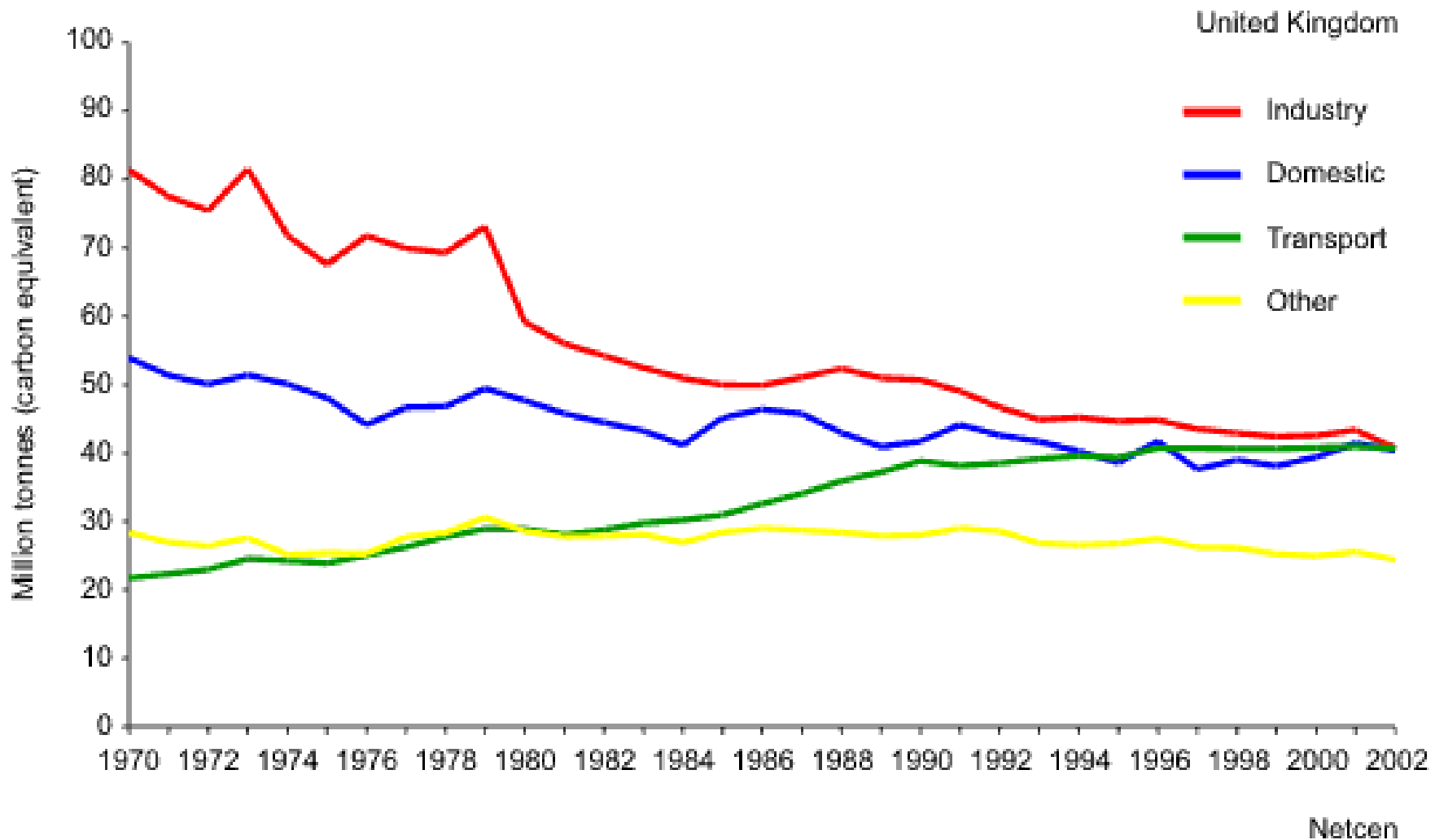


Road Transport and Carbon Emissions

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Figure 7: Carbon dioxide emissions by end user: 1970-2002



Source:DEFRA 2005

Low Carbon Transport Futures: How Can We Get There?

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Research Project

Project objectives:

- Determine targets for CO₂ reduction in the UK transport sector and specifically for personal land based transport;
 - Develop strategies to deliver these targets
 - Explore the adaptation strategies of households
 - Identify policies to move towards low carbon transport
-
- Today: review main findings and examine progress in reducing carbon emissions from transport

Studies reviewed

- Royal Commission on Environmental Pollution (2000) Energy The Changing Climate
- The Carbon Trust (2001) Draft Strategic Framework
- The Policy and Innovation Unit (2002) The Energy Review
- The Interdepartmental Analysts Group (2002) Long-term reductions in Greenhouse Gas Emissions in the UK
- AEA Technology and Imperial College (2002) Options for a Low carbon Future

- Emphasis on the role of technology
- Degree of consensus that transport emissions would continue to increase proportionately to other sectors.

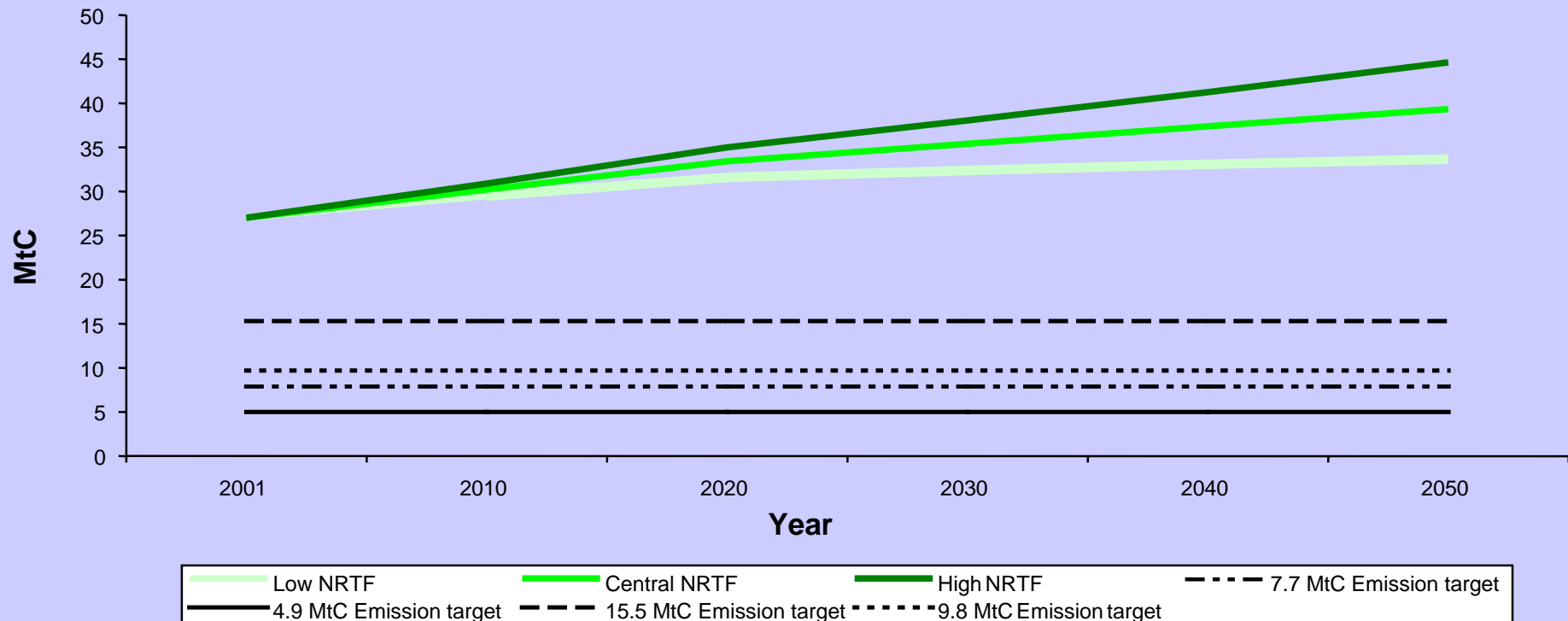
Transport Emissions Targets for 2050

Transport Emissions 2000: 39 MtC

Personal Land Based Transport: 27 MtC

	41% Share	26% Share
79% reduction Total transport Personal land based transport	12.9 MtC 7.7 MtC	8.2 MtC 4.9 MtC
58% reduction Total transport Personal land based transport	25.8 MtC 15.5 MtC	16.4 MtC 9.8 MtC

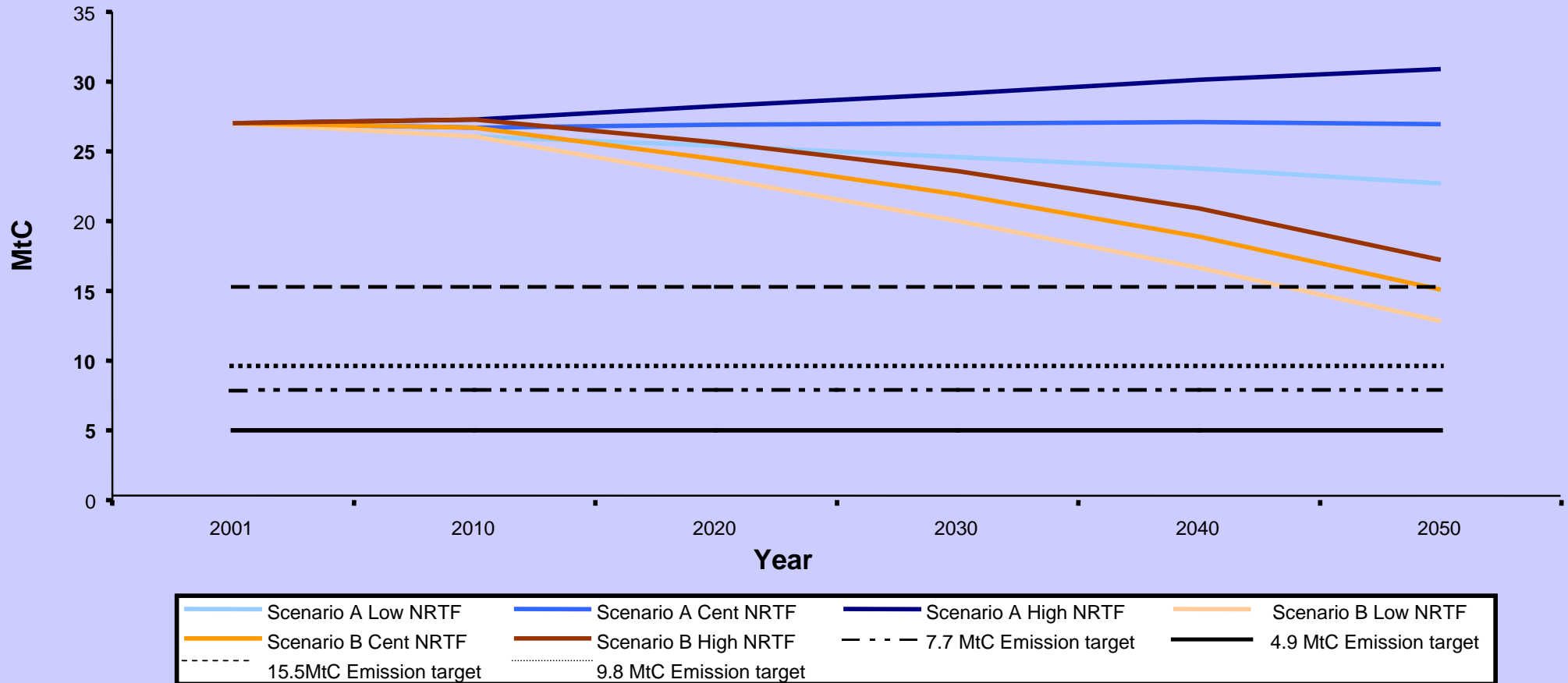
Personal Transport Emissions in 2050 in the UK without vehicle improvements or behavioural change



Personal Transport Emissions in 2050 in the UK with lower emission vehicles

Scenario A 25% reduction in emissions per vehicle km

Scenario B 60% reduction in emissions per vehicle km



Other Measures: evidence on impacts from literature

Strategy	Implementation	Optimism of Assumptions
Pricing (fuel tax or road user charging)	2010-2015 revenue neutral road user charging 2015-2030 price increase 2% per annum 2021-2030 4%	Conservative: late introduction
Passenger Transport	2015-2035 fares fall 5% per annum bus, 3% rail. Services up 3% per annum bus, 5% rail	Conservative: late introduction Optimistic: impacts especially quality
Telecommunications	By 2050 replaces 40% business and shopping trips, 16% commuting trips	Optimistic: as assumes no trip generation or substitution
Land use/walking/cycling	Increased densities, integration, improved facilities	Neither optimistic or conservative

Emissions under Scenarios A and B for Central NRTF (MtC)

Strategies	2050	
	A	B
Lower Emission Cars (LEC)	27.0	15.3
LEC + Road Pricing	22.1	12.5
LEC + Fuel Prices	22.2	12.6
LEC + Public Transport	24.9	14.0
LEC + Telecommunications	22.4	12.6
LEC + Land Use	23.3	13.2

Packages of Measures: to Achieve 12.6 MtC by 2050

Strategy 1: Dramatic Technical Change

- Emissions per vehicle kilometre fall to 66 grams CO₂
- Traffic levels rise
- Fleet 42% hybrid and 58% fuel cell might achieve this *IF* the hydrogen is carbon neutral

Strategy 2: Mix

- Emissions per vehicle kilometre 88.4 gms
- Growth in car vehicle kilometres constrained below the low NRTF
 - Fuel price up 2% per annum 2015 to 2050
 - Enhanced and cheaper public transport

Strategy 3: Behavioural Shift

- Emissions per vehicle kilometre 133.6
- Car kilometres FALL:
 - Increase price of fuel by 5.5% per annum 2015 to 2050
 - Enhanced and cheaper public transport
 - Increased accessibility for walk, cycle
 - Increased use of telecommunications

Household kilometres by mode and % change from current (per week) (exploratory survey 15 households)

Mode	Current kilometres	% change current context	% change supportive measures
Car	8963	-10.6	-19.2
Walk	475	+7.4	+42.9
Bus	692	+119.6	+129.3
Train	1796	-34.9	-26.4
Taxi	193	-20.2	-30.0
Cycle	82	+100.0	+309.8
Motorcycle	375	+2.9	-6.4
Underground	26	0	0
TOTAL	12602		
Change in CO₂		-3.10	-13.34

Progress towards targets

Limited: 1990-2004 transport emissions up 10%

- Some success with clear price signals:
 - Fuel tax escalator to 1999
 - Reforms to company car taxation
- ACEA/EU agreement: progress on reducing new car emissions
 - But rate of improvement needs to increase
 - Some gains offset by air conditioning
- Policy focus very much on technological change with little recognition of the need to change behaviour as well. With an expectation that:
 - *“the key drivers of changes in CO₂ emissions from road transport through to 2010 are expected to be reductions in real fuel prices combined with income growth, which would more than offset the impact of policies to improve the fuel economy of vehicles”* DEFRA 2004
- Limited range of incentives to purchase cleaner vehicles....

Inducing Behavioural change?



Lowest CO₂ emitting models in each market segment in the UK in 2004 (SMMT 2005)

Segment	Model	Fuel	CO ₂ g/km	Segment Average	Difference
Mini	Smart Fortwo	Petrol	113	136	-17%
Supermini	Citroen C2	Diesel	107	147	-27%
Lower medium	Honda Civic	Petrol/electric	116	162	-28%
Upper medium	Toyota Prius	Petrol/electric	104	176	-41%
Executive	Audi A6	Diesel	151	209	-28%
Luxury saloon	Mercedes S320	Diesel	204	286	-29%
Sports	Honda Insight (Vauxhall Tigra)	Petrol/electric (petrol)	80 (146)	232	-66% (-37%)
4x4	Toyota Rav4	Petrol	175	244	-28%
MPV	Fiat Doblo	Diesel	147	192	-23%

Conclusions

- Uncertainty of delivery of “step changes” in technology
- Existing technology can deliver significant reductions in CO₂ emissions BUT
- Clear price signals are required AND
- Cleaner passenger transport AND
- Improvements to passenger transport and facilities for walking and cycling AND
- Better access via telecommunications or walk and cycle
- Need for early action to:
 - Secure early reductions in emissions and
 - To avoid additional growth ahead of implementation