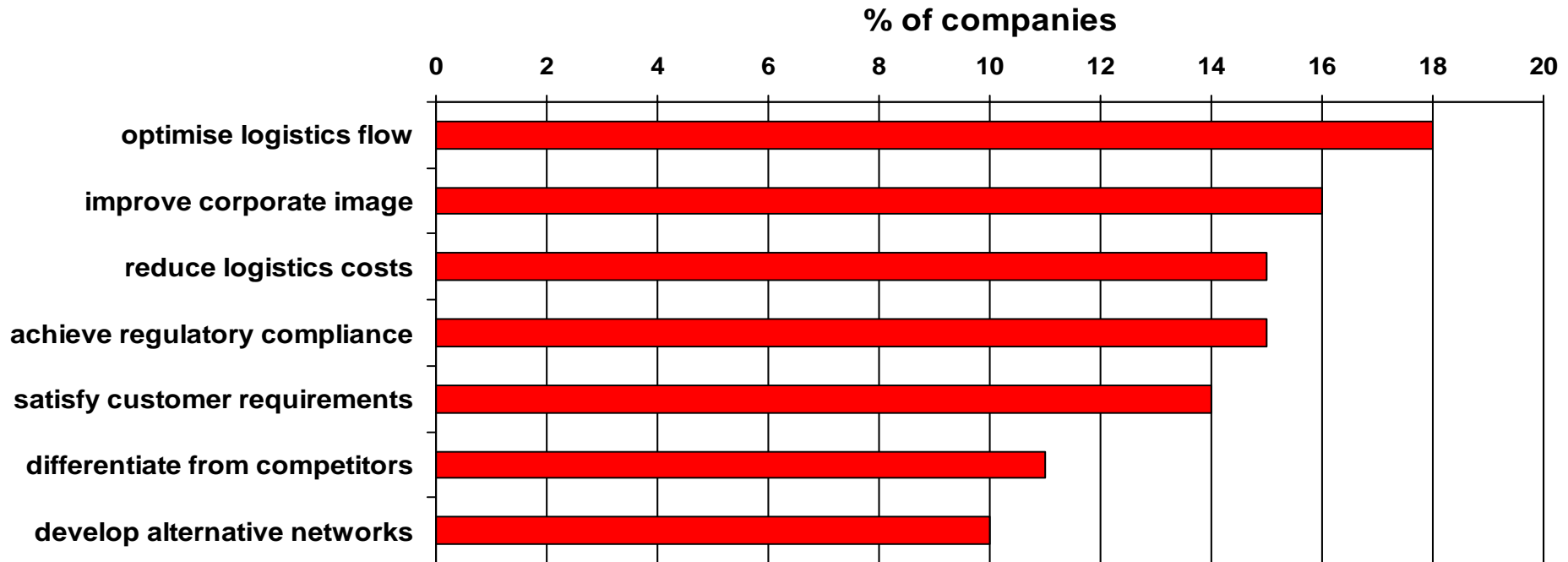
# Levels of Logistical Decision-making

- STRATEGIC: numbers, locations and capacity of factories and warehouses  
Restructuring of logistical systems
- COMMERCIAL: trading links to suppliers, customers and sub-contractors  
Reconfiguring supply chains
- OPERATIONAL: scheduling of production and distribution operations  
Rescheduling of freight flows
- FUNCTIONAL: day-to-day management of the logistics function  
Changes in the management of freight transport

Interaction between decisions at different level determines volume of freight traffic and related externalities

Green measures implemented a lower levels offset by effects of higher level strategic decisions

# Main Drivers for Green Logistics



No reference to a desire to save the planet or wider CSR objectives

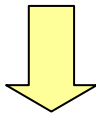
Sample: 600 companies (UK 43% France 26% USA 12% Japan 7% other Europe 12%)

Source: Bearing Point – Insight Survey ‘2008 Supply Chain Monitor- how mature is the Green Supply Chain’

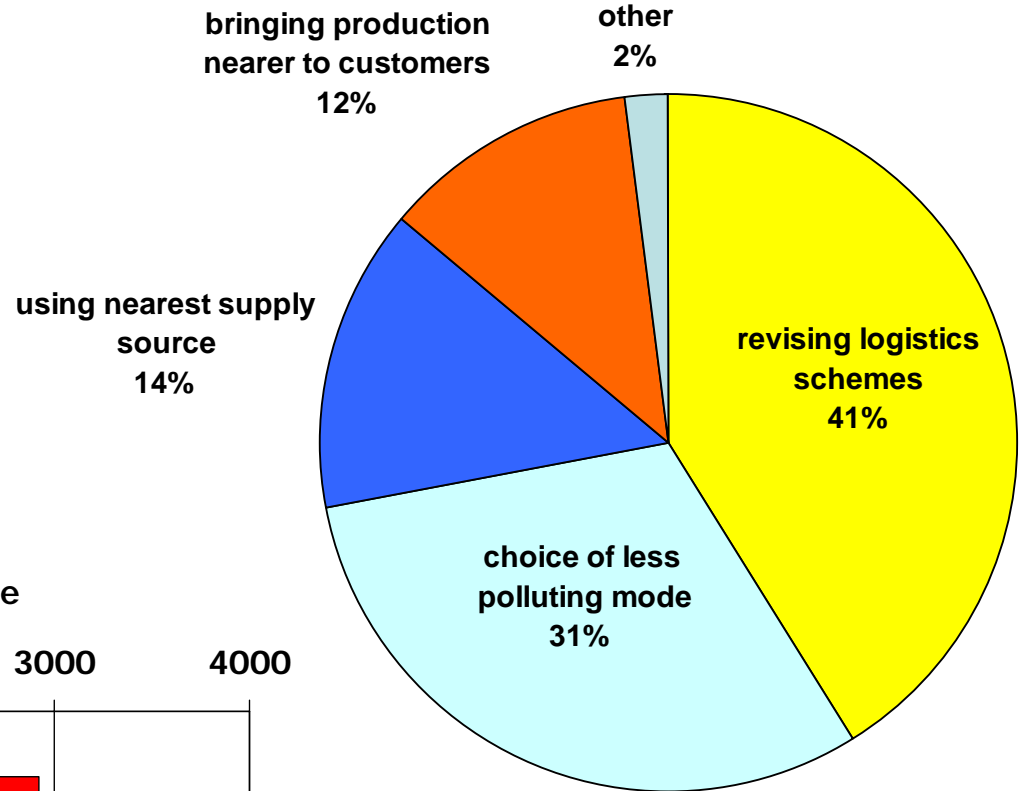
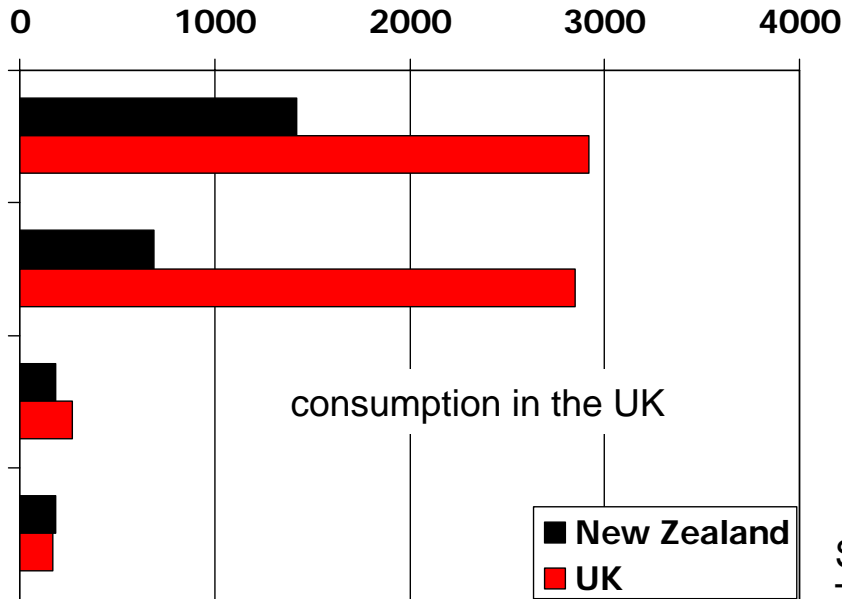
# Green Logistics actions undertaken

Localisation of sourcing does not necessarily reduce total CO<sub>2</sub> emissions

Need to conduct full life cycle analysis to determine CO<sub>2</sub> impacts



kg of CO<sub>2</sub> per tonne

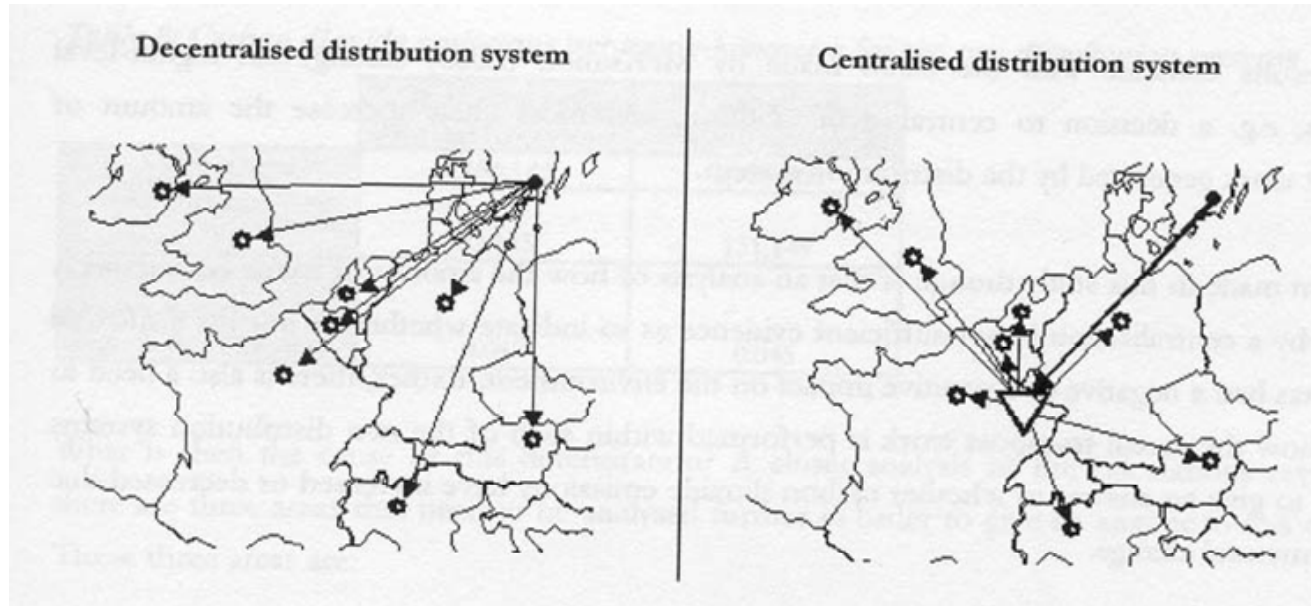


Source: Bearing Point – Insight Survey

Source: Saunders, Barber and Taylor, 2006

# Environmental Trade-offs in Strategic Logistics Decisions

*ITT Flygt – manufacturer of submersible pumps and mixers*



	<i>Decentralised</i>	<i>Centralised</i>
Average length of haul	1512 km	2153 km
Total tonne-kms	2.2 million	2.9 million
CO <sub>2</sub> emissions	92.2 tonnes	131.1 tonnes

Source: Kohn 2005

# Modelling Energy / CO<sub>2</sub> Trade-offs between Transport, Warehousing, Materials Handling and Inventory

## Potential CO<sub>2</sub> Benefits from Inventory Centralisation:

Lower inventory levels:

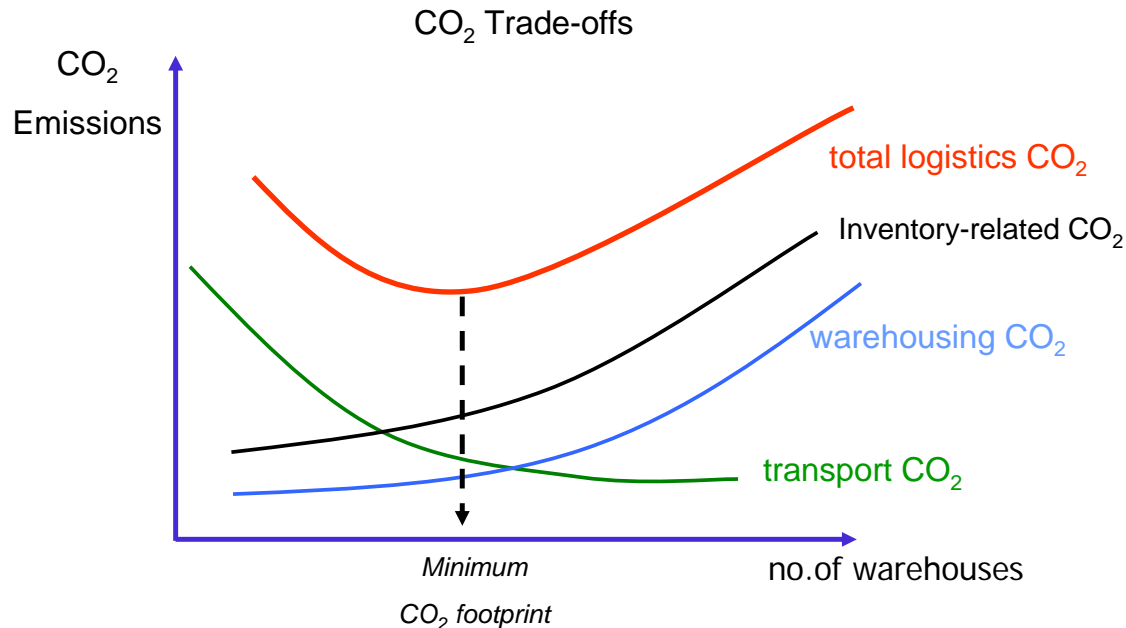
- less energy use in storage (heating, refrigeration, lighting etc.)*
- less wastage of product*

Less warehouse space required:

- less CO<sub>2</sub> in construction, operation and maintenance*

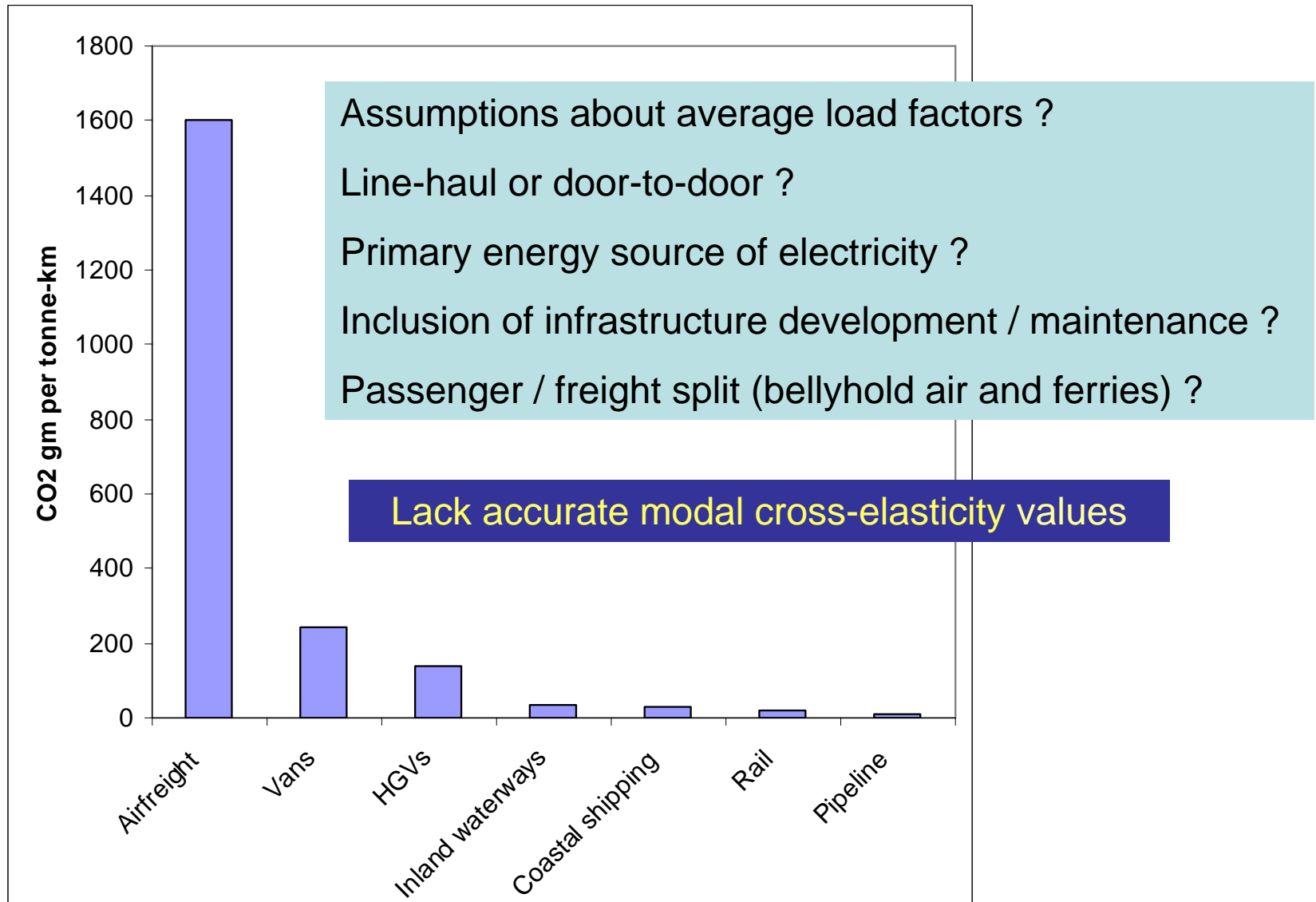
Larger warehouses can be more energy efficient:

- emit less CO<sub>2</sub> per unit of throughput*



# Assessing the carbon benefits of freight modal shift

## Variations in CO<sub>2</sub> Intensity by Freight Transport Mode



→ FreightBestPractice *Department for Transport*

London Construction Consolidation Centre

Case Study




Transport for London

→ FreightBestPractice *Department for Transport*

Make Back-loading Work for You


Guide



→ FreightBestPractice *Department for Transport*

Working Together to Improve the Operational Efficiency of Regional Distribution Centres (RDCs)


Guide



→ FreightBestPractice *Department for Transport*

Telematics for Efficient Road Freight Operations

Guide




## UK Government 'Freight Best Practice' Programme

[www.freightbestpractice.org.uk](http://www.freightbestpractice.org.uk)

→ FreightBestPractice *Department for Transport*

Consolidate and Save

Case Study






Company: JW Suckling Transport Ltd  
Location: Essex  
Fleet: 90 Tanker Vehicles

→ FreightBestPractice *Department for Transport*

Fuel Management Guide

Fuel Management Guide




   
FREIGHT TRANSPORT ASSOCIATION

→ FreightBestPractice *Department for Transport*

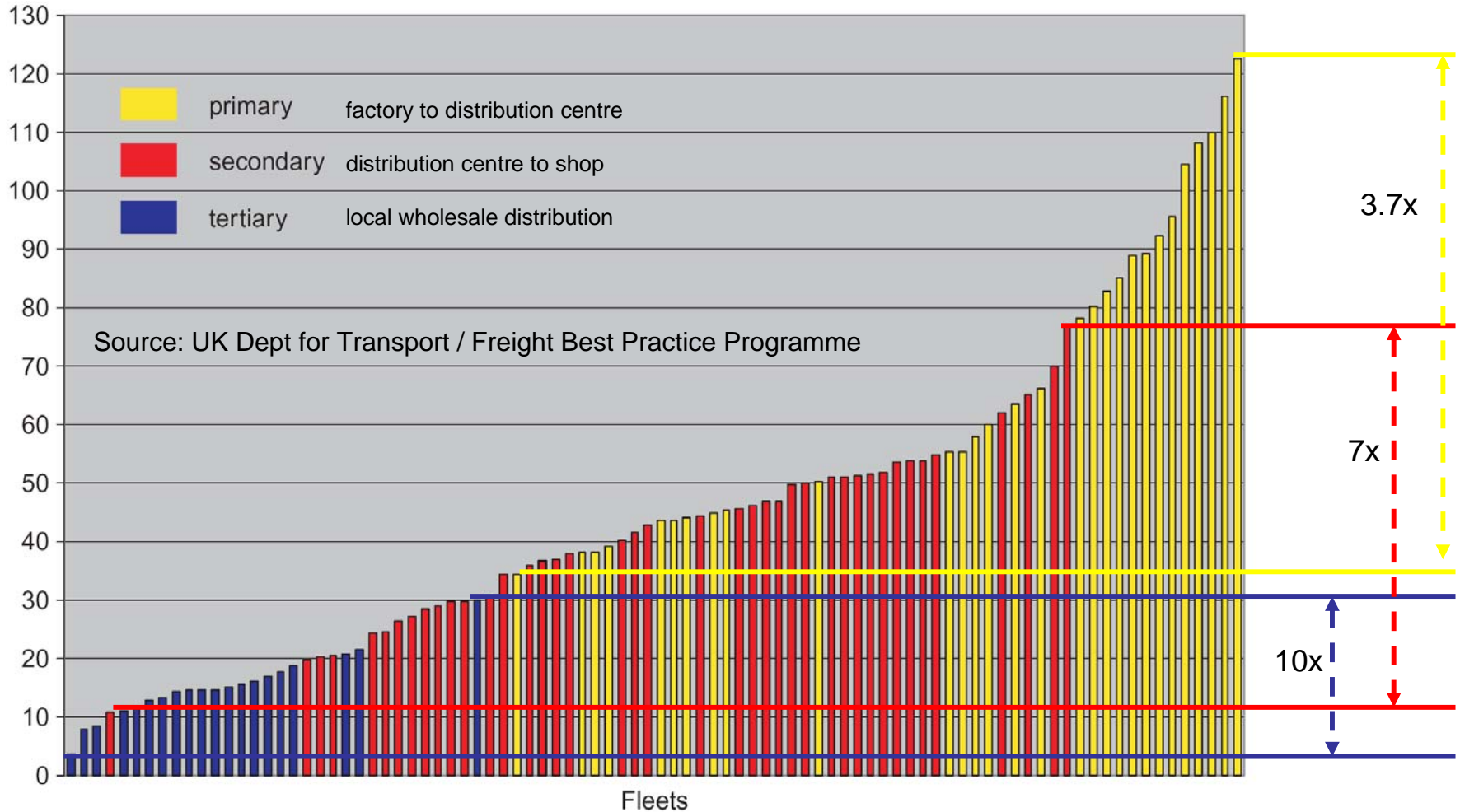
Aerodynamics for Efficient Road Freight Operations

Guide



# Variation in Energy Intensity of UK Food Distribution (2007)

*pallet-kms per litre*

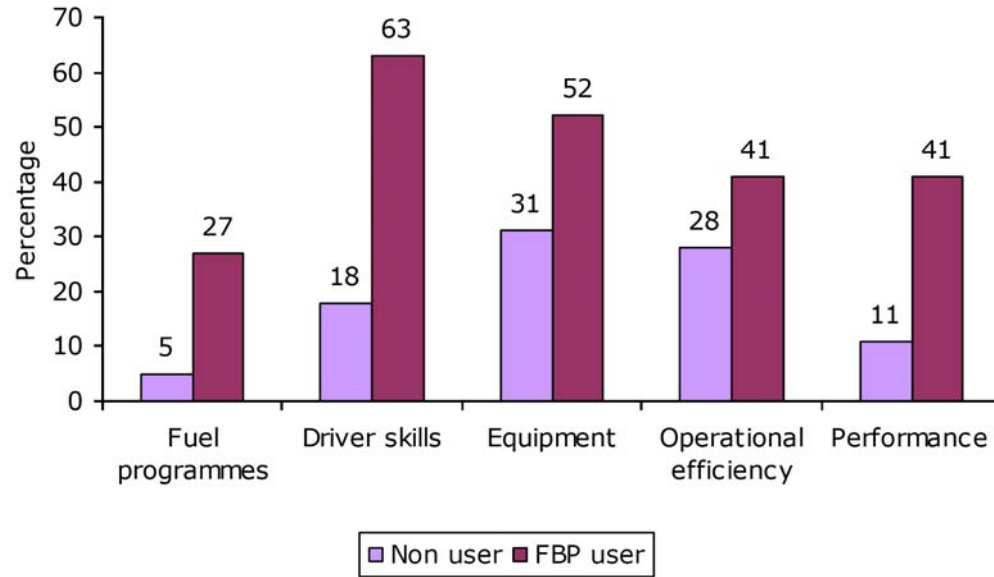


2002 Benchmark survey in food supply chain  
Fleets below mean raise energy efficiency to:

Sub-sectoral mean:	5% cut in CO <sub>2</sub>
Mean of top 1/3 in sub-sector:	19% cut in CO <sub>2</sub>

# Cost-effectiveness of the UK Freight Best Practice Programme

Fleet size	Aware of programme	Used programme
1 vehicle	20%	6%
2-14 vehicles	24%	9%
15+ vehicles	49%	24%
All fleets	24%	9%



Average fuel savings per fleet:

FBP users: £41,000

Non-users: £12,000

FBP cost 2004-6: £2m

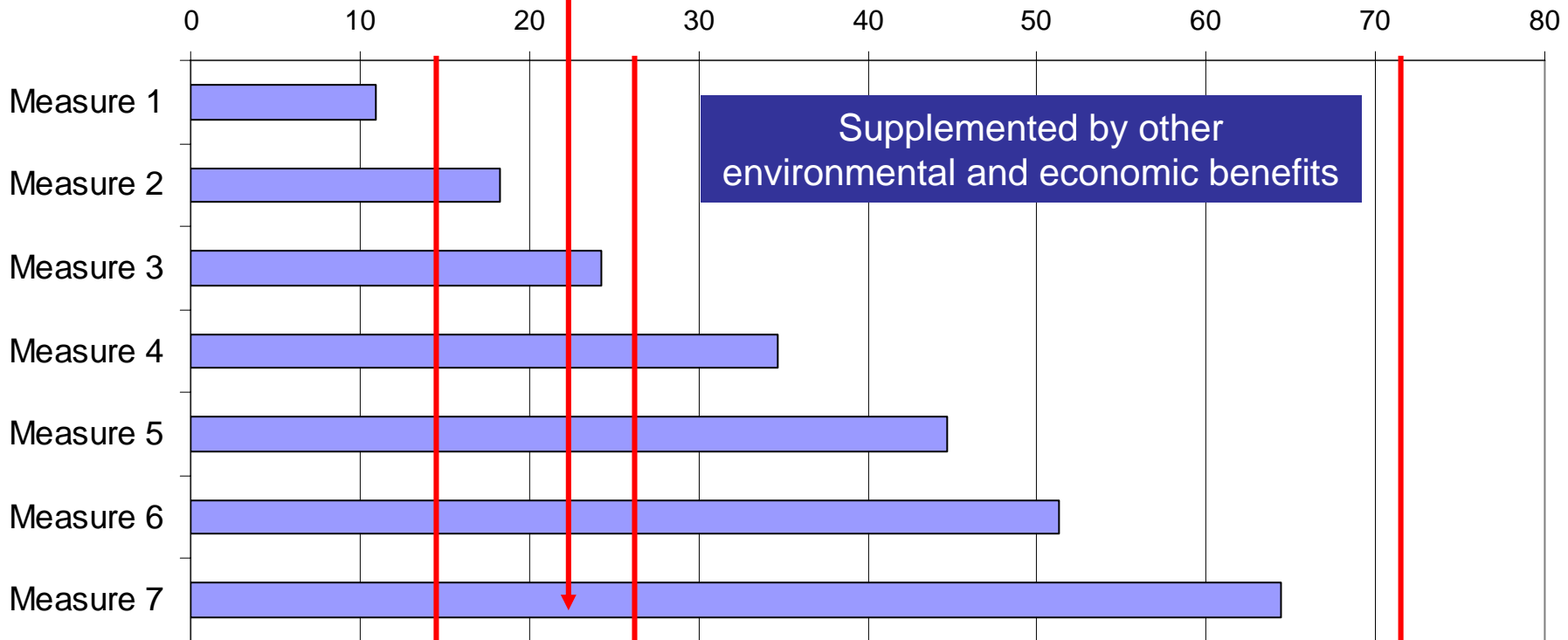
Estimated CO<sub>2</sub> savings: 240,000 tonnes

Cost per tonne of CO<sub>2</sub> saved: £8

# Economic Justification for Freight-related Carbon Abatement Measures

European Emission Trading Scheme phase 2  
£21 (Sept 2008)

£ per tonne of CO2 saved



Typical carbon offset cost £15

UK government shadow price of carbon £26.50

Stern social cost of carbon £72 (2006)

Supplemented by other environmental and economic benefits

# Supply Chain Carbon Auditing at Product Level



**May 2008:** Tesco puts carbon labels on own-brand varieties of orange juice, potatoes, energy-efficiency light bulbs and detergent

**August 2008:** Japanese government launches product-level carbon labelling scheme

Amount of time and effort in product level carbon auditing?

How will CO<sub>2</sub> labelling influence consumer behaviour?

Practicalities of putting a carbon rating on the label?

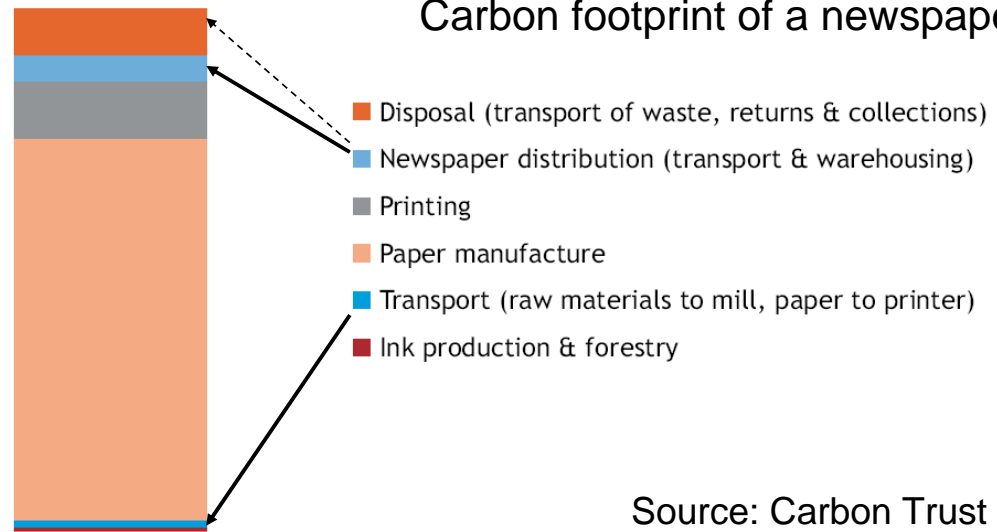
Pre-requisite for carbon trading at personal levels?

Paralysis by analysis?

'Fiddling while Rome burns...'

gm of CO<sub>2</sub> per newspaper

174



Carbon footprint of a newspaper

Source: Carbon Trust

UK-manufactured  
100% recycled newsprint\*

# Conclusions

- Projected growth of freight traffic in the EU presents a major environmental challenge
- Broad range of decarbonisation measures and incentives available
- At an operational level, close correlation exists between CO<sub>2</sub> and cost reductions
- Still much '*low hanging fruit*' to be harvested in the '*logistics garden*'
- Exploiting self-financing green measures will not be enough
- Need stronger green commitment / mindset – especially at strategic level
- On a life cycle basis, minimising freight movement need not minimise total CO<sub>2</sub>
- Economic incentives should be targeted on modal choice, vehicle utilisation and fuel efficiency: *limited fiscal leverage on logistics / supply chain structures and wider business trends*
- Freight transport / logistics will eventually be covered by emissions trading scheme
- Seriously question the costs & benefits of product-level carbon auditing and labelling

# Contact details

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<http://www.sml.hw.ac.uk/logistics>



[www.greenlogistics.org](http://www.greenlogistics.org)