Low carbon cars and fuels for fleets

Presentation to ACFO London East

Ford Dunton

10th December 2010

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Outline

- Introduction to the LowCVP
- Market drivers for low carbon vehicles and fuels
- Evolving technologies for low carbon cars
- Low carbon vans
- Electrification of transport
- Other alternative fuels options
- Conclusions

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LowCVP ‘s mission is to accelerate a sustainable shift to low carbon vehicles and fuels & stimulate opportunities for UK businesses

THE LOWCVP
LOW CARBON CHAMPIONS
AWARDS 2010

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ACT ON CO2

Low carbon technologies for HGVs

WINNER
THE LOWCVP TECHNOLOGY CHALLENGE 2010
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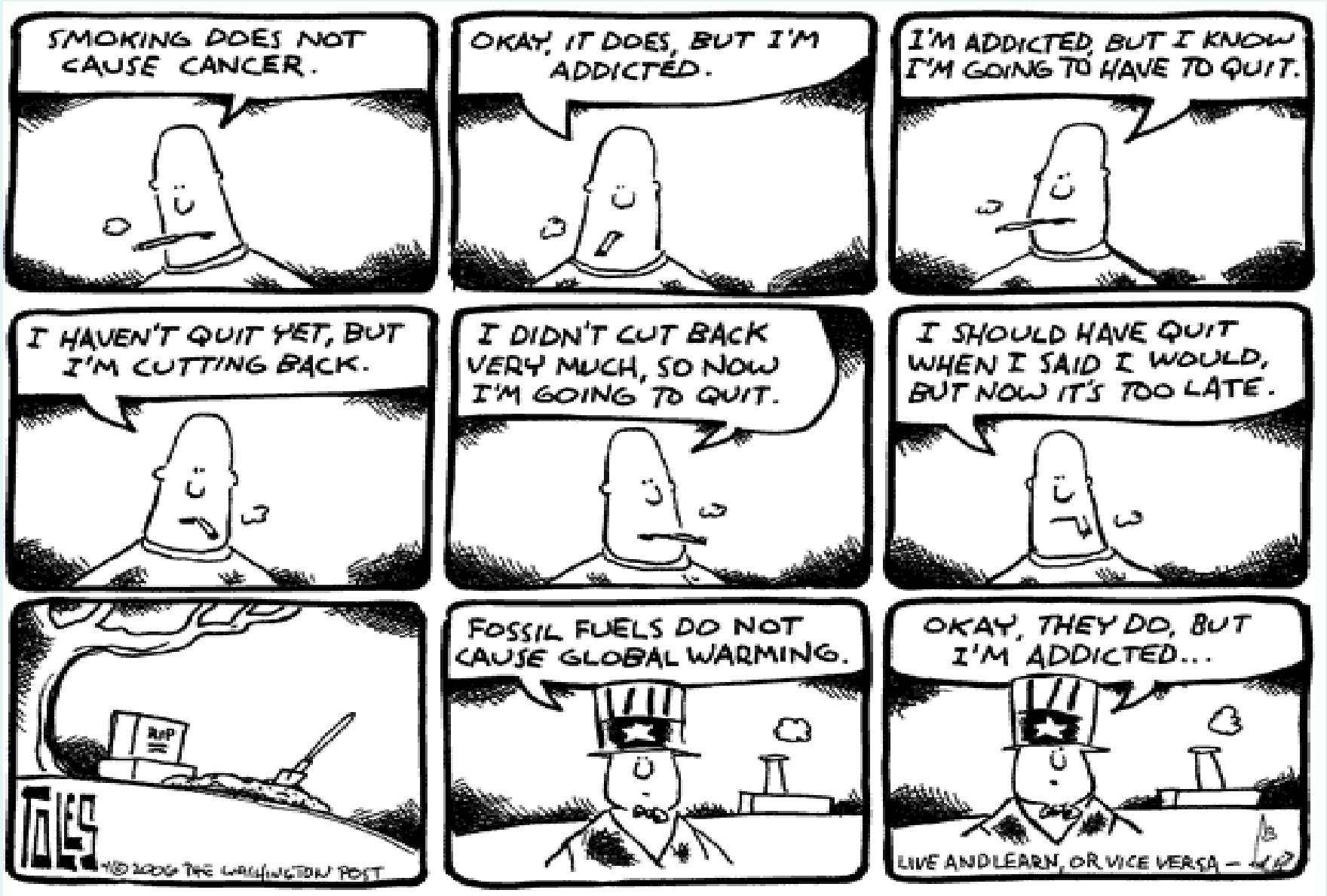
energy saving trust

Community Challenge
Leading the way to lower carbon journeys

cenex

Petroleum accounts for 99% of transport fuel use with widely recognised future climate, security of supply and price risks



Improving vehicle efficiency

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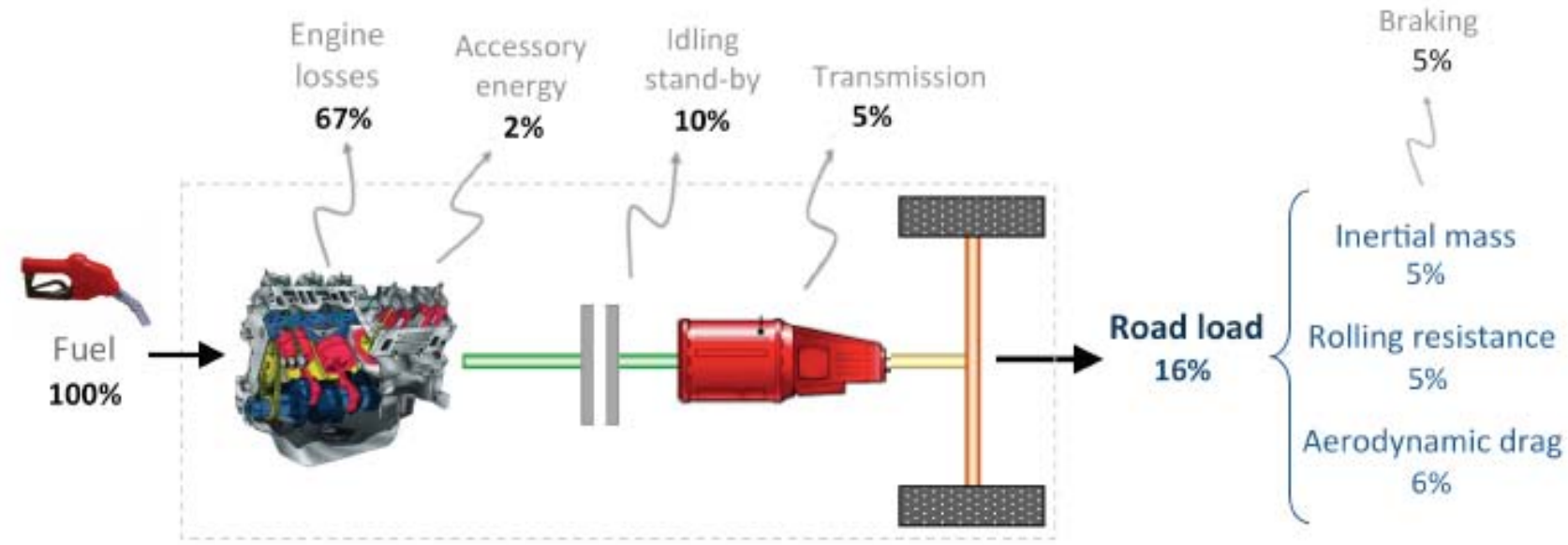
Modern cars are 15-20% efficient – there is considerable opportunity for improvement



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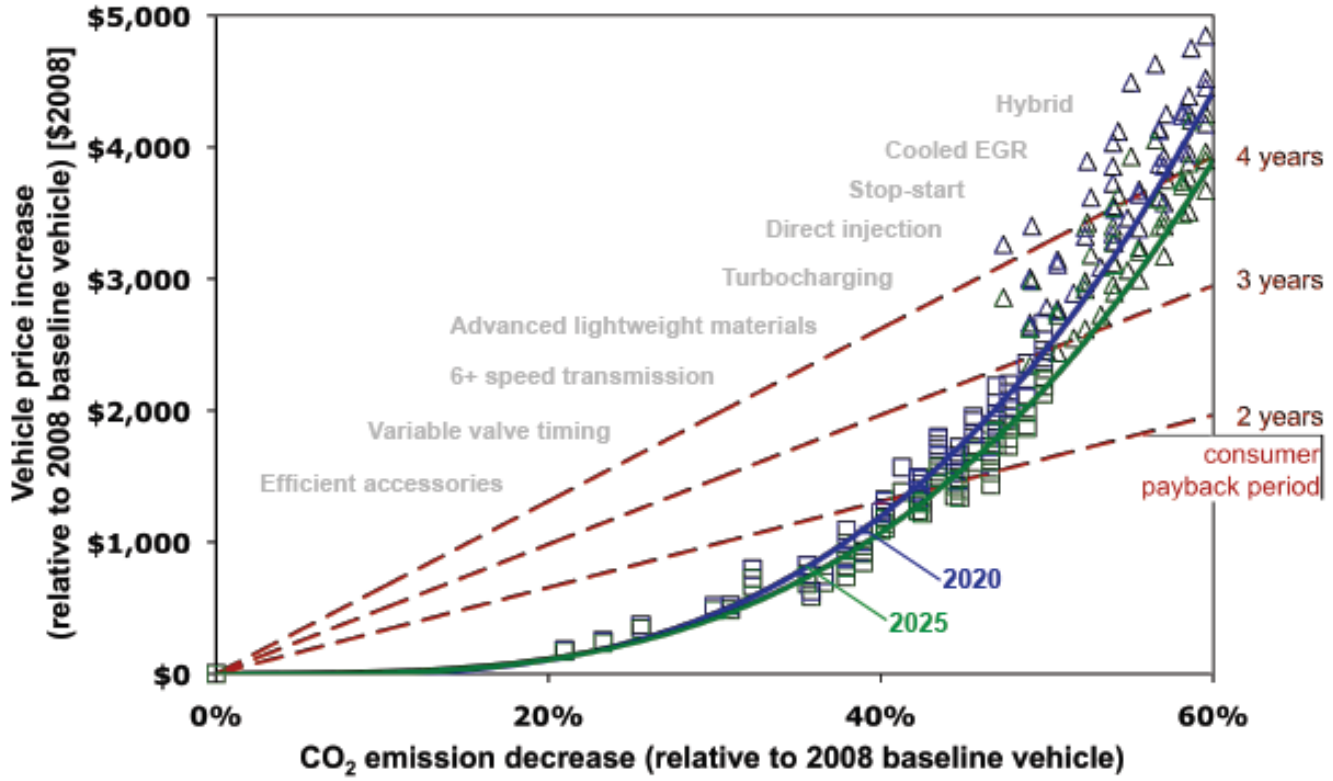
ICCT 2010

50% improvements in vehicle efficiency are possible with existing technology – most payback within 3 years

Cost-benefit assessment of alternative vehicle technologies



Data source: EPA, NHTSA, CARB Interim Joint Technical Assessment Report: Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2017-2025
Consumer payback calculation assumptions: Baseline fuel consumption 6 l/100 km, fuel price 1.30 €/l, annual mileage 15,000 km

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ICCT 2010

There are a wide range of lower carbon vehicles now available - but sales remain modest

Smart for two 88g/km
Mini 124g/km

Prius 3 89g/km
Lower medium 154g/km

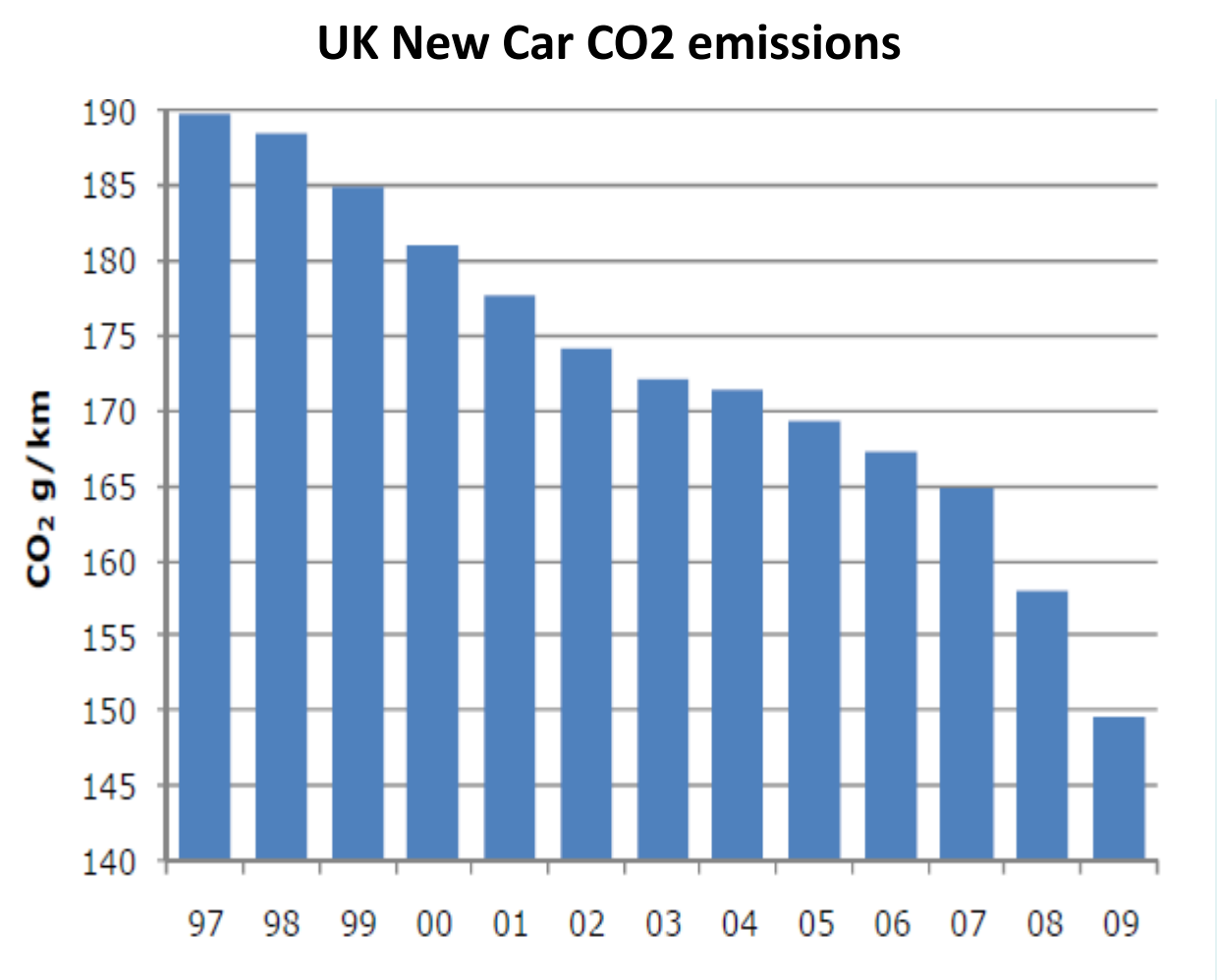
Volvo S80 129g/km
Executive 186g/km

Lexus RH450 148g/km
4x4 219g/km

Seat Ibiza118g/km
Super mini 138g/km

Volvo V50 104g/km
Upper medium 161g/km

Improvements in new car CO2 emissions are accelerating as a result of regulation and changing consumer attitudes



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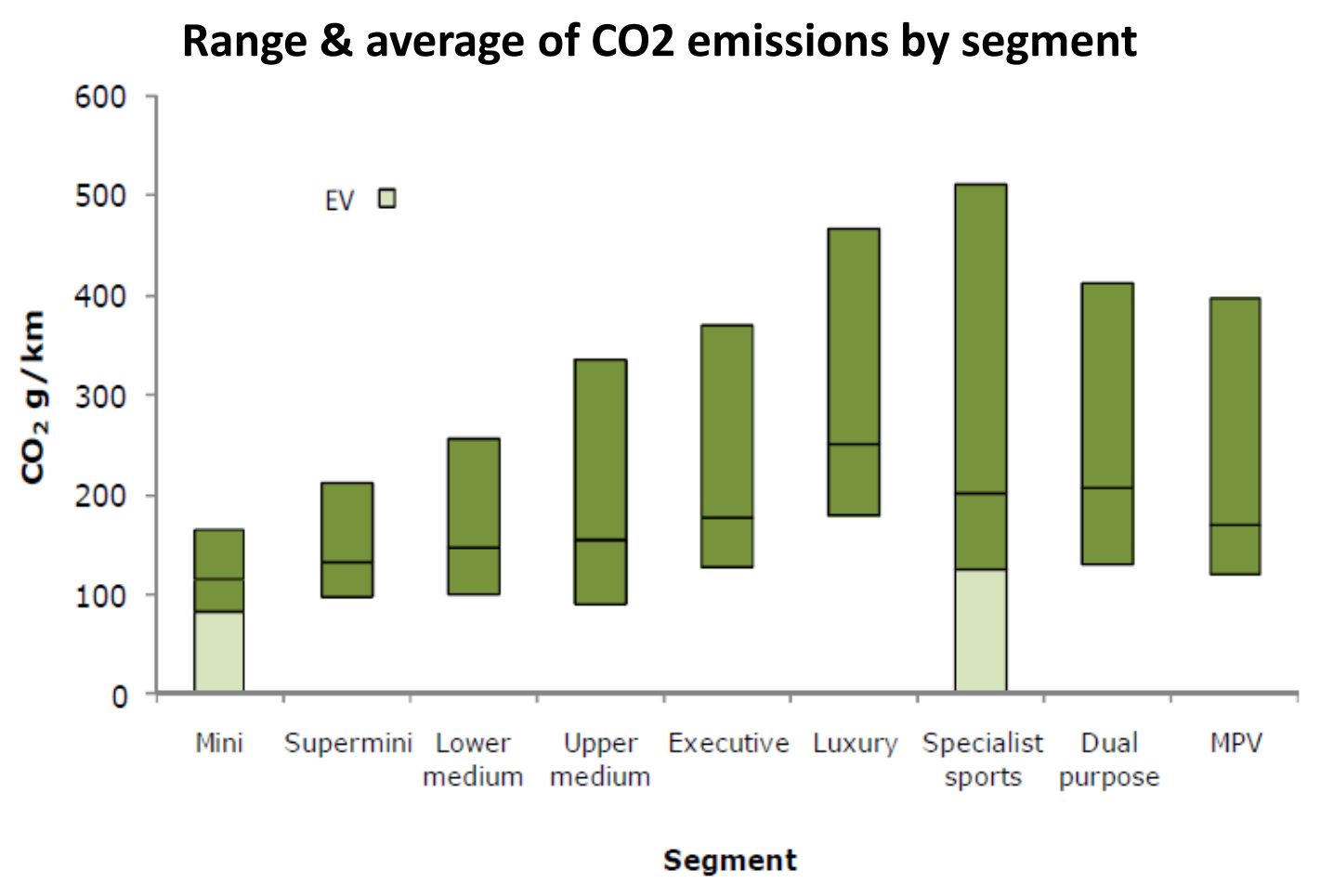
SMMT 2010

The most efficient vehicles in each market segment have around 30% better fuel consumption than the segment average



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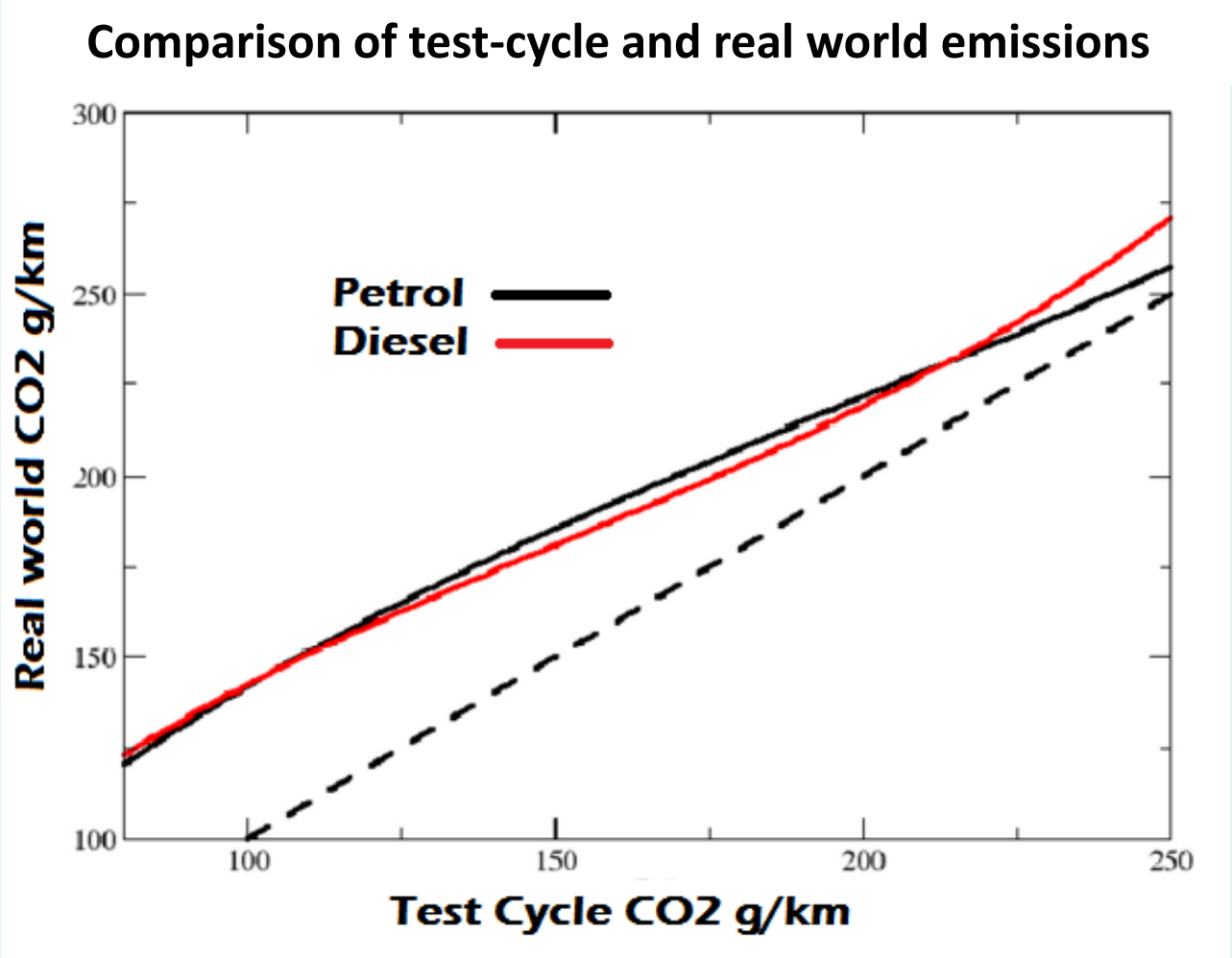
SMMT 2010

The disparity between real world and test cycle emissions increase disproportionately for more efficient vehicles



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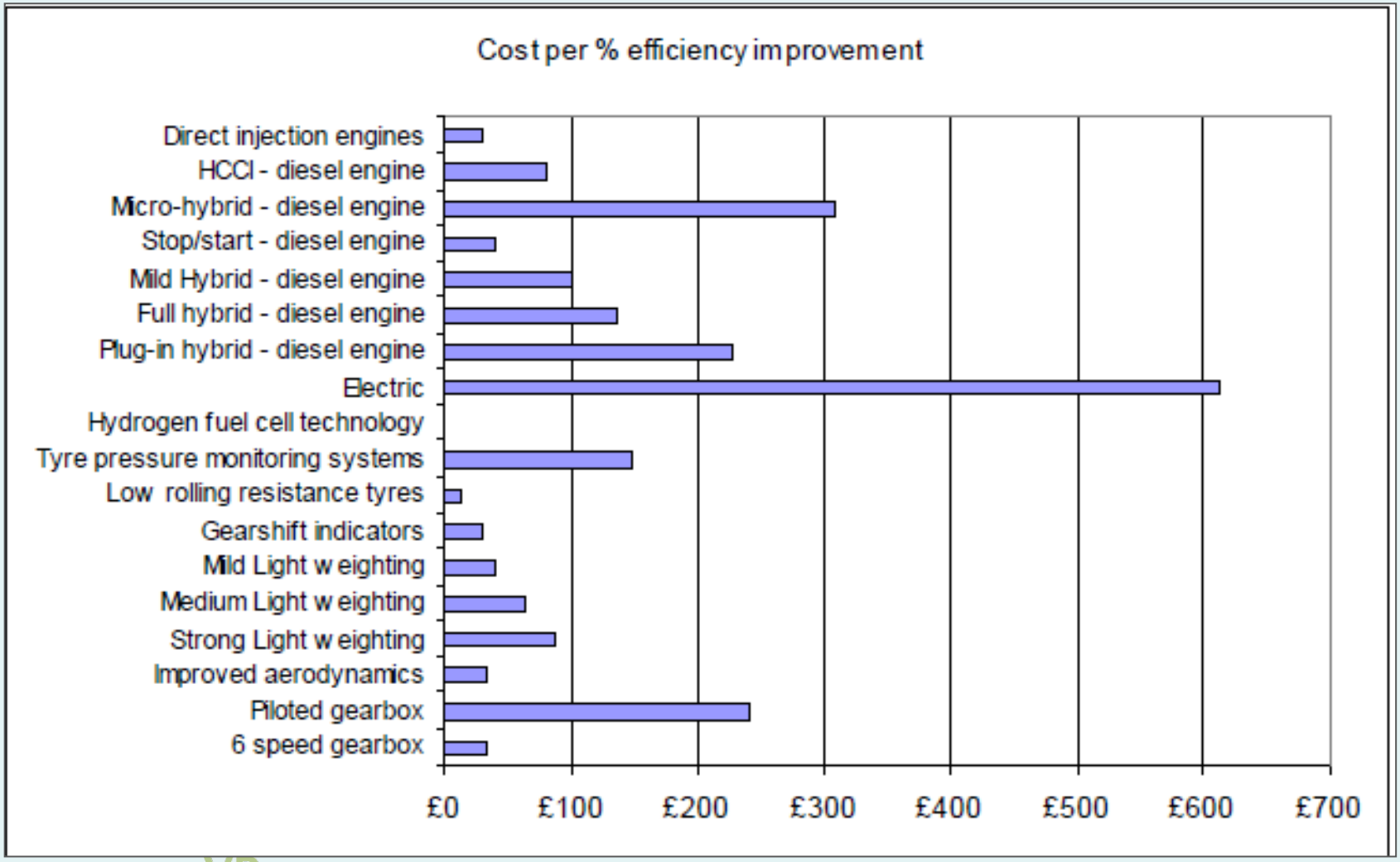
TNO 2009

There are a range of closer to market technologies for vans which deliver significant CO2 and fuel savings



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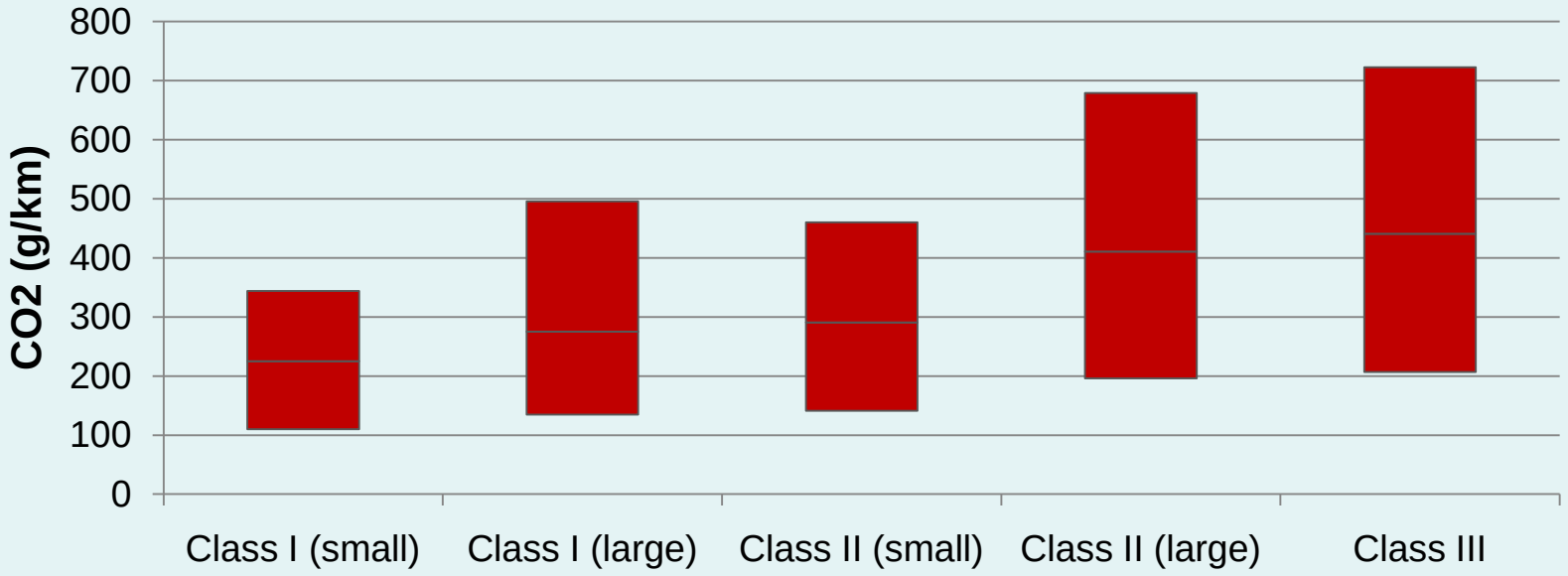
Source: AEA 2010

Choosing best in class van offers significant opportunities to reduce carbon footprint now



Vehicle type	Min CO2	Ave CO2	Min v Ave
Class I (small)	111	115	-3.5%
Class I (large)	135	139	-2.9%
Class II (small)	141	151	-6.6%
Class II (large)	196	216	-9.3%
Class III	207	234	-11.5%

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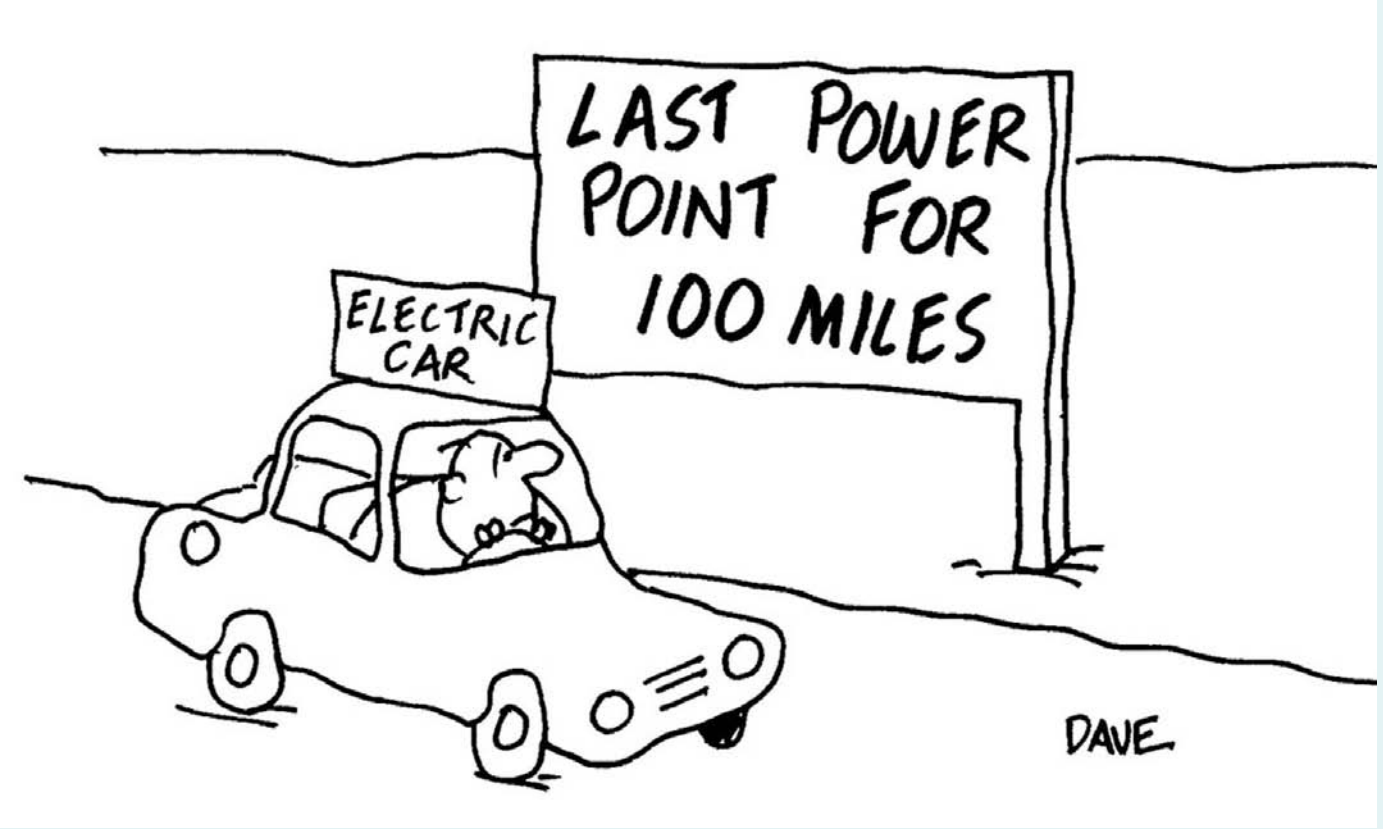
Source: AEA

Electrification of transport



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There is global momentum towards electrification of transport

- EVs address key geopolitical concerns:
  - Climate
  - Energy security
  - Peak oil
- Early consumer interest as sustainable, cool, high technology products
- Substantial public funding of research, development and demonstration and purchase support
- Investment & commitment from global OEMs

But ...early visionary vehicles do not create a mass market

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A range of EVs from global manufacturers will become available from 2011 – most based upon current car platforms

Toyota FT EVII - 2012

Toyota Prius PHEV - 2011

Nissan Leaf – 2011

Mitsubishi MiEV – 2010
Citroen Evie – 2011

Renault Fluence – 2011
(not EU) + others

Vauxhall Ampera - 2011

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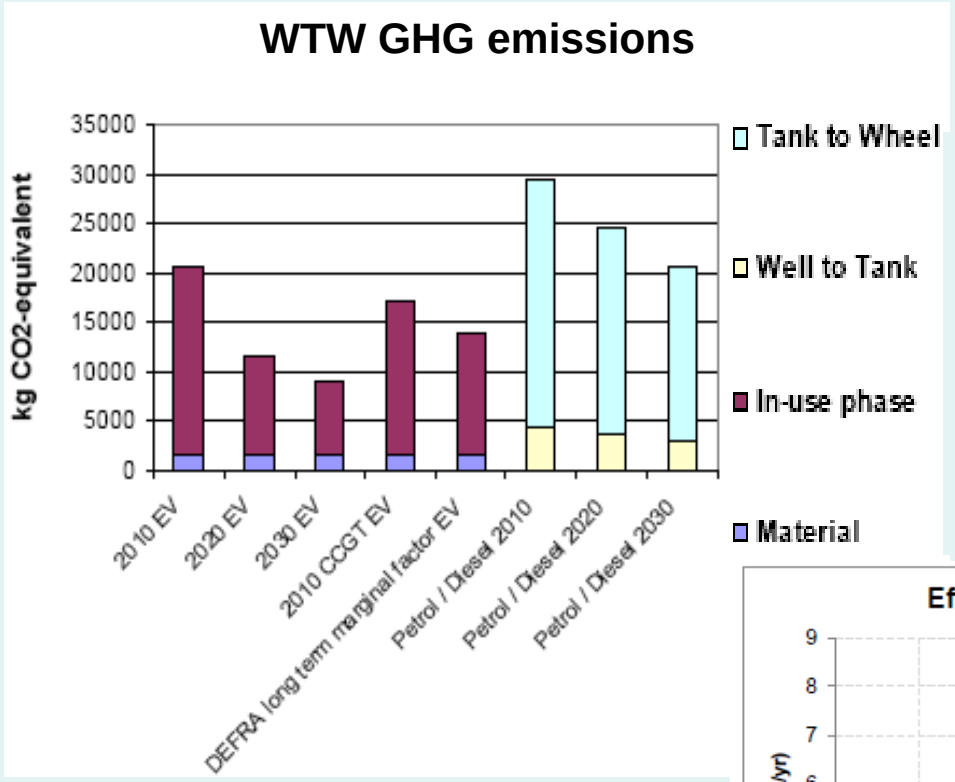
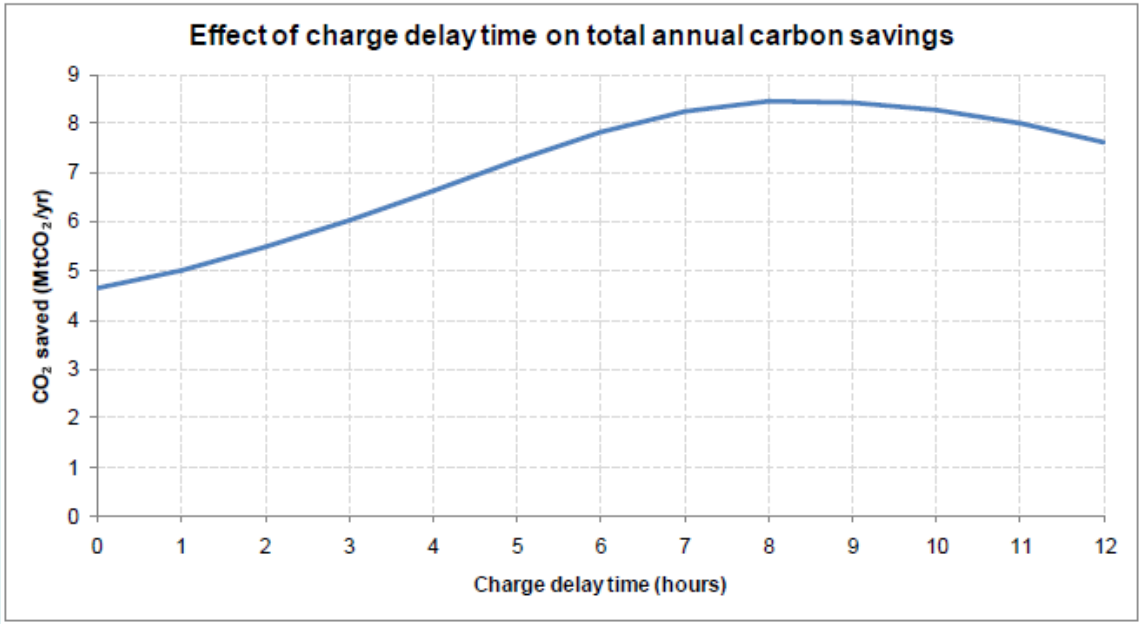
EVs deliver a third lower CO2 emissions using current UK grid-mix – off-peak recharging increases the benefit by approaching 50%



Cenex / Arup 2008

Element Energy 2009



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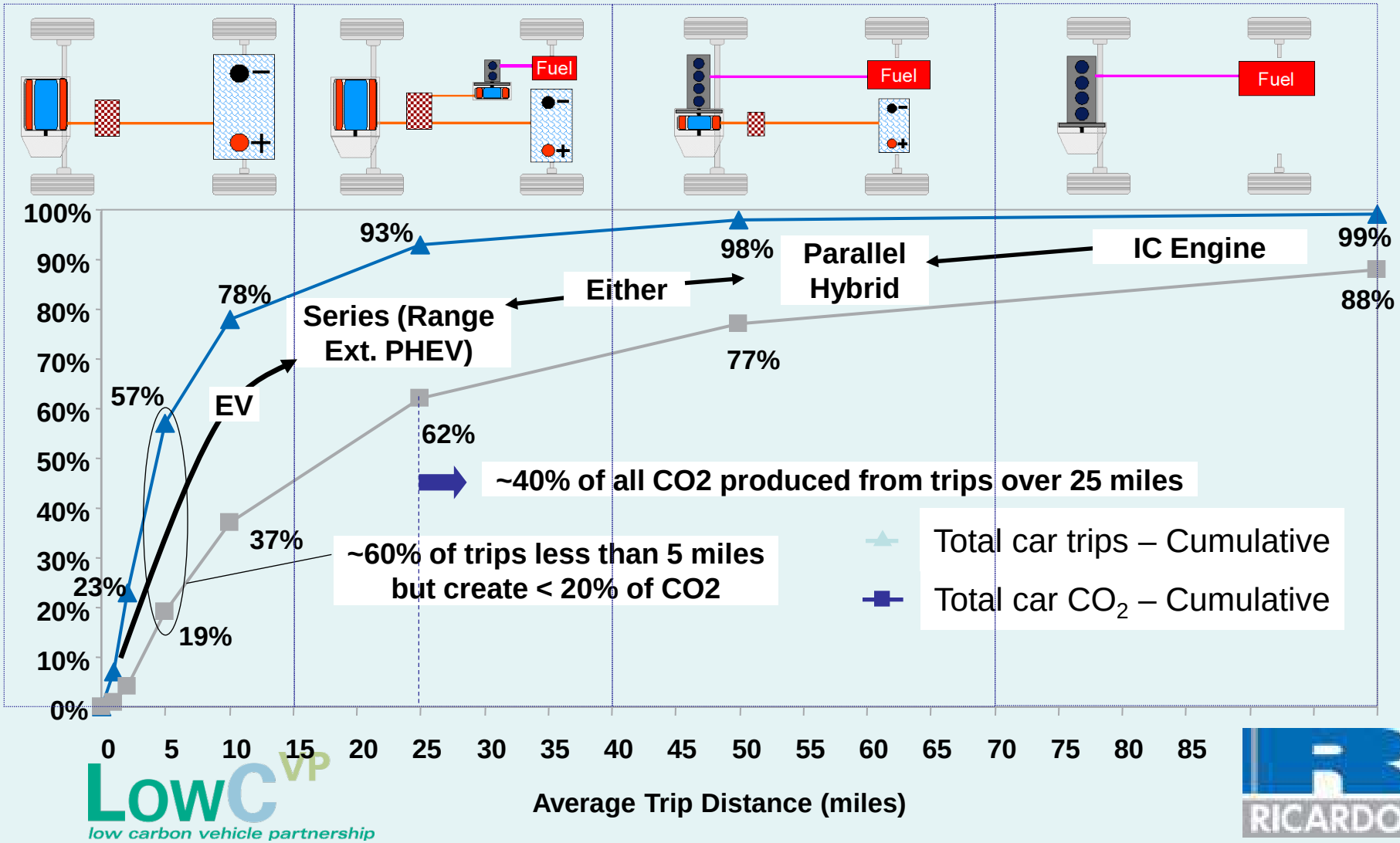
Technology will be tailored to the application - EV for city use, PHEV or parallel hybrid for medium length journeys; IC for long journeys



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RICARDO

In the medium term electric vehicles will only appeal to most car-buyers with significant incentives

EV users are educated, relatively affluent, multi-car households with off-road parking

- High capital costs – key purchase determinant
  - Leasing options likely
- Fuel-cost savings heavily discounted
- Requirement for very high range
- Range anxiety reduces usage to 33-50% of technical range
  - Fast charging / battery swap builds confidence
- Low willingness to pay – beyond early adopters
- Limited availability of recharging infrastructure
- New technology aversion

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Fleets are more sceptical than private buyers and concerns increase with experience

	High Price	Limited Range	Time to charge	Inconvenience of recharging	No recharging points	Lack of power or performance	Unfamiliarity	Lack of choice
Household EV owners	+++	++	+	+	++	+	+	++
Household EV considerers	+++	++	+	+	++	+	+	++
Commercial EV owners	+++	+++	+++	++	+++	++	+	+++
Commercial EV considerers	+++	++	+	+	++	+		+

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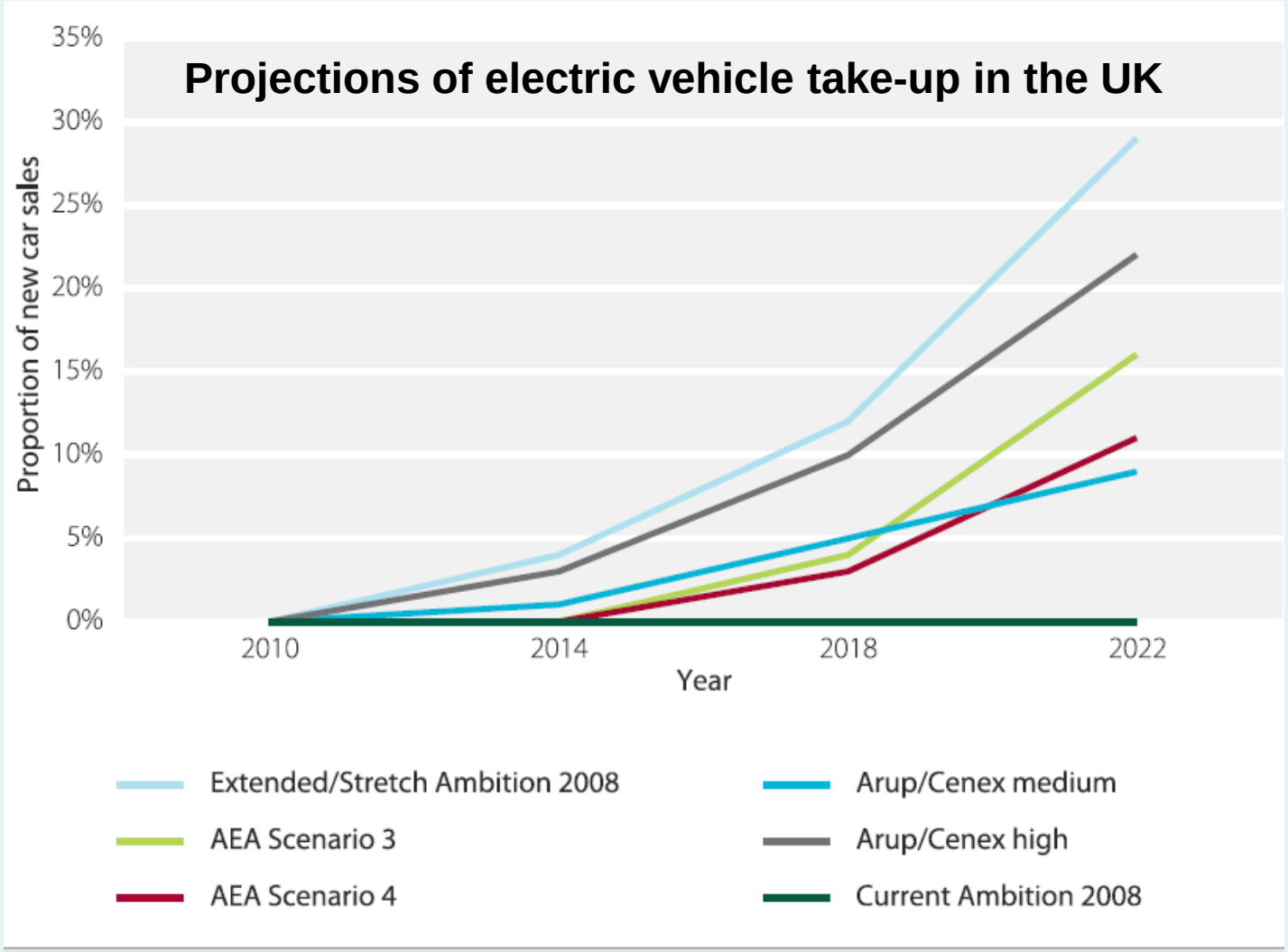
Element Energy, 2009

Market uptake is highly uncertain – depending upon public acceptability, battery costs / subsidies



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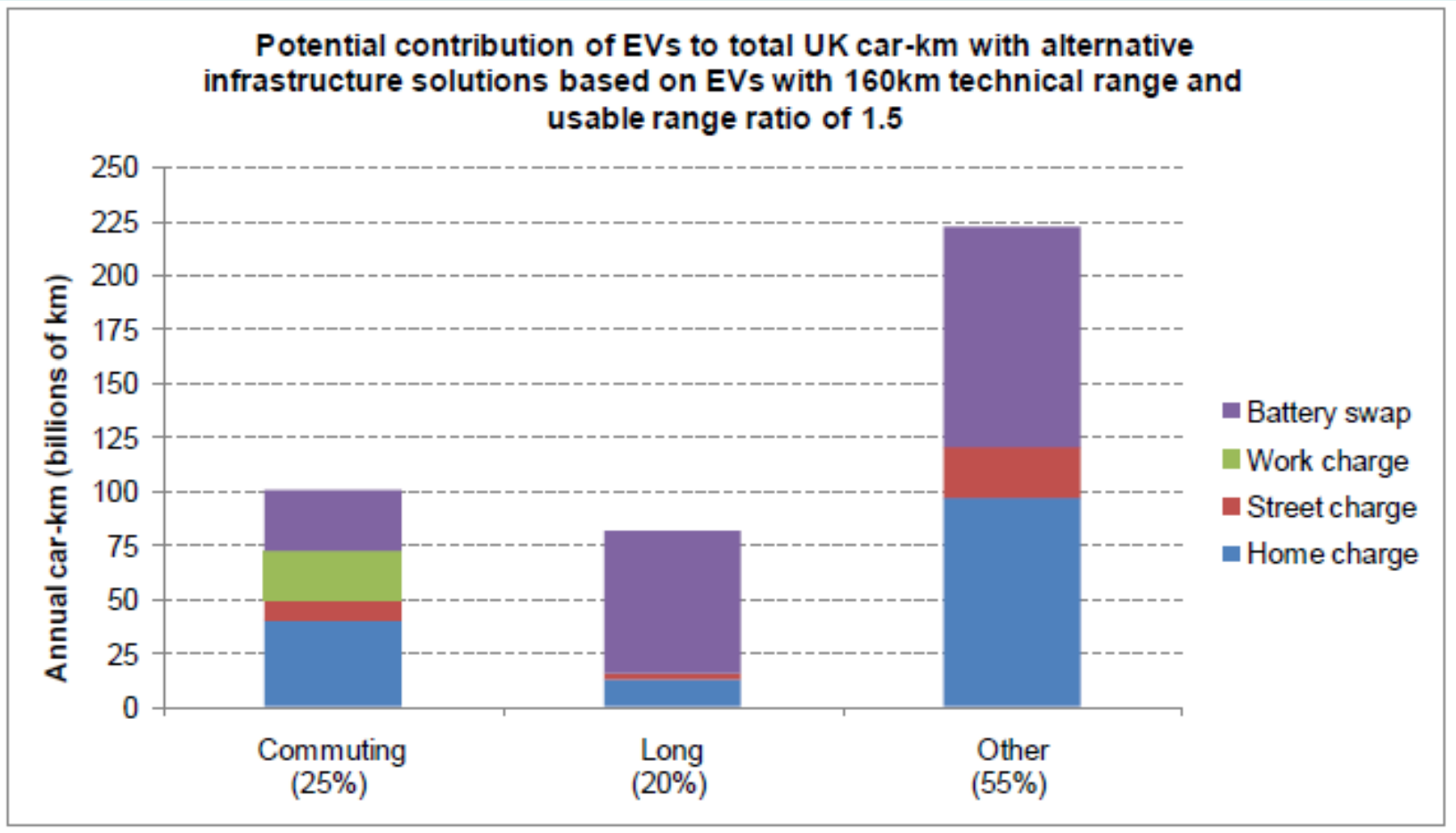
Climate Change Committee 2009

Visible on-street charging may be important to increase public acceptability without being technically important



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Element Energy, 2009

The Coalition Government is maintaining strong support for EVs

- Office of Low Emission Vehicles
- £250M purchase support fund for cars
  - 2011-14
  - £5k per vehicle to 2012
- £140M Low Carbon Vehicle Innovation Platform
- £30M infrastructure support
  - Plugged-in-Places
- £5M Ultra-low carbon car competition
  - 340 vehicles
  - Joint cities demo programme
- £20M public procurement support for electric vans?

The elephant in the room
- Fuel duty revenues

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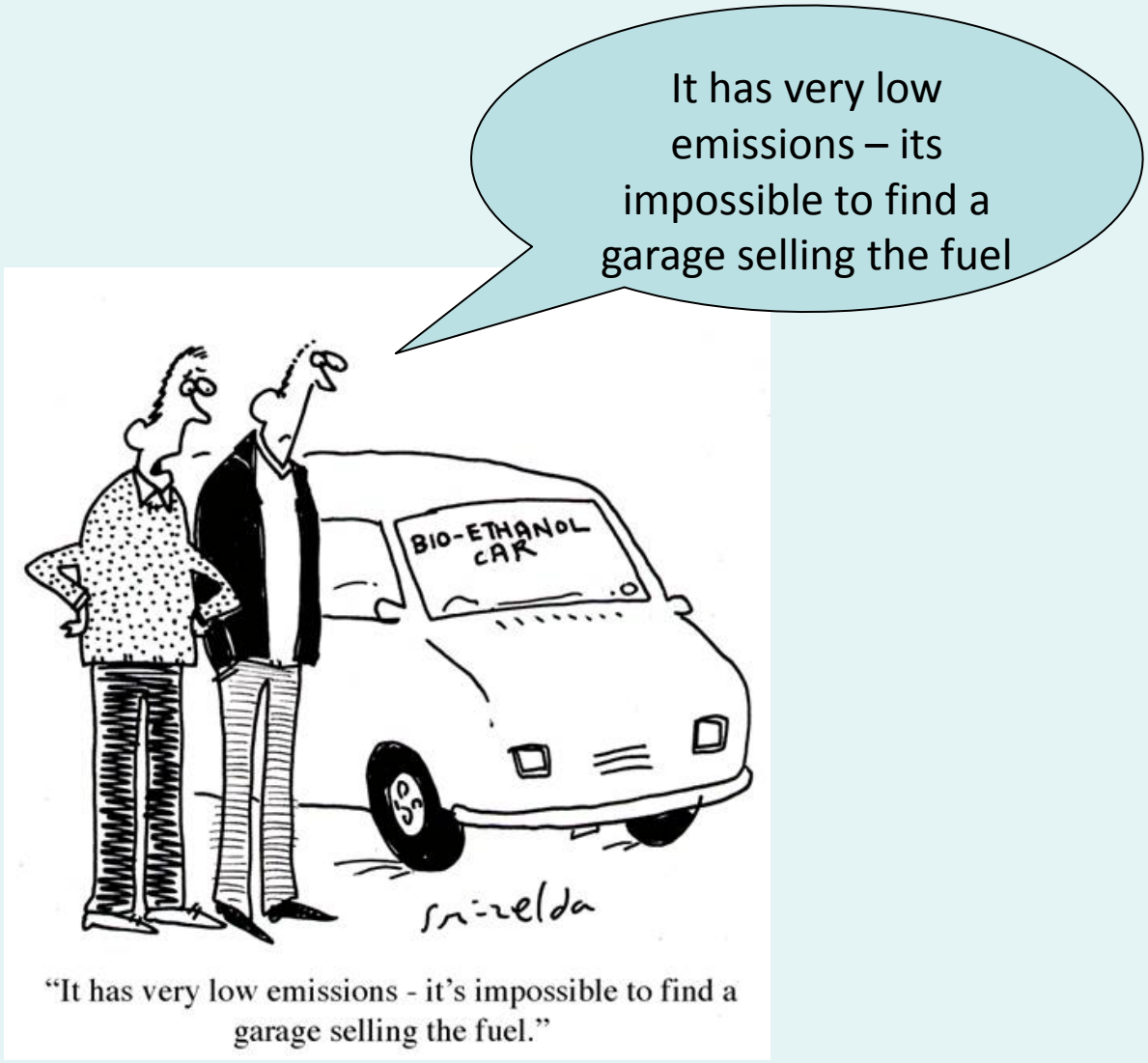
Alternative fuels



"It has very low emissions - it's impossible to find a garage selling the fuel."

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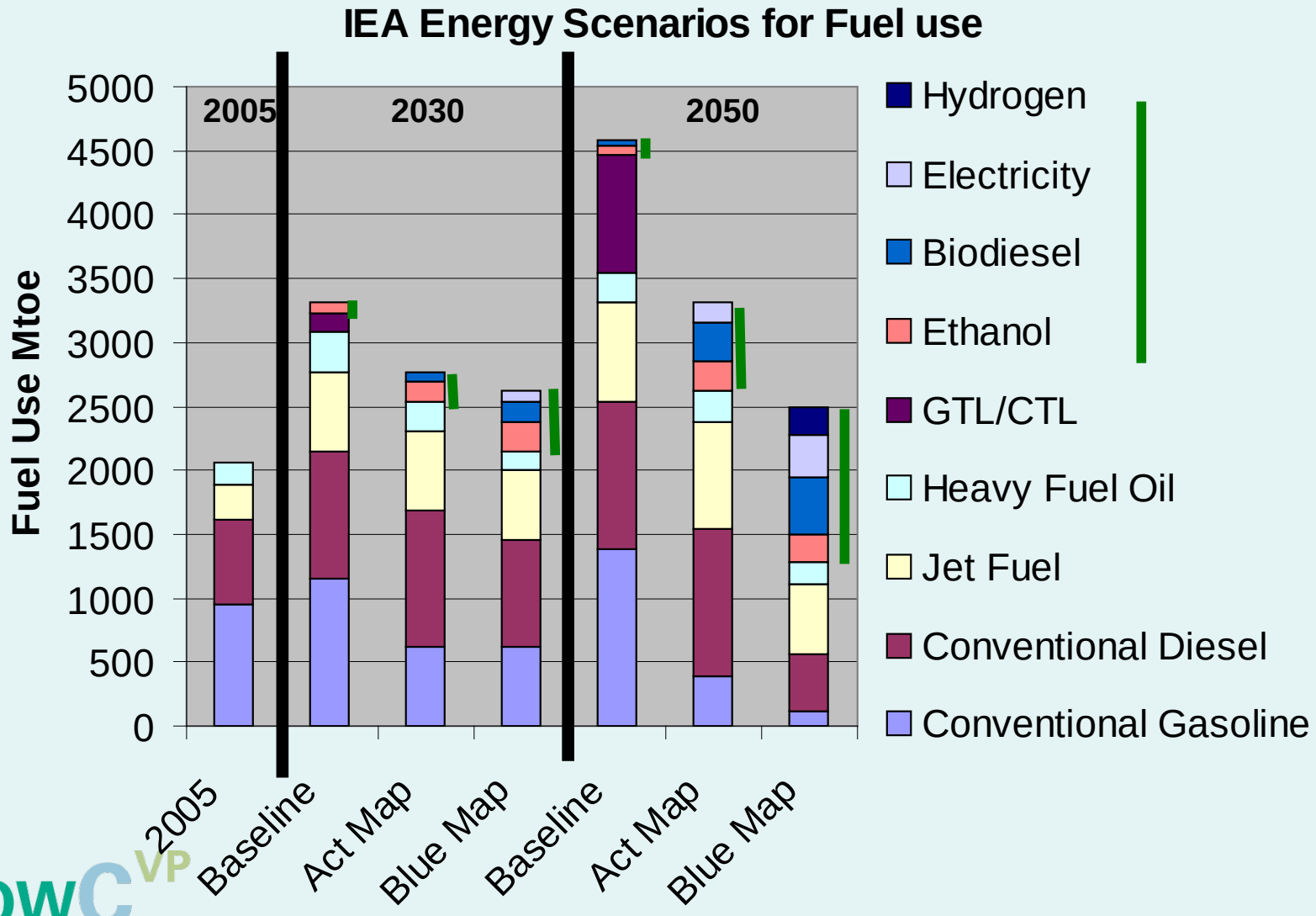
IEA scenarios show an increasing penetration of renewable transport fuels to meet increasing demand



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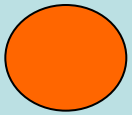
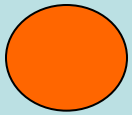
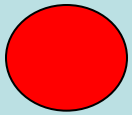
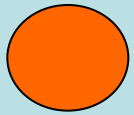
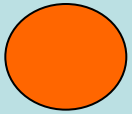
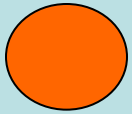
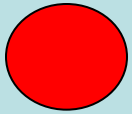
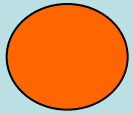
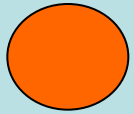
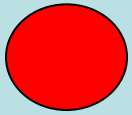
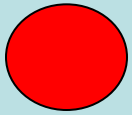
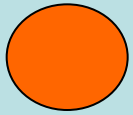
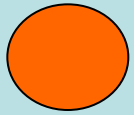
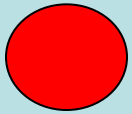
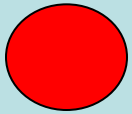
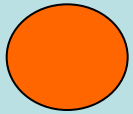
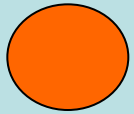
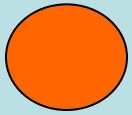
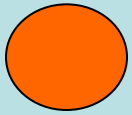
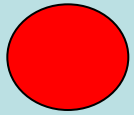
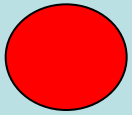
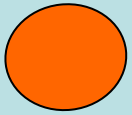
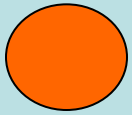
IEA 2008, Energy Technology Perspectives

There remain challenges with all current renewable transport fuels

	Current Biofuel	Adv. Biofuel	H2-ICE	H2-FCV	Bio-methane	EV
Technology readiness						
Cost competitiveness						
Vehicle availability						
Infrastructure deployment						
Driver acceptability						
Sustainability						

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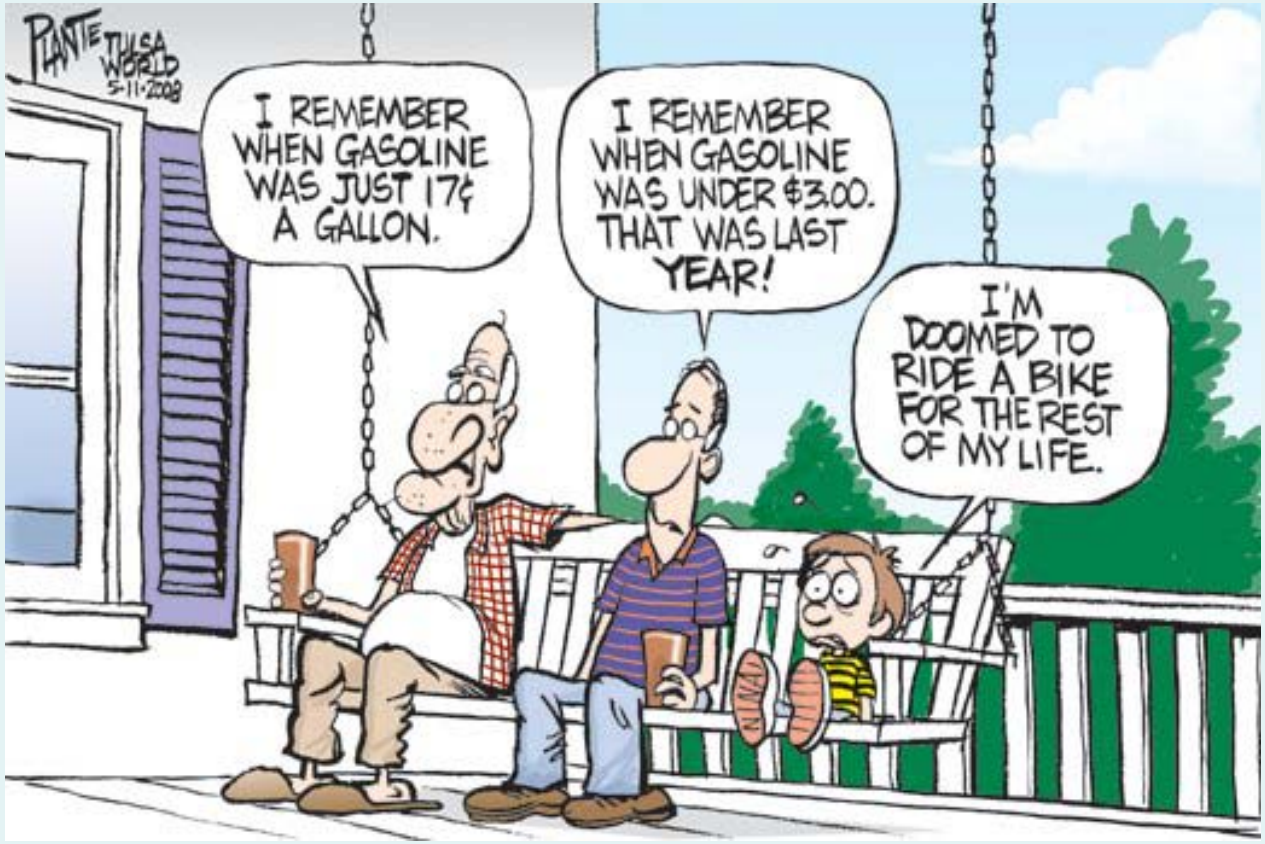
The relative scores do not represent LowCVP policy

Final Thoughts



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In the next 5-years?

Small, light-weight, efficient cheap vehicles

e.g., TATA Nano

Diesel hybrid

e.g., Citroen C4

Efficient family cars

e.g., Ford Econetic

Electric vans and gas trucks

e.g., Modec

In-use efficiency tools

e.g., Fiat Eco-drive

An increasing range of EVs e.g., Leaf

Final Thoughts

- We must wean ourselves off our petroleum dependency
- There are no silver bullets
- Selecting fuel efficient models can deliver significant savings now!
- Vehicle efficiency can be improved by 50% using existing technologies that payback within c4 years
- Barriers to electrification of transport are unlikely to be resolved quickly; the market share of electric and plug-in hybrid vehicles will become important 2020+; but gain experience early
- Beyond 2020 renewable fuels will play an increasing important role including biofuels and hydrogen
- Technology is only part of the solution – demand management and building public transport infrastructure to encourage modal shift is crucial

2000

2004

2006

2008

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Any Questions?

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The Low Carbon Vehicle Partnership

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Metrics are confusing .... In tests the most efficient new cars emit less than 100g/km CO2; 65-75 mpg; an average new car is 140g/km 45-55 mpg

CO2 g/km test	VED Band	Diesel mpg	Petrol mpg
100 g/km	A	75 mpg	64 mpg
125 g/km	D	59 mpg	51mpg
150 g/km	F	49 mpg	42 mpg
175 g/km	H	39 mpg	39 mpg
200g/km	J	35 mpg	33 mpg
225 g/km	K	31 mpg	30 mpg

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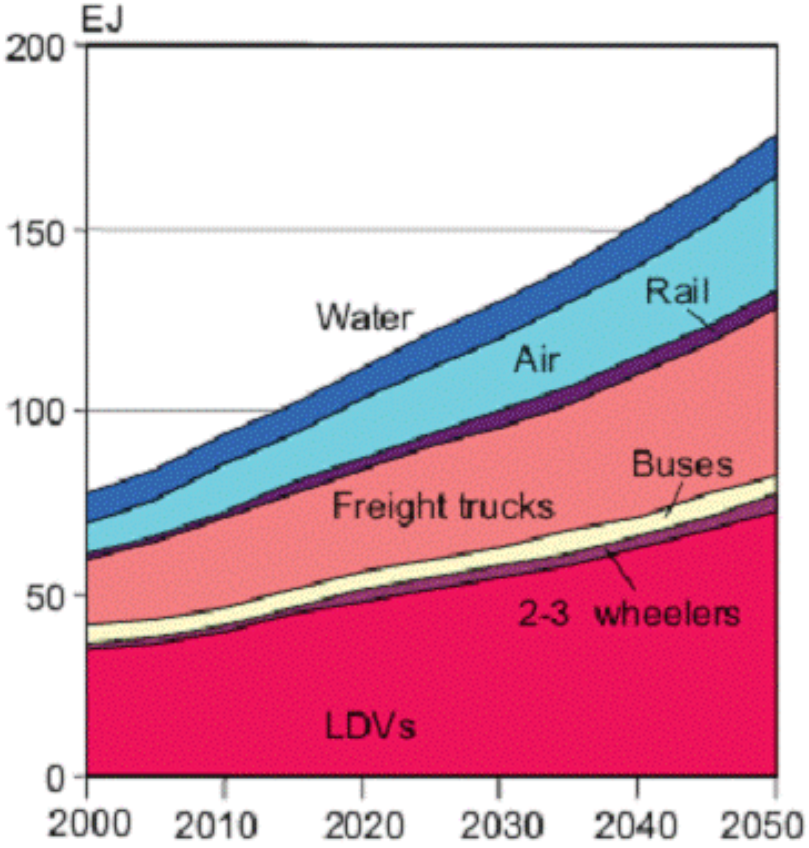
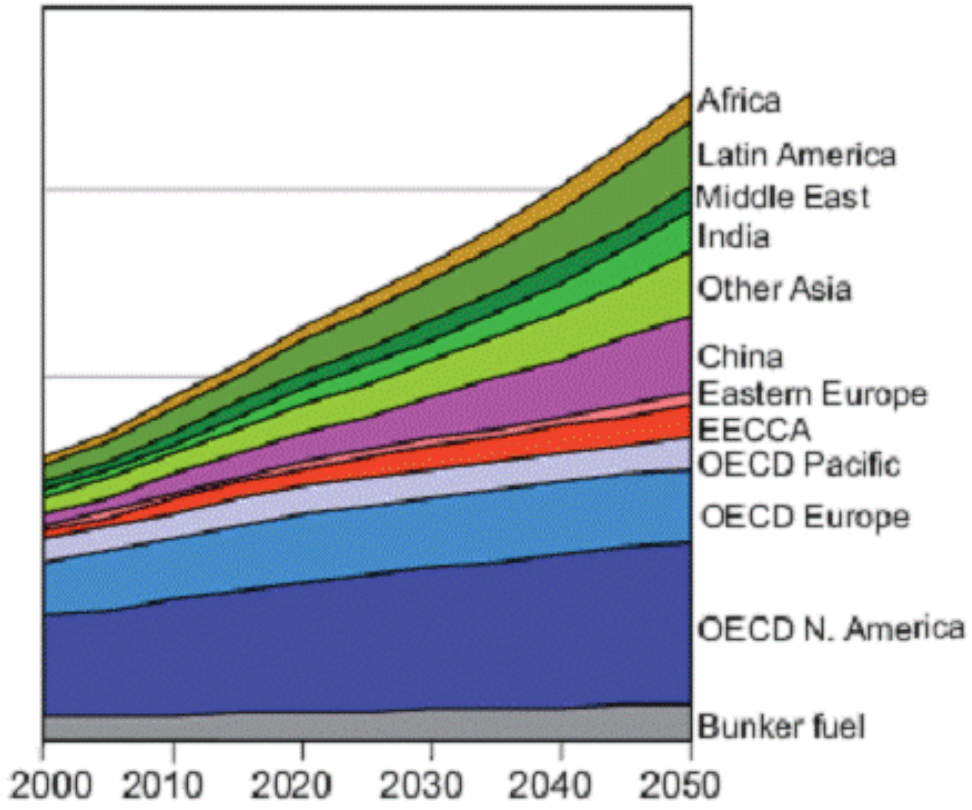
LowCVP works with multiple stakeholders to tackle market barriers and stimulate change

Global energy demand for transport is projected to more than double by 2050





IEA 2008, citing WBCSD 2004

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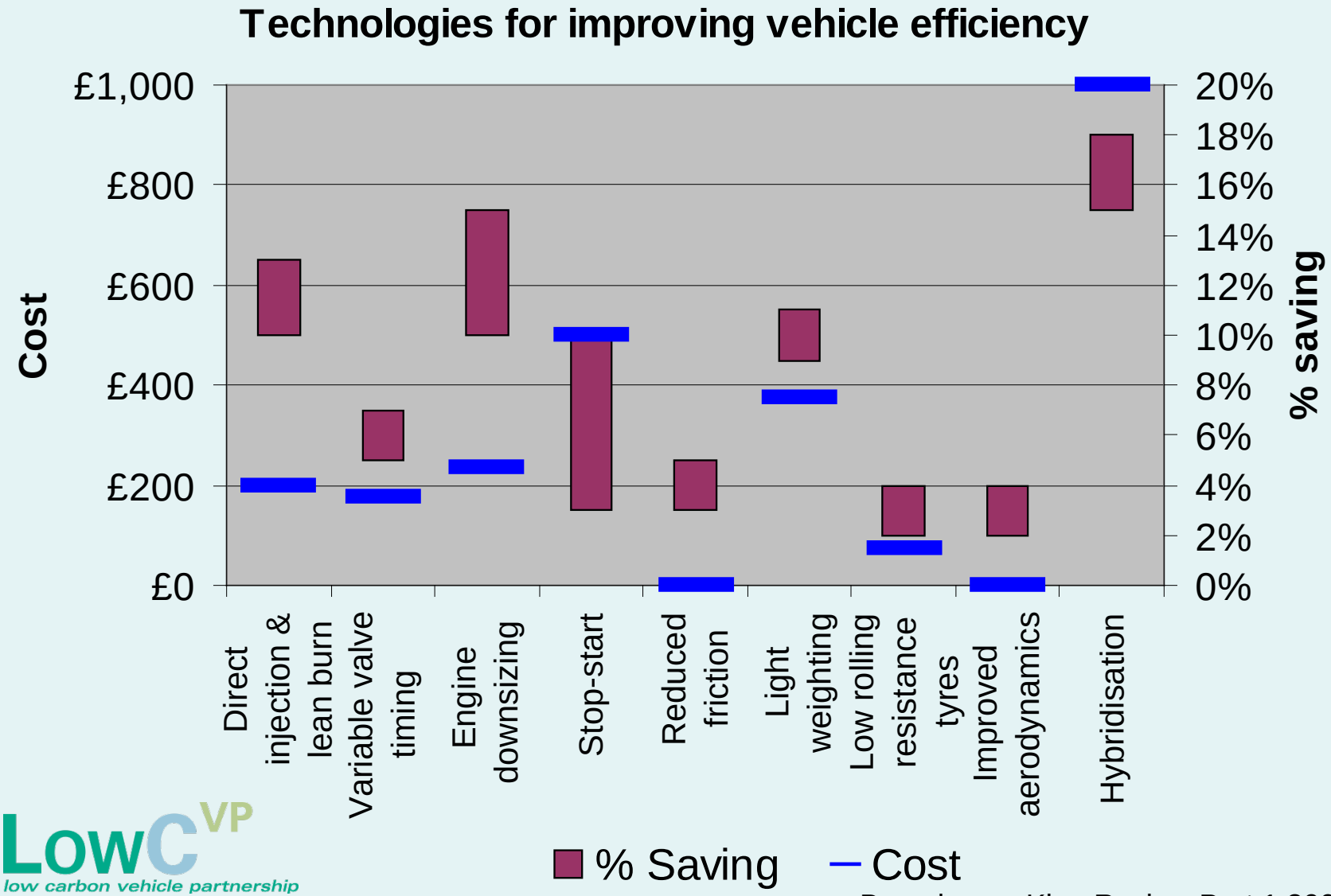
A range of existing technologies are available to reduce CO2 emissions – at a cost



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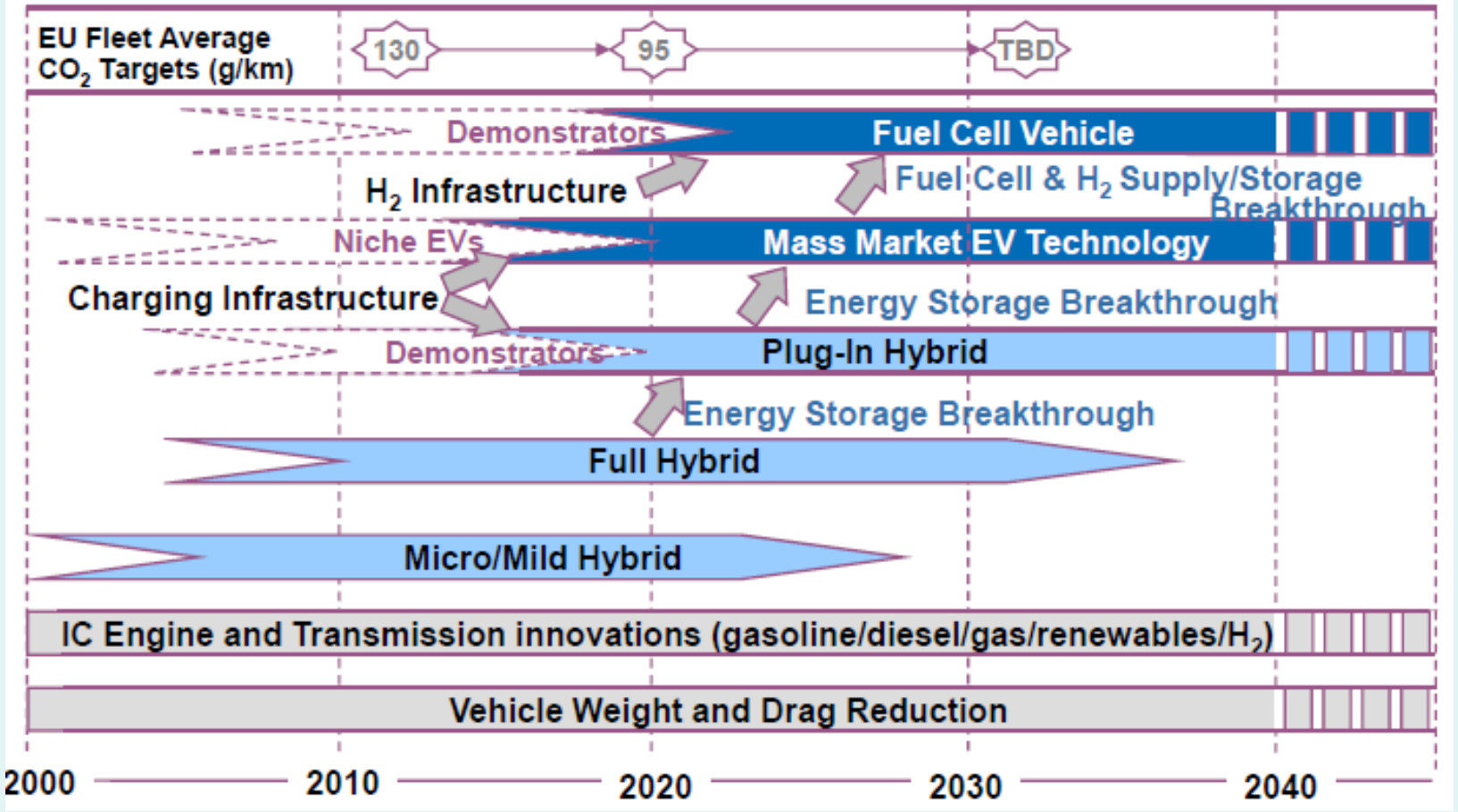
Based upon King Review Part 1 2008

There is emerging consensus on the future evolution of low carbon car technologies many of which are applicable to vans

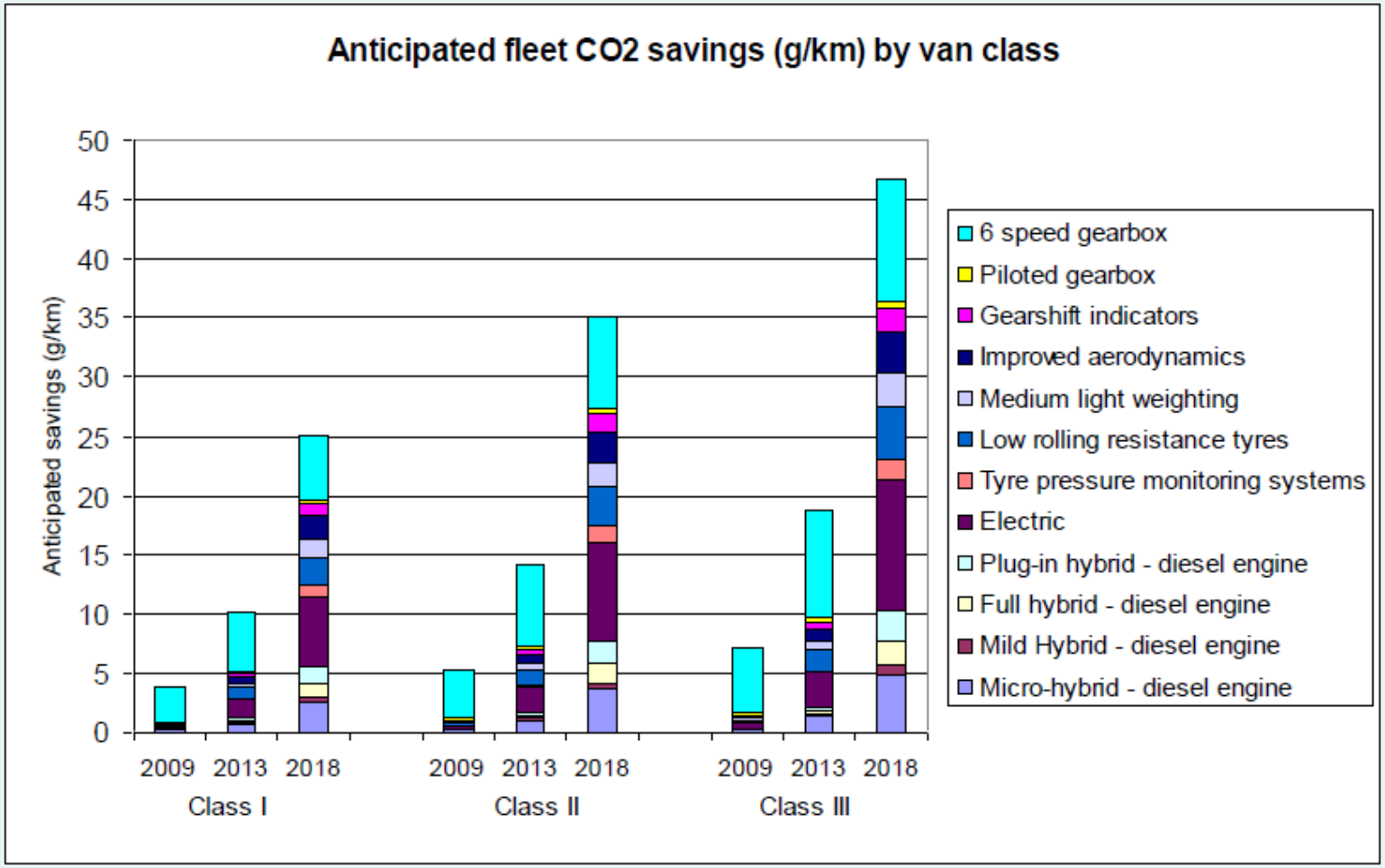
NAIGT low carbon car technology roadmap



LowCVP
low carbon vehicle partnership

Source: BIS 2009

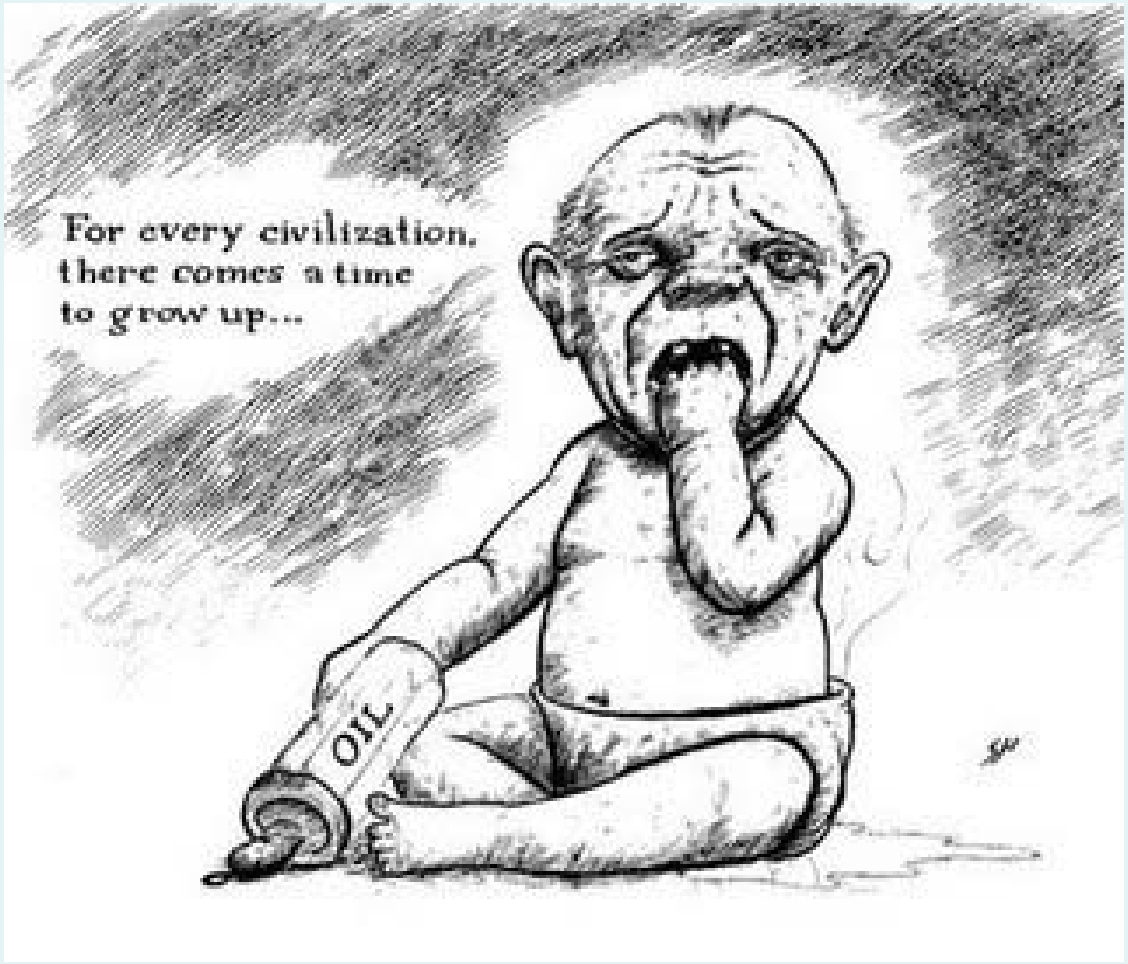
Over the next decade a range of technologies are expected to help deliver reductions in CO2 emissions



Source: AEA 2010

LowCVP
low carbon vehicle partnership

The scale of the challenge



LowCVP
low carbon vehicle partnership