

CO₂ Emissions from Freight Transport

An Analysis of UK Data

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LRN Conference 2007

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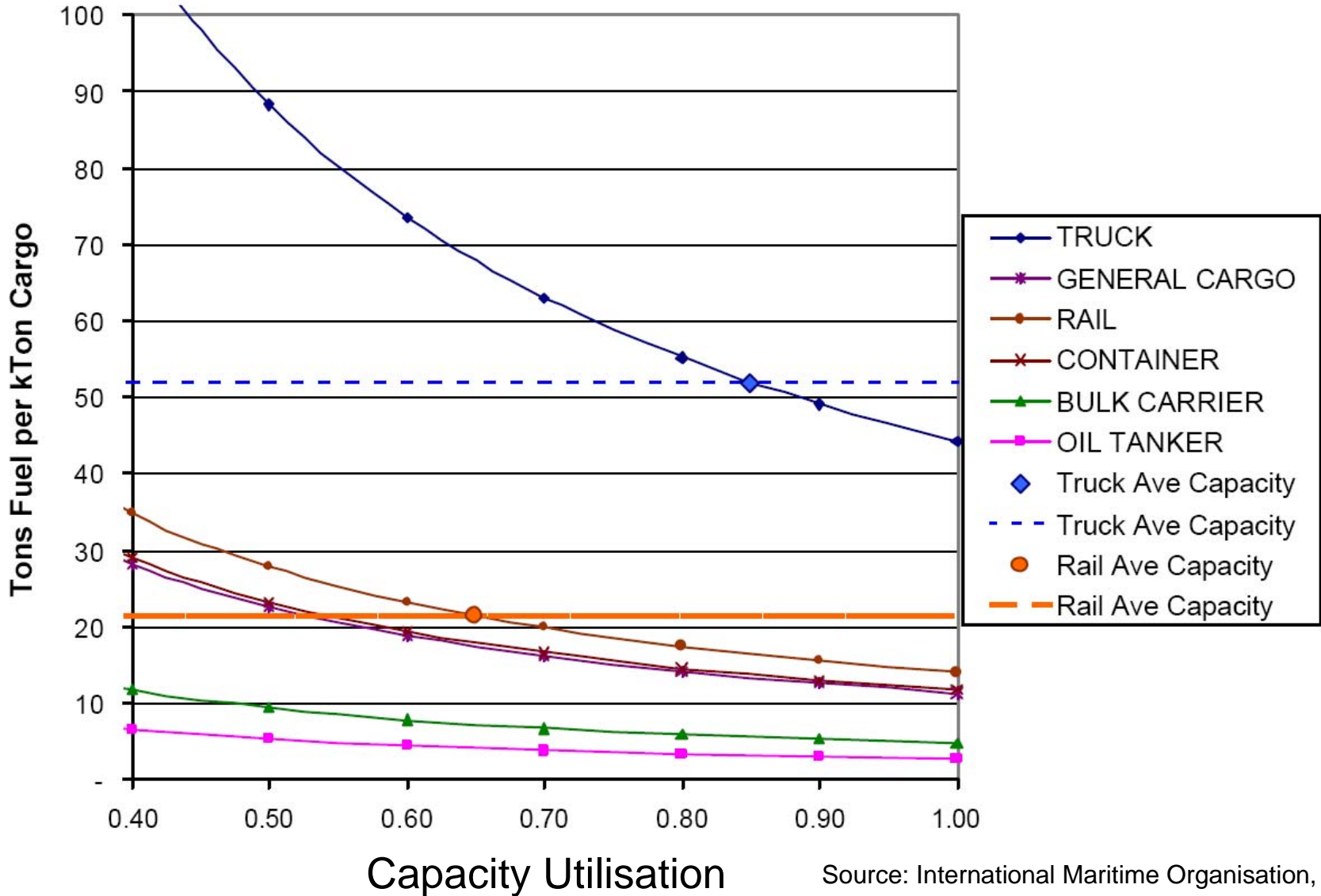
Estimation Methods

- Input-based measures:
 - top-down
 - based on energy / fuel purchases
 - sectoral - classified by dominant activity
- Output-based measures;
 - bottom-up
 - based on surveys of freight transport operations
 - cross-sectoral
 - multiply volume of freight movement by CO₂ emission factor
tonne-kms x CO₂ per tonne-km

Caveats

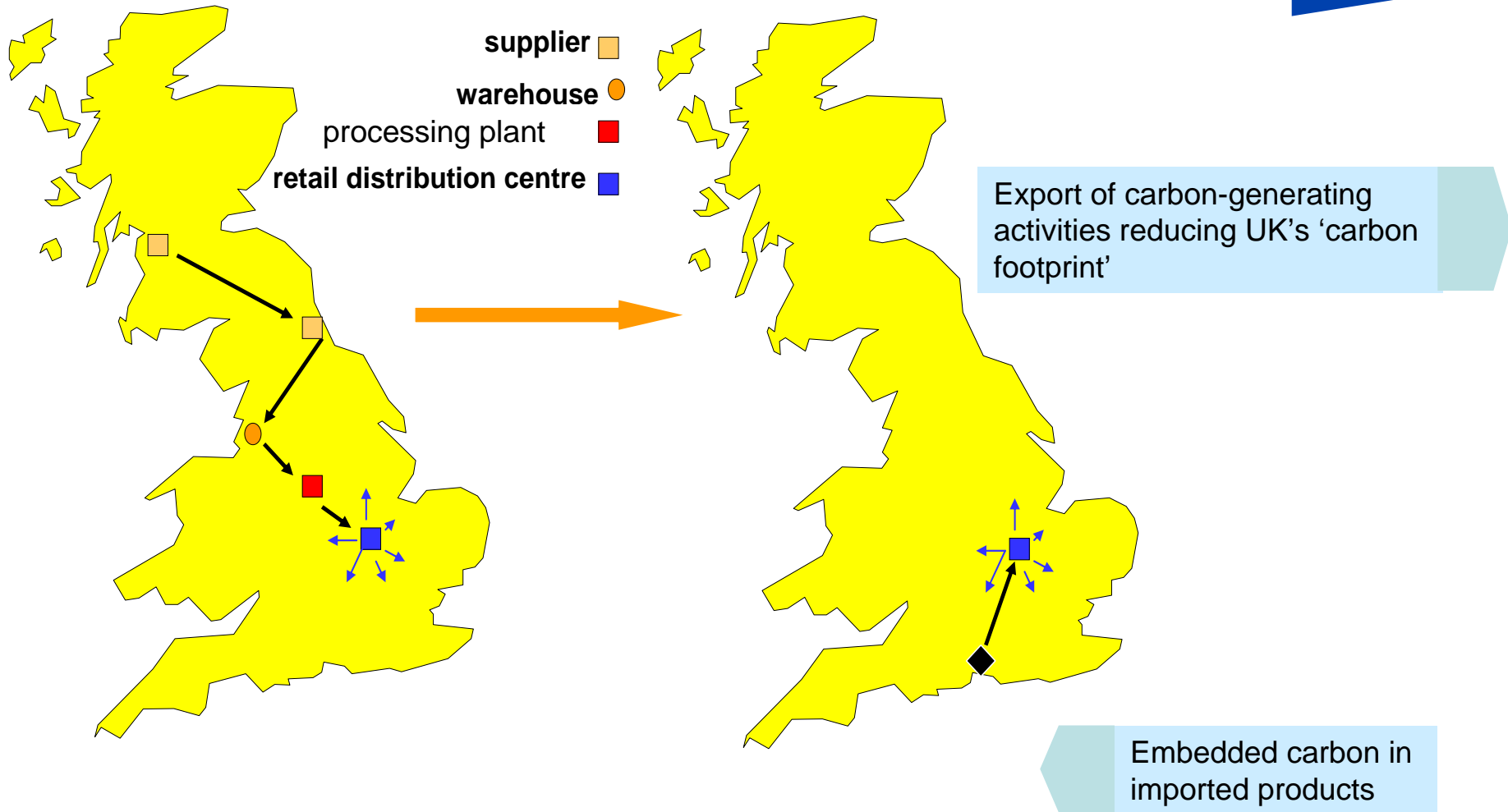
- Assumptions about the utilisation of vehicle capacity
- Use of parameters derived from international studies
 - e.g. IFEU, INFRAS, Tremove
 - *differences in primary energy mix, transport infrastructure, vehicle age profile etc.*
- National 'environmental accounts' estimate CO₂ emissions only from British companies and on a sectoral basis
- Use of tonne-kms as the measure of freight transport activity
- Movement of freight in passenger vehicles: *allocation issues*
- Focus on CO₂ – excluding other global warming gases:
 - e.g. N₂O – *roughly 1% of carbon equivalent emissions from HGVs*
- Analysis confined to CO₂ emissions from domestic freight transport

Modal Energy Intensity and Capacity Utilisation



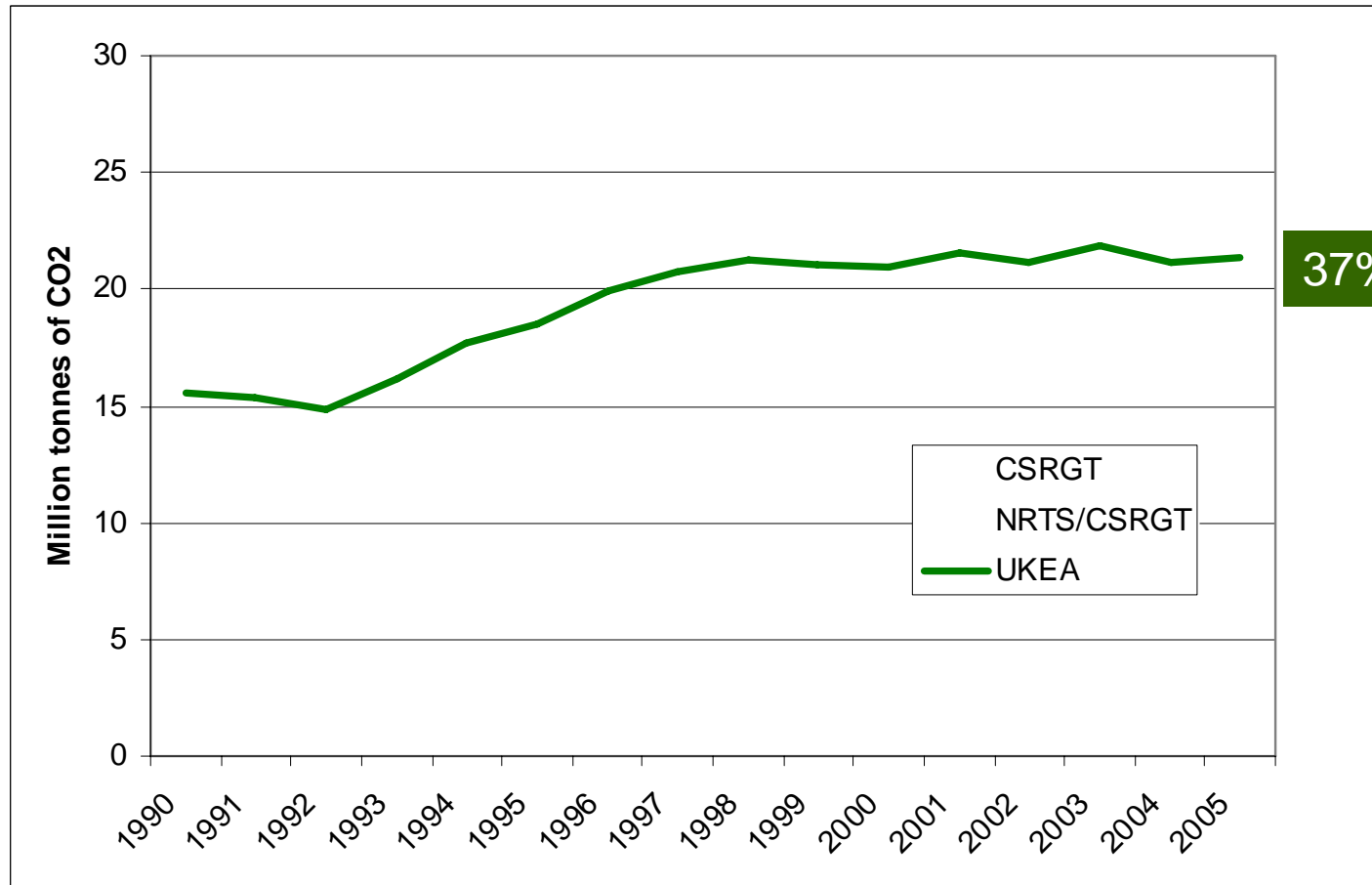
Source: International Maritime Organisation, 2000

Off-shoring of Manufacturing and the Upstream Supply Chain



UK contributing to the growth of freight-related CO₂ emissions in exporting countries + growth of CO₂ emissions from international transport

Trends in CO₂ Emissions from Road Freight Transport

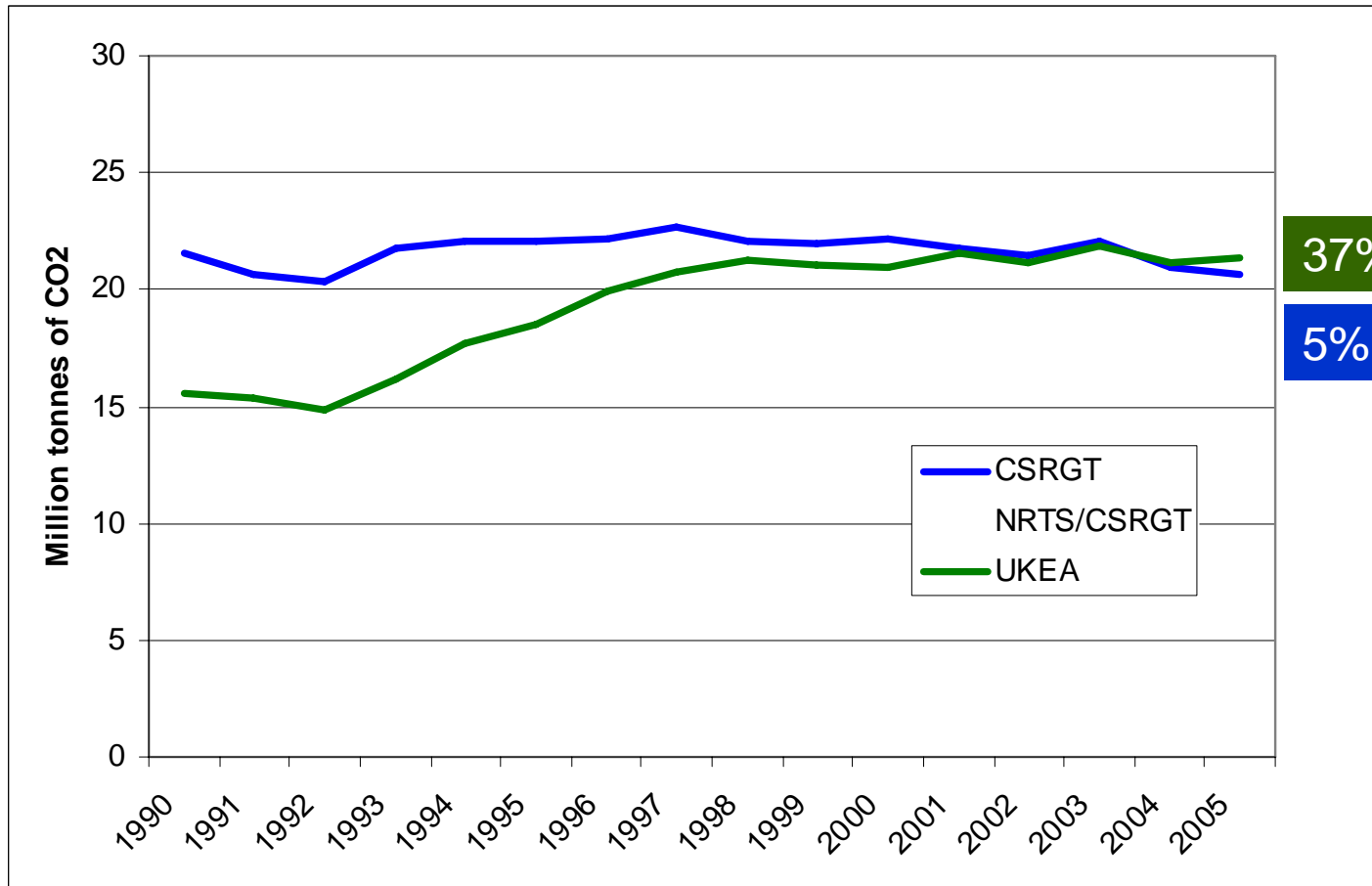


CSRGT Continuing Survey of Road Based Transport

NRTS National Road Traffic Survey

UKEA United Kingdom Environmental Accounts

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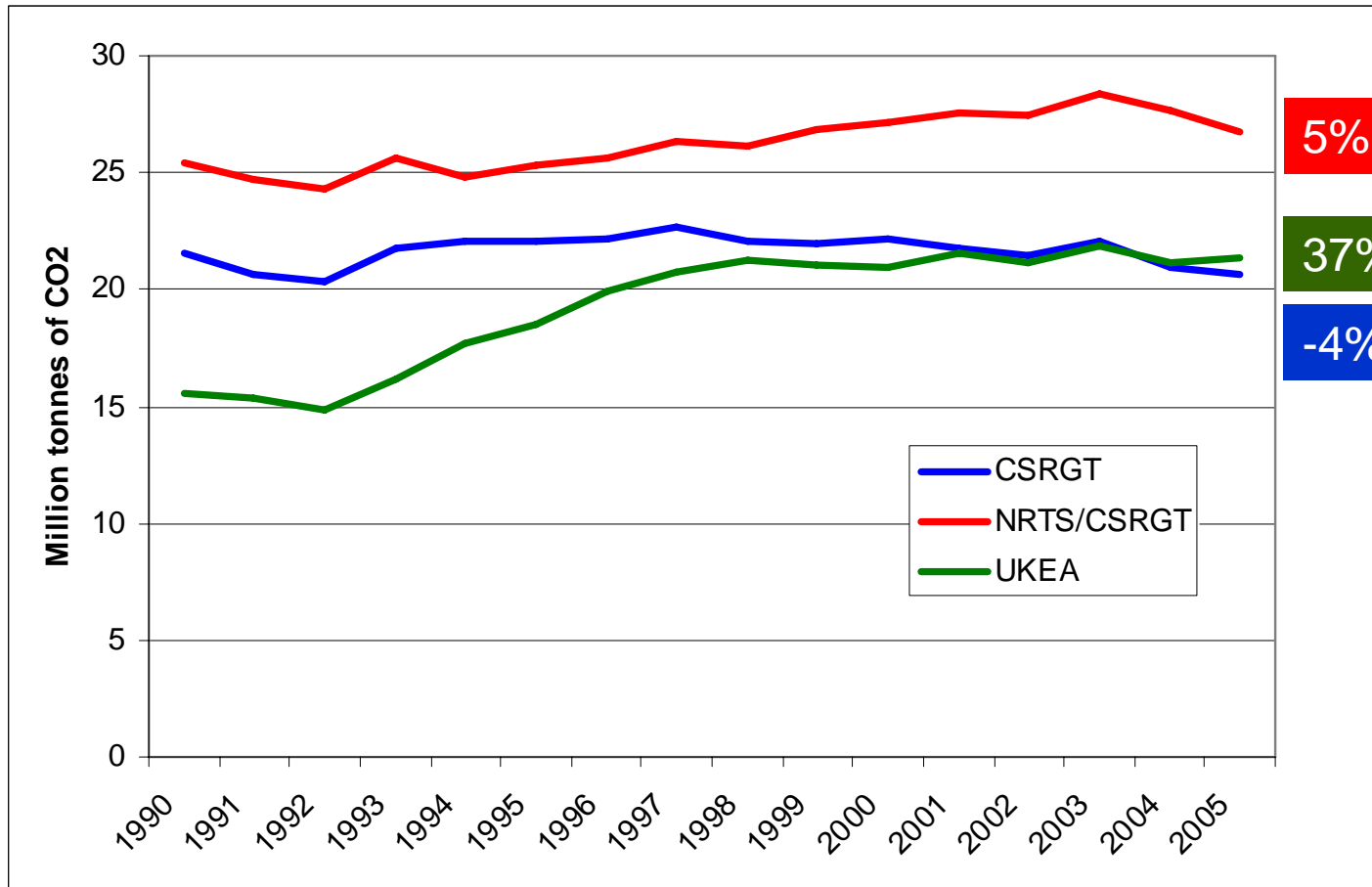


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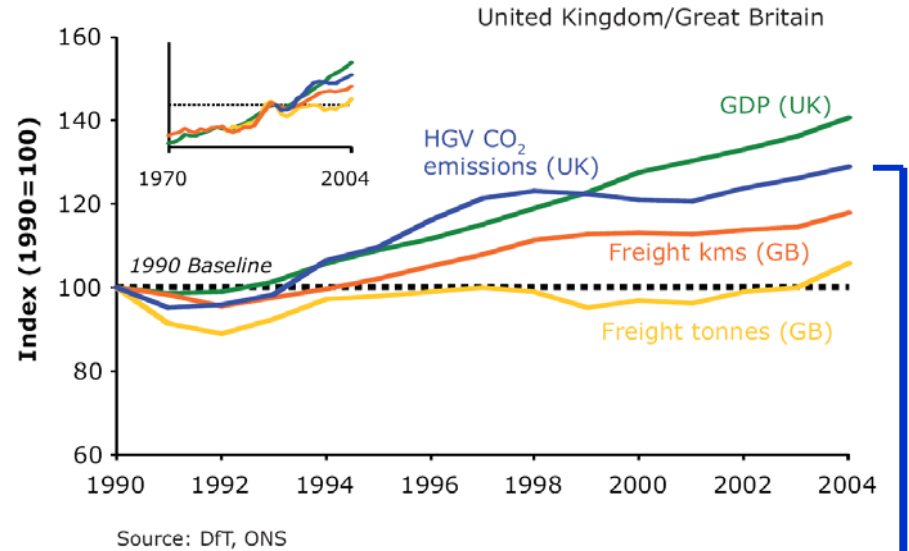
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Discrepancy in Estimates of CO₂ Emissions from HGVs

Sustainable development indicators in your pocket **2006**

Securing the future
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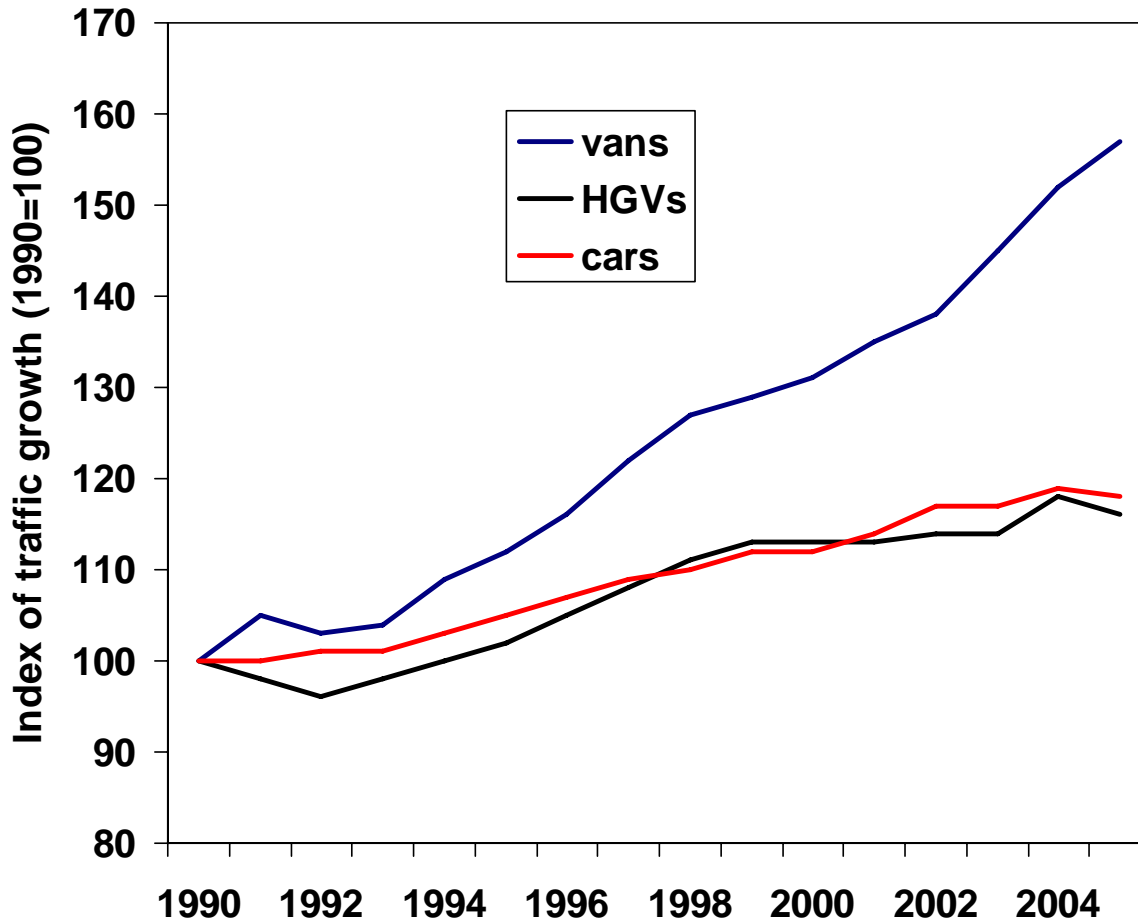
national STATISTICS



29% growth in CO₂ from HGVs ←

NRTS / CSRGT: 9% growth

Road Traffic Growth in the UK 1990-2005



Source: Department for Transport

Growth of CO₂ emissions

1997-2005

Cars = + 3.2%

Vans = + 24.4%

(Source: SMMT)

No CO₂ / km target for vans

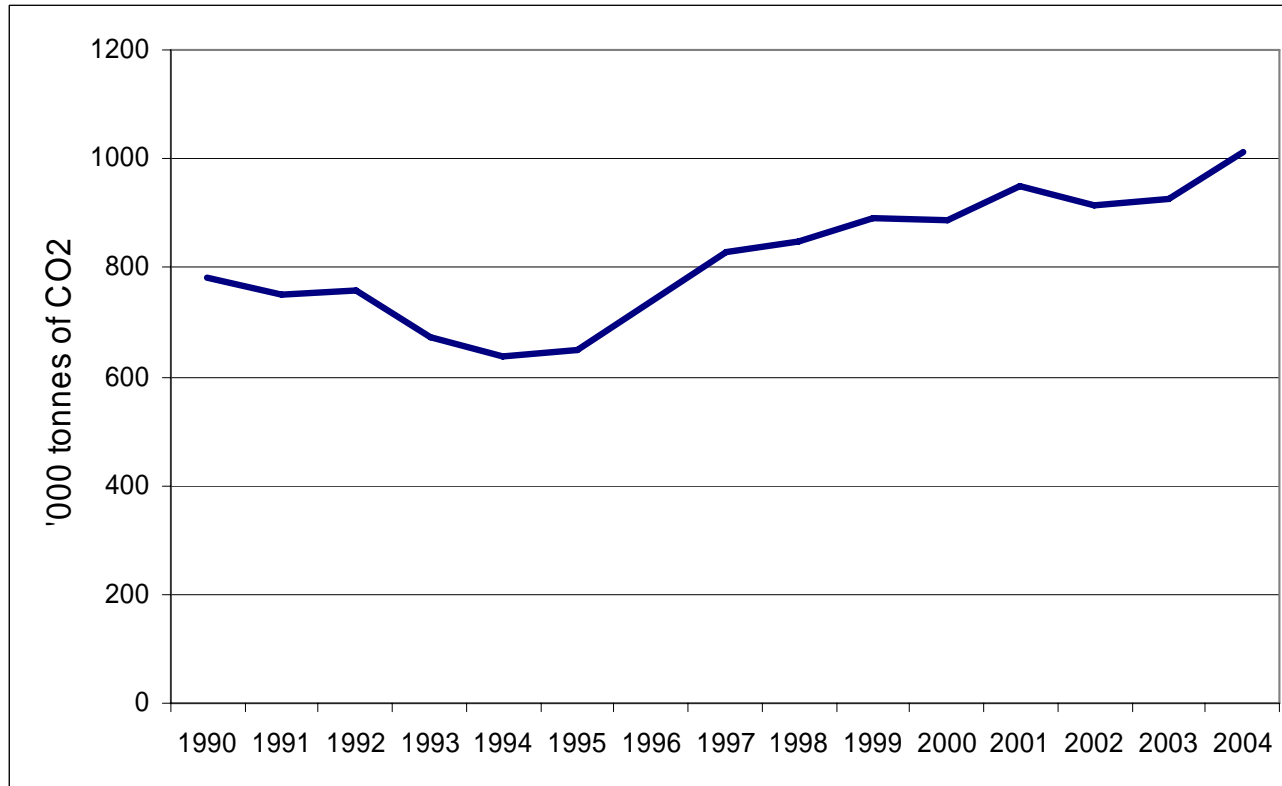
EU target being considered

Vans

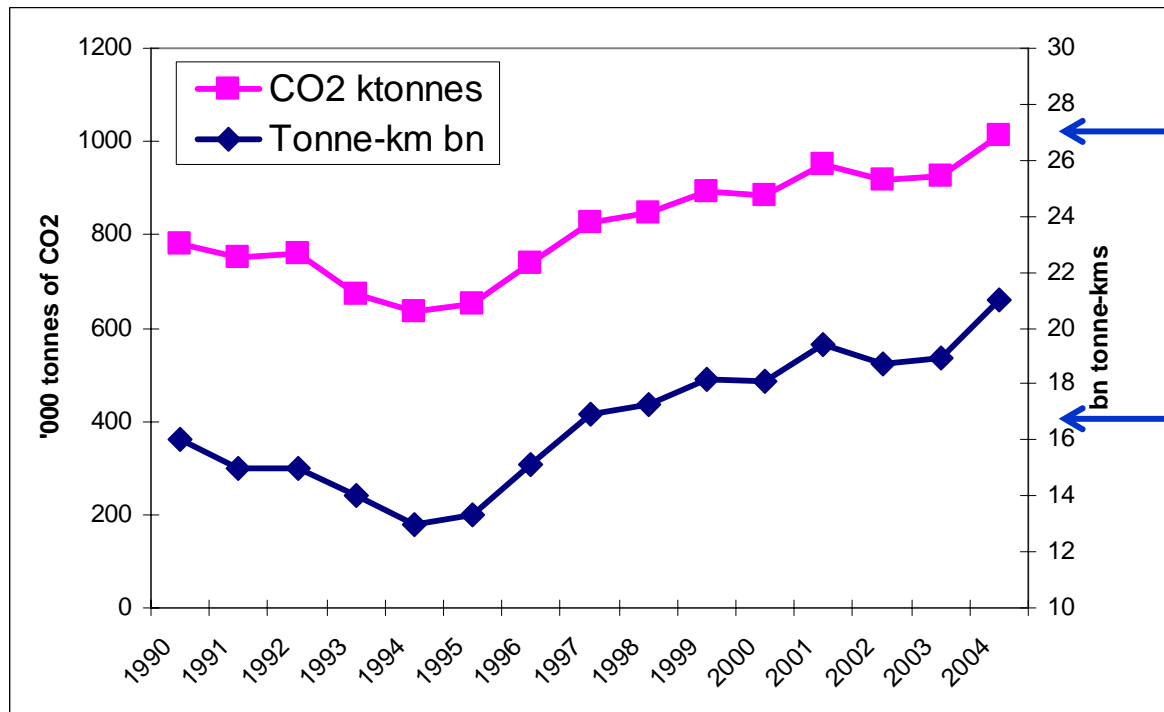
- Freight collections and deliveries + associated empty running represents only 35% of total van-kms
- 10.7 bn tonne-kms of freight in 2004 6.6% of total
- Assuming average fuel efficiency of 12 km / litre for vans
- 242 gms of CO₂ per tonne-km
- 2.6 million tonnes of CO₂
- Not possible to monitor trends for freight-carrying vans

CO₂ Emissions from Railfreight

National Atmospheric Emissions Inventory



CO₂ Emissions from Railfreight



- Assumes fixed CO₂ intensity: 49 gms of CO₂ per tonne-km
- No allowance for improvements in fuel efficiency of railfreight operations
- Rail Emissions Model (2000) for SRA: 20 gms of CO₂ per tonne-km
- EWS / DfT estimate – based on high load factors: 14.7 gms of CO₂ per tonne-km
- Using 20 gms of CO₂ per tonne-km: **420K tonnes of CO₂ in 2004** (cf 1,012K)

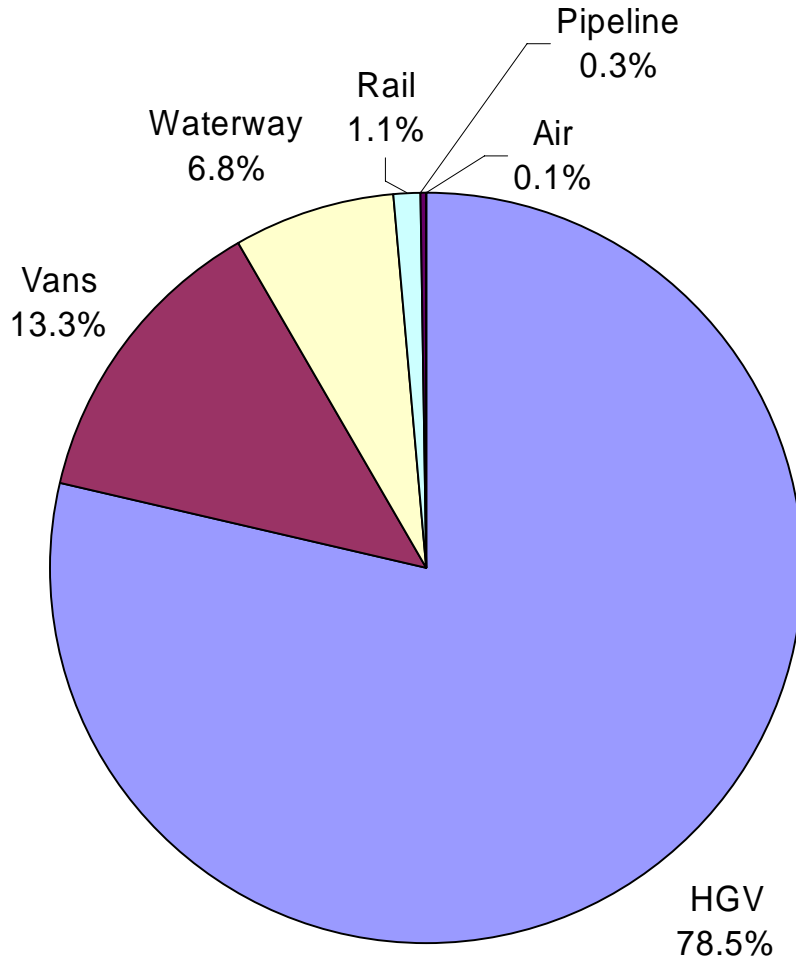
Other Freight Transport Modes

- Coastal shipping (UK vessels): 97.5% of all waterborne tonne-kms
30 gm of CO₂ per tonne-km
1.74 m tonnes of CO₂
- Inland waterways: 2.5% of waterborne tonne-kms
35 gm of CO₂ per tonne-km
53K tonnes of CO₂

Airfreight (domestic): 29 million tonne-km 0.01% of all UK freight movement
bellyhold freight on passenger aircraft + freighters
average 1600 gm of CO₂ per tonne-km
55K tonnes of CO₂ (2 x global warming potential)

Pipeline: 11 bn tonne-km 8.2 gm of CO₂ per tonne-km 90K tonnes of CO₂

CO₂ Emissions from Freight Transport in the UK (2004)



33.7 million tonnes of CO₂

21% of transport CO₂ emissions

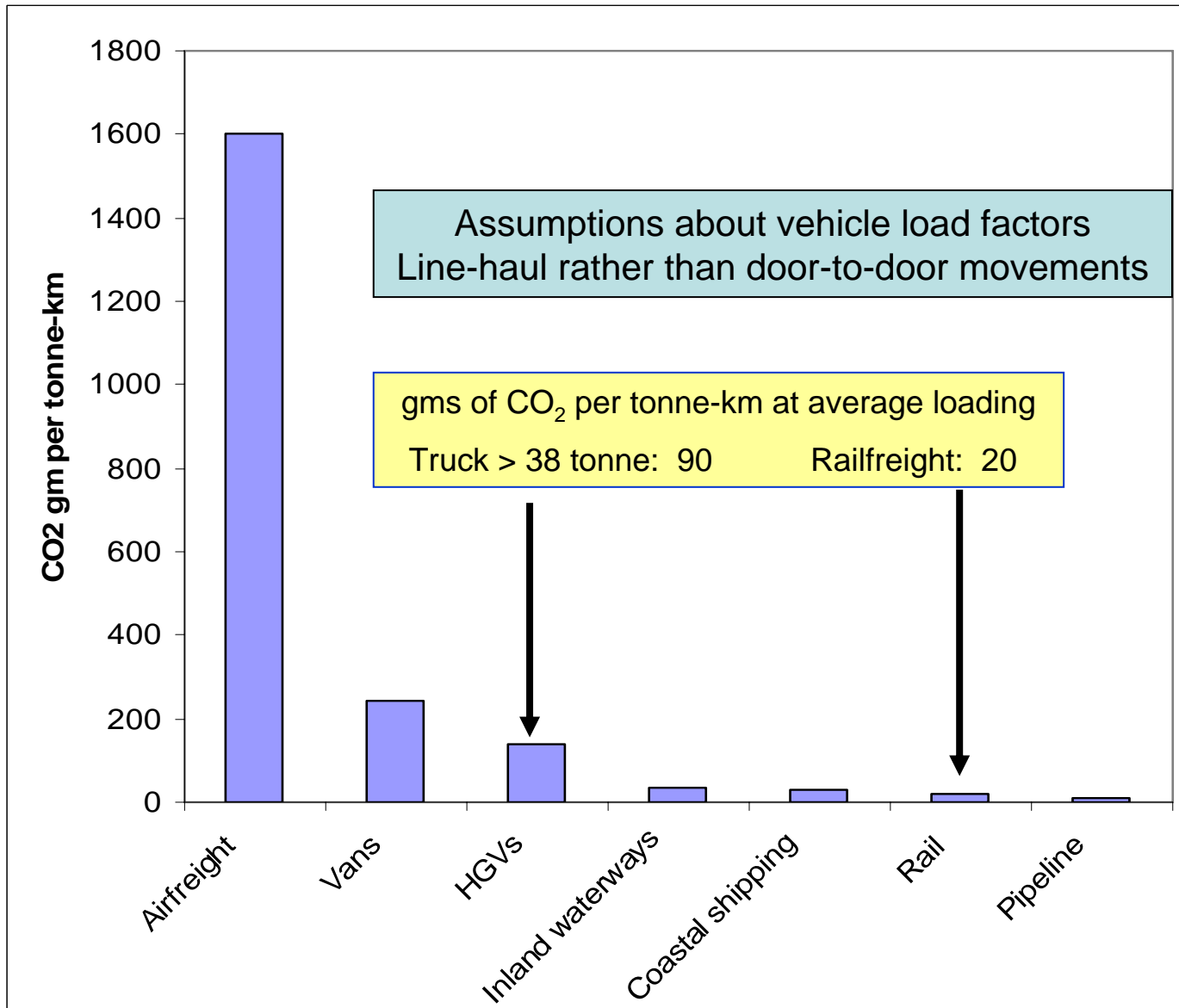
6% of total UK CO₂ emissions

Drax power station



20.6 million tonnes of CO₂

Variations in CO₂ Intensity by Freight Transport Mode



Research undertaken for the Climate Change Working Group
of the Commission for Integrated Transport

Publication of main report and briefing papers

12th September 2007

<http://www.cfit.gov.uk/docs/2007/climatechange/index.htm>

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



www.greenlogistics.org