

“Solutions for Sustainability”

Road transport and CO₂

The need for an Integrated Approach

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GBF 12th annual conference - Workshop II - 11 October 2007

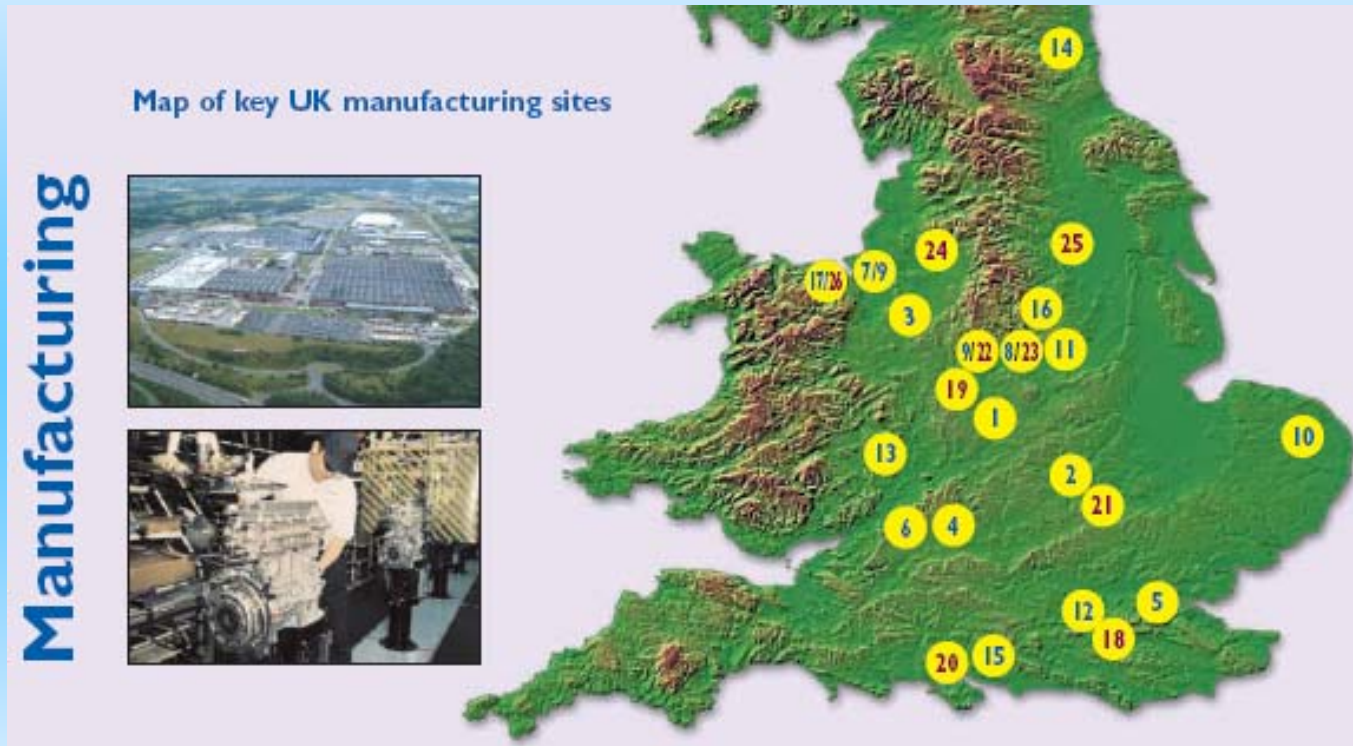


UK motor industry - profile

Automotive manufacturing turnover	£48.5bn
Value of exports	£24.5bn
UK car production	1.44m
Employees dependent on sector	851,000
Value added share of GDP	3.1%
New car registration	2.34m
Car parc (cars & light CVs)	34.24m



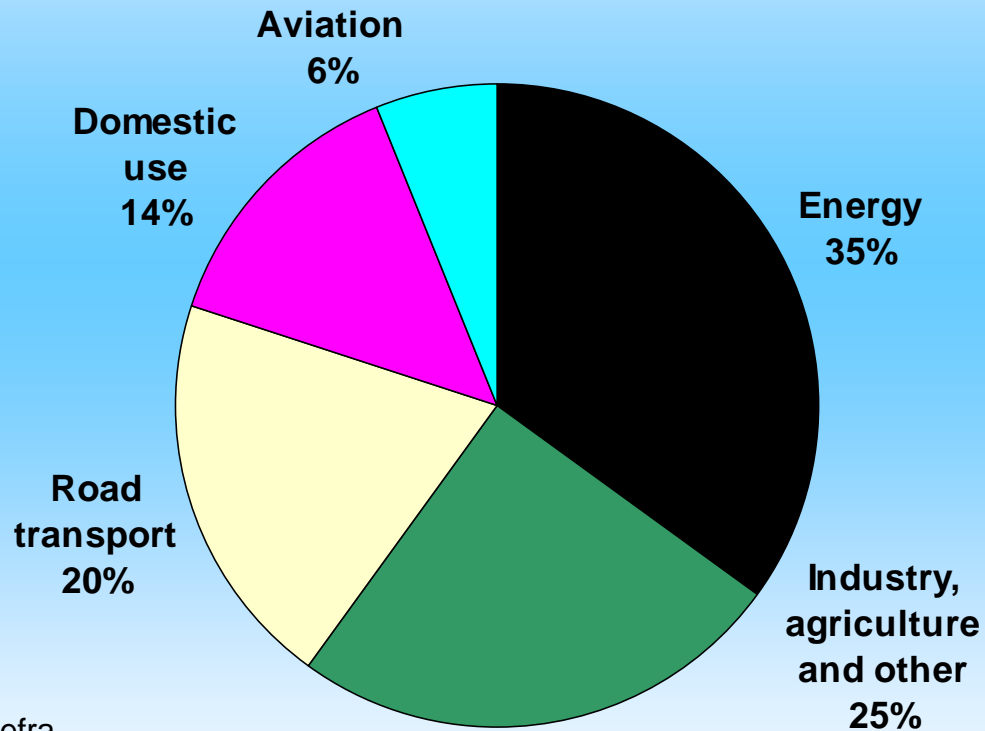
UK automotive manufacturing sites



7 volume car & 9 CV manufacturing sites
Largest number of specialist
luxury & sports car producers in EU



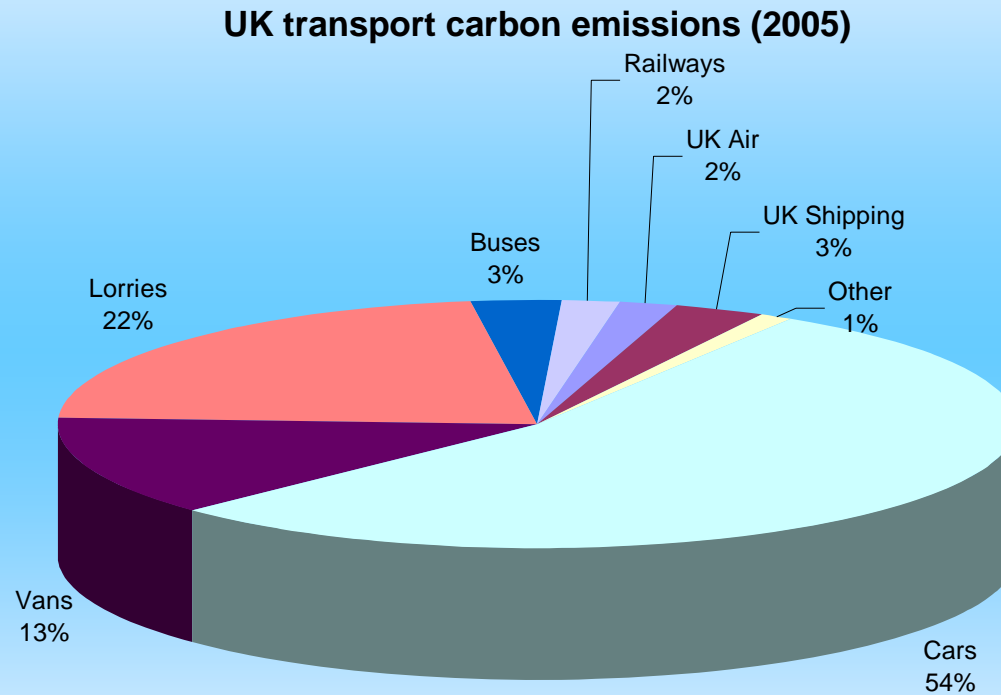
The carbon challenge: Road transport emissions



Source NAEI defra



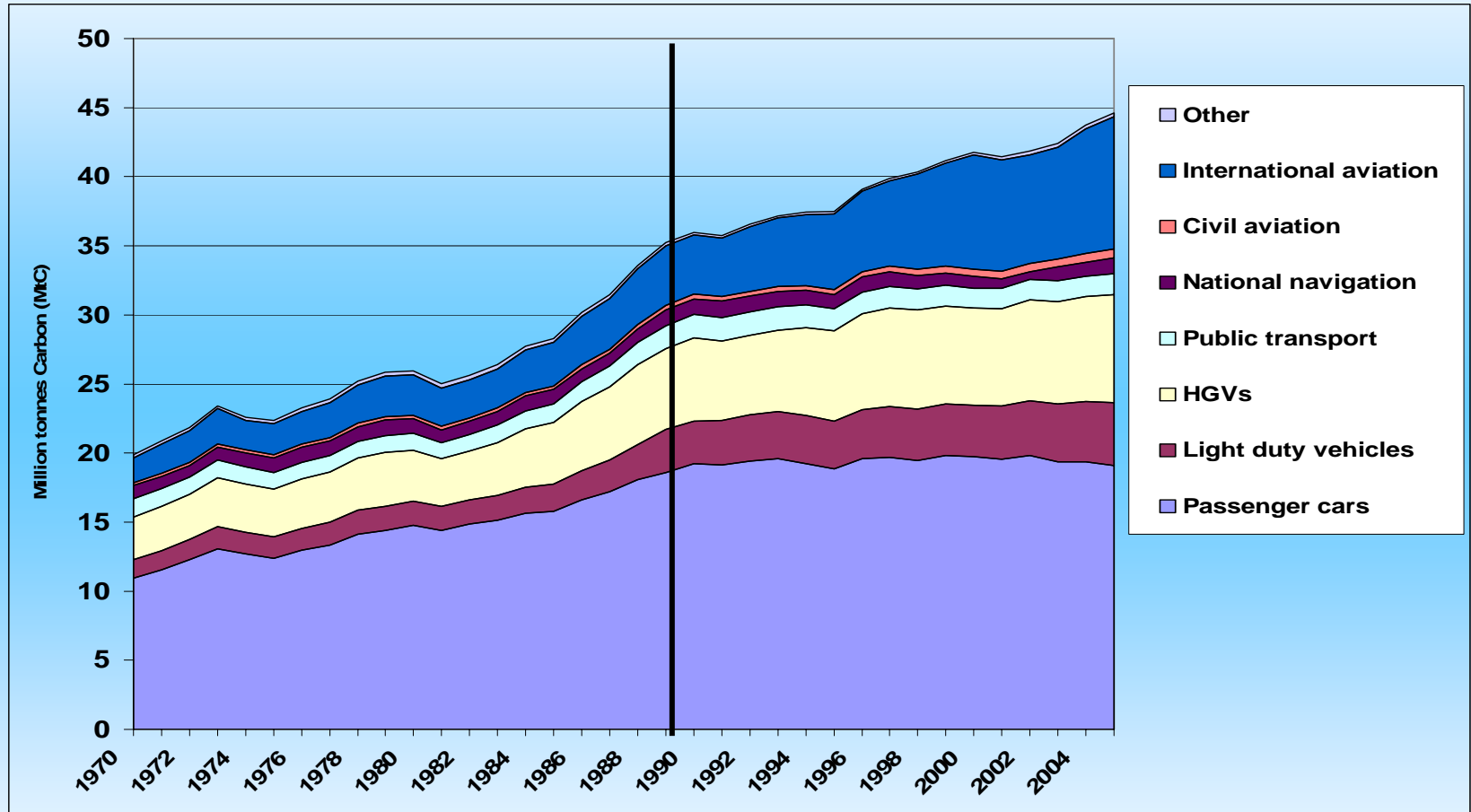
Carbon emissions by source



Source: CfIT (2007)



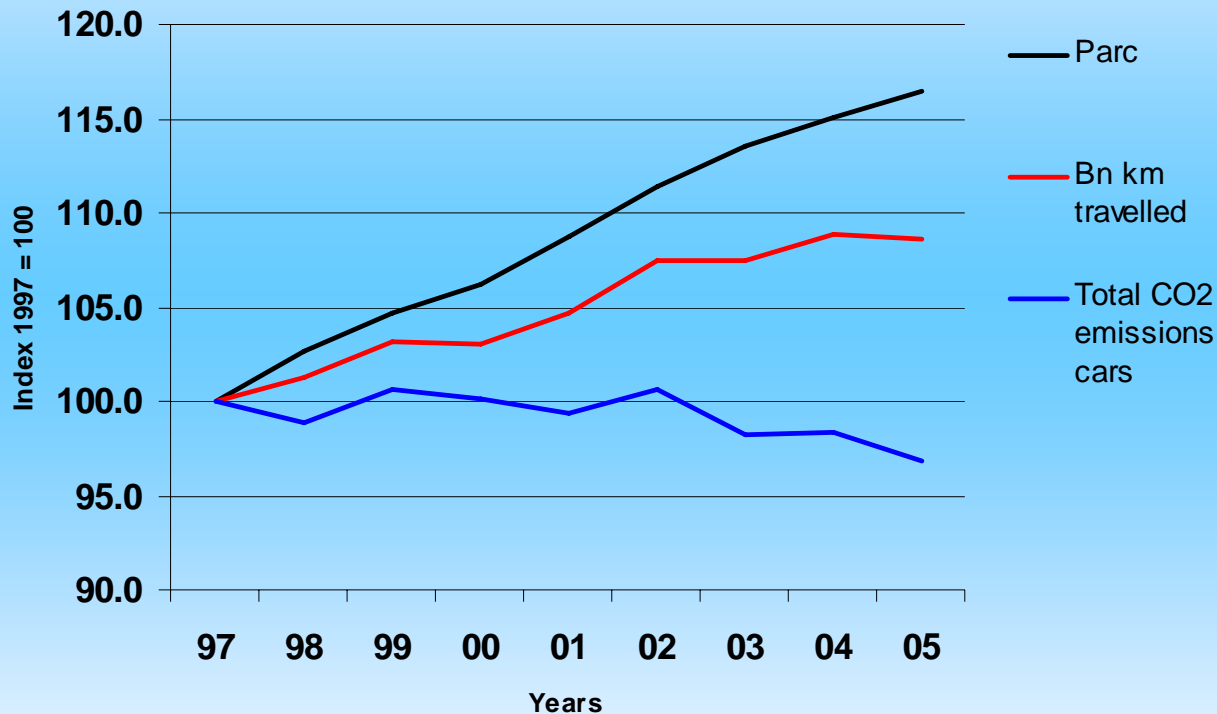
CO₂ & road transport in context



Source NAEI defra



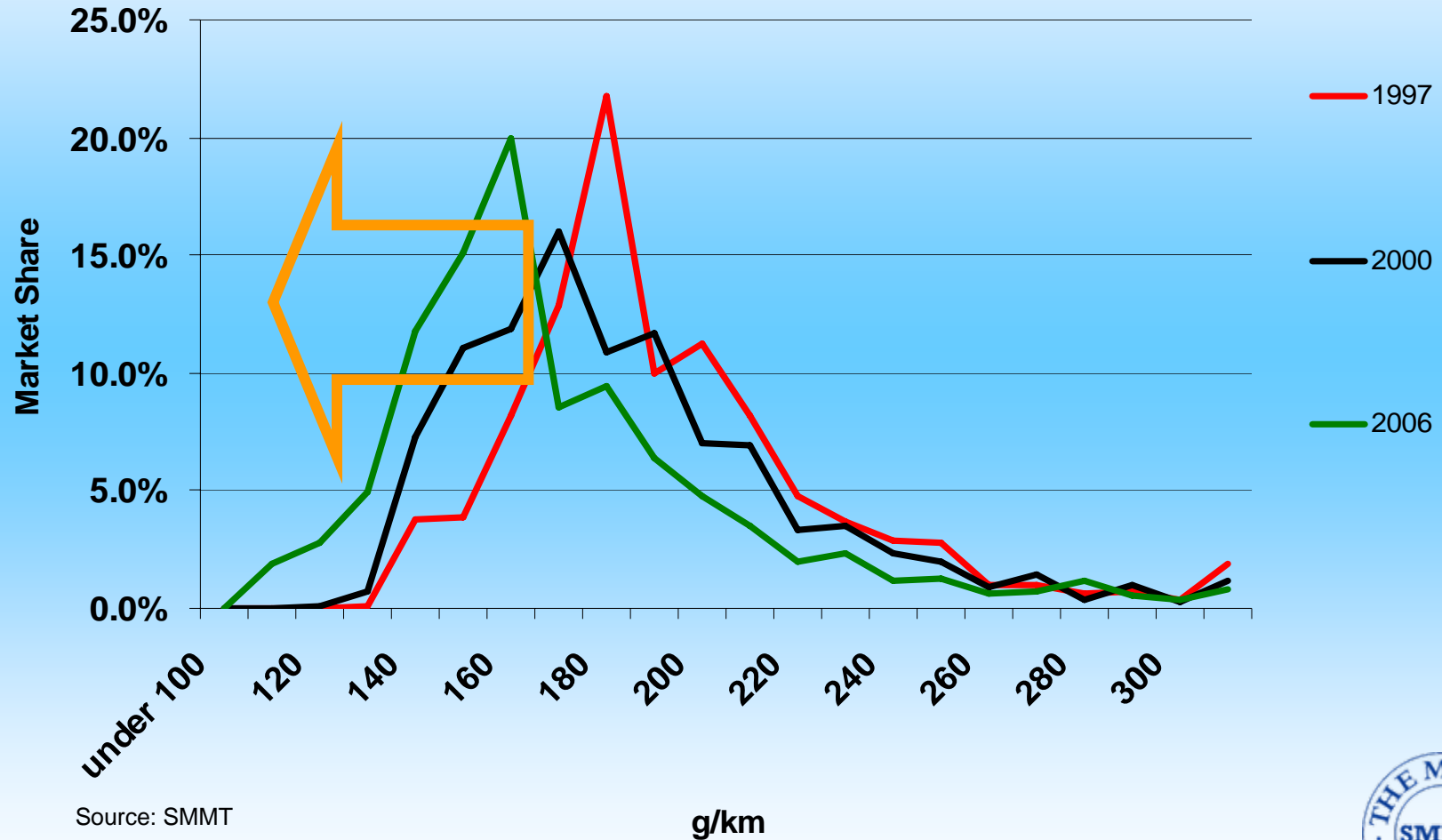
CO₂ emissions versus car numbers and distance



Source: CO₂ – AEA E&E, DfT - Transport Statistics GB 2006 edition for fuel and distance travelled, SMMT Motorparc for parc



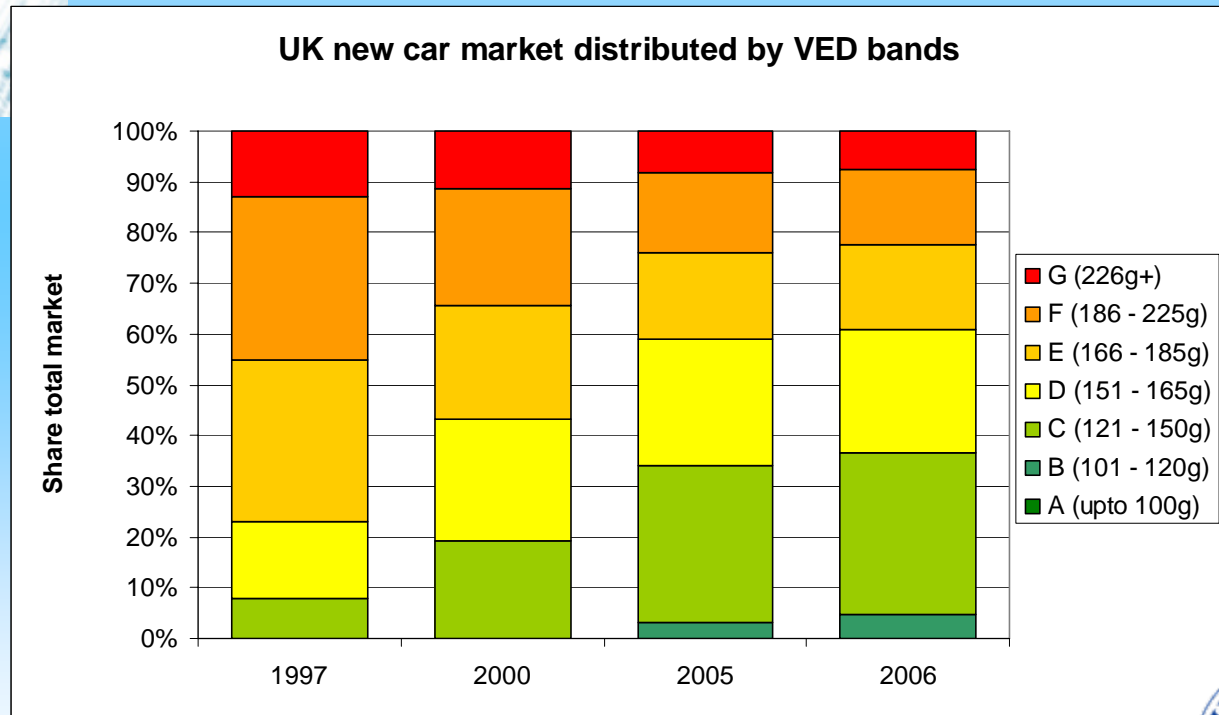
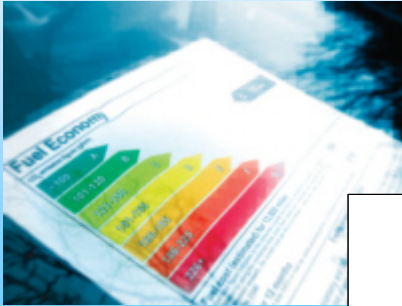
Progress to date: Increased sales of lower carbon cars



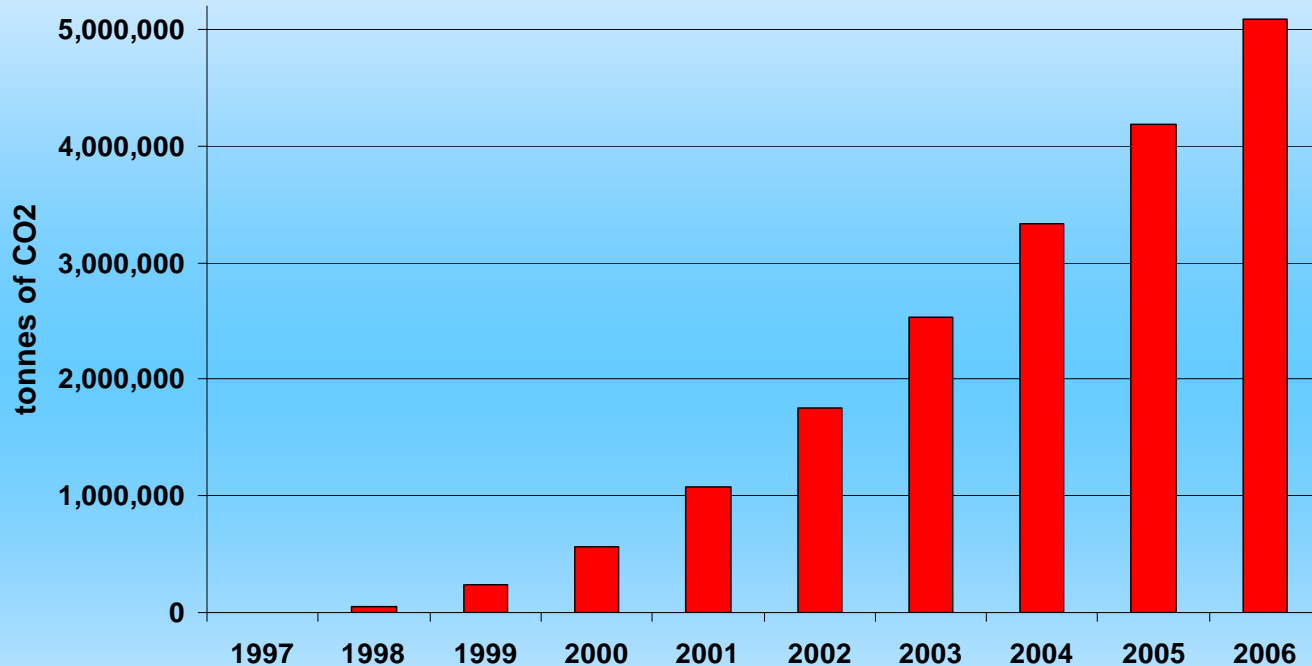
Source: SMMT



UK new car market - shift



Contribution to climate change reduction



Source:SMMT

Sustained and continued technological progress to cut average new car CO₂ saving of over 5 million tonnes in ten years, compared to 1997.



Stern review: how to “Act on CO₂”

Technology

Carbon pricing

Barriers to change



“Three elements of policy for mitigation are essential: a carbon price, technology policy, and the removal of barriers to behavioural change. Leaving out any one of these elements will significantly increase the costs of action.”

STERN REPORT



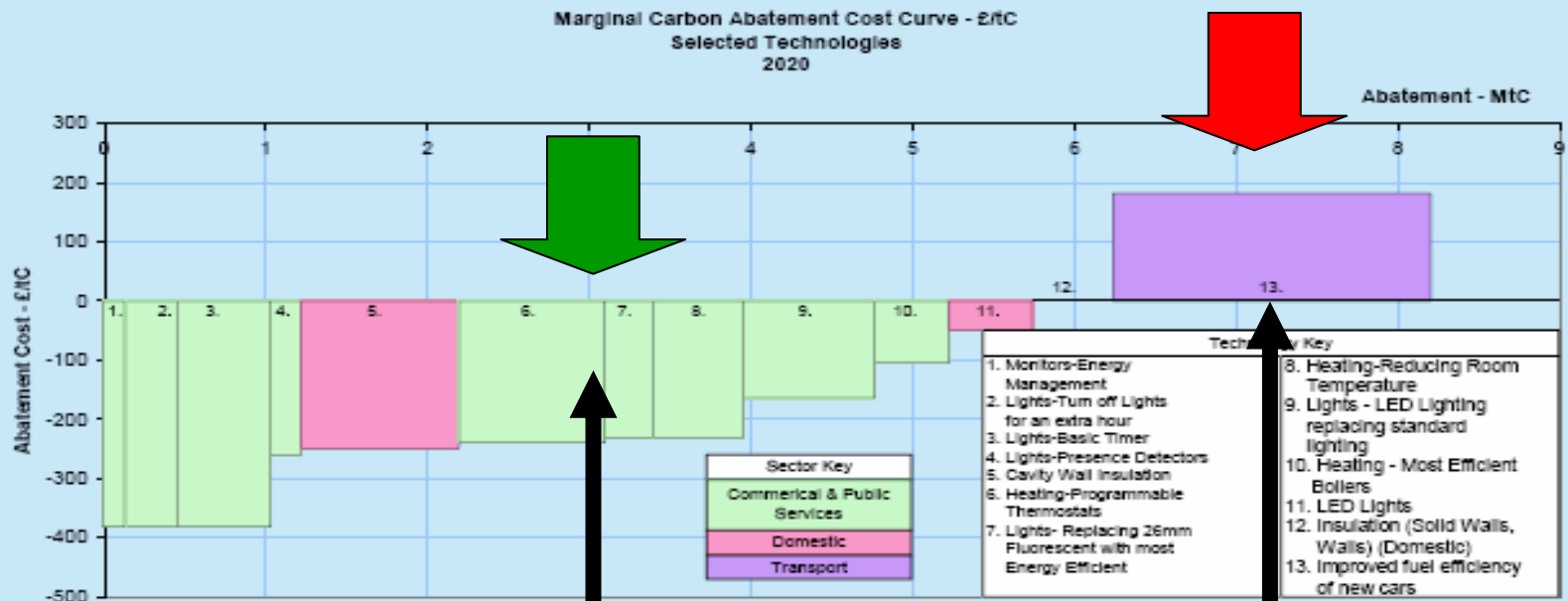
Past progress: technology only

Introduction Year	New CO ₂ Efficient Technology		
<ul style="list-style-type: none"> • 1995-1996 	<ul style="list-style-type: none"> • Direct-injection diesel engines 		
<ul style="list-style-type: none"> • 1997-2000 	<ul style="list-style-type: none"> • New generation of advanced diesels, notably incorporating common rail technology • Automated Manual Transmissions • Gasoline direct injection (GDI) 	<ul style="list-style-type: none"> • 2003 	<ul style="list-style-type: none"> • Double clutch/Direct Shifting gearbox • 7-speed fuel-economy optimised automatic transmissions • Common rail injection system with 1600 bar • Unit injector of 2050 bar • Energy management control systems, including load levelling, to reduce engine idle speed • Electro-hydraulic power assisted steering system • Fully electric power assisted steering
<ul style="list-style-type: none"> • 2001 	<ul style="list-style-type: none"> • Two-step variable valve timing • Valve train with roller followers • Fully variable valve lift & timing • Variable length Intake Manifold • 2nd generation diesel (common rail pressure) • Exhaust gas turbocharger with variable geometry turbine • Application of advanced engine technologies, and consequently smaller engines • 6-speed automatic gearbox • New generation of bio-fuels 	<ul style="list-style-type: none"> • 2004 	<ul style="list-style-type: none"> • New generation turbocharged small displacement diesel engines introduced • Variable Twin Turbo technology on diesel engines • Piezo-injection systems on diesel engines • Stop-start with regenerative braking • 2nd generation friction optimised rear-axle gearbox • Torque converter lock-up for 1st gear on automatic transmissions across model-range • High efficiency alternator • Regulated electrical fuel pump
<ul style="list-style-type: none"> • 2002 	<ul style="list-style-type: none"> • Fully variable valve lift with GDI • Variable length intake manifold • Fast warm-up cooling system • Torque converter lock-up on automatic transmissions • Low-viscosity/friction oil • Friction optimised rear-axle gearbox • Engine covering/underbody aerodynamic improvements 	<ul style="list-style-type: none"> • 2005 	<ul style="list-style-type: none"> • 2nd generation Valvetronic (fully variable valve lift & timing system) • Twin-charger technology for gasoline vehicle combined with downsizing of combustion engine • Roll-out of LED technology for high volume segments with benefits concerning electric energy consumption • Hydro-high-pressure forming for high strength structures with weight advantages • Advanced cooling system with electric water pump • Electronically controlled oil pump • 3rd generation common rail injection system

Stern Review

Cost effectiveness means reaching environmental targets at lowest cost to society

Figure 9.2 Aggregate carbon abatement cost curve for the UK – annual carbon savings by 2020²⁸



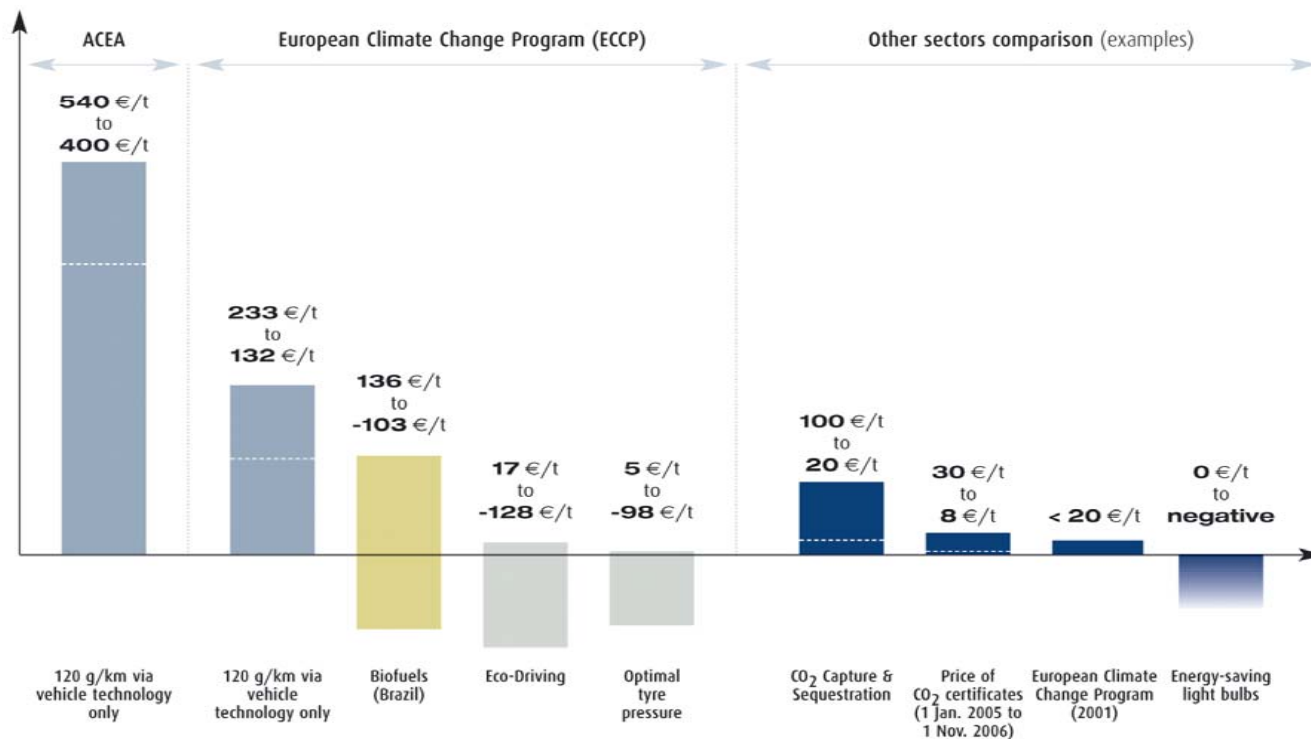
Source: See notes



Cost effectiveness

ECCP: Vehicle technology only is a high cost abatement option

Estimates of Societal Costs for CO₂ Reductions



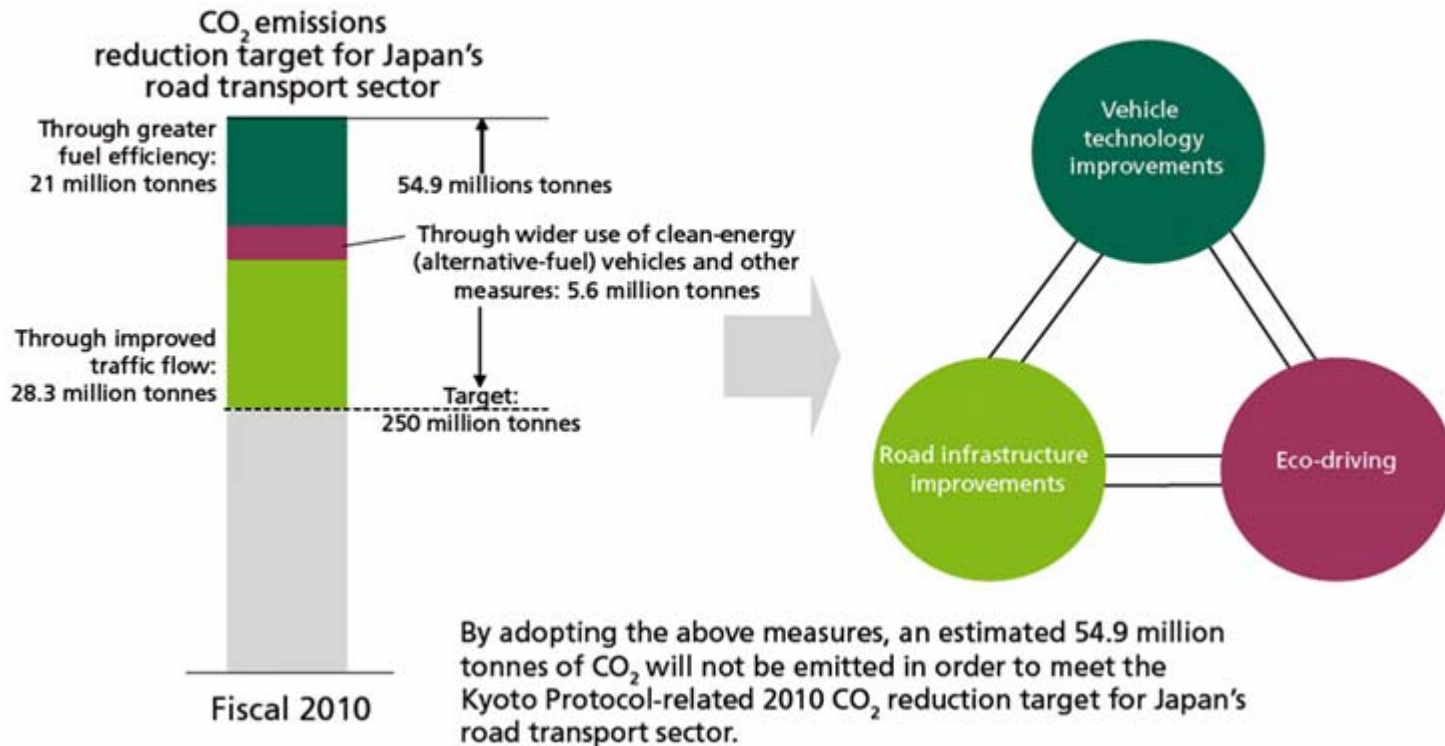
Way forward: Integrated Approach

- **Vehicle technology**
- **Alternative fuels**
- **Eco-driving / Behavioural change**
- **Infrastructure measures**



It is possible! Japanese example

An integrated, "three-in-one" approach is required.



Commission for Integrated Transport

“Transport & Climate Change” (2007)

Advice on practical & cost-effective abatement options for 2020

- Car technology: 2.4MtC
- Behavioural measures & public transport: 2.0MtC
- Sustainable distribution/lorries & vans: 2.7MtC



Messages for policy makers

- **Stern: Carbon price, technology & barriers to change**
- **Integrated approach & cost-effectiveness principle**
- **EU - New car CO2 regulation**
 - establish challenging yet achievable, fair & affordable system
 - provide industry with a **realistic timetable (2015) and flexibility** to meet targets
- **UK - Consistent regulatory & fiscal environment**
 - recognise real sources of transport emission growth & the cost of abatement through vehicle technology alone
 - **realise all practical and cost-effective abatement measures involving all stakeholders**
 - develop clear & consistent carbon pricing



“Solutions for Sustainability” Road transport and CO₂

Thank you

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