

Low Emission Cities Workshop

Best practice measures for increasing the take up of low pollution and carbon vehicles in cities

Monday 6th July, City of York Council

Introduction to low emission vehicles policy overview and overcoming barriers

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LowCVP - accelerating a sustainable shift to lower carbon vehicles and fuels

- LowCVP is an independent public-private stakeholder partnership.
- Established in 2003 by UK Government

Objectives

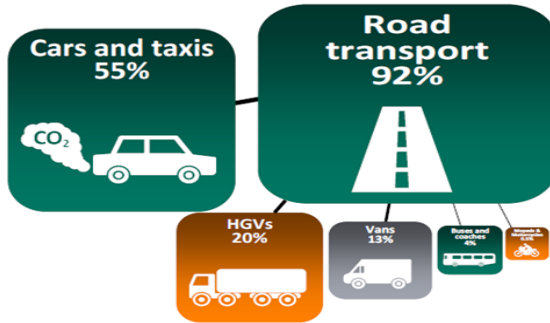
- Building an understanding of the optimal pathways to low carbon road transport.
- Influencing Government policy mechanisms and future direction.
- Supporting collaborative initiatives that develop the market for low carbon vehicles and fuels.



Low Emission Bus Policy
 Biofuel Policy Development
 Biomethane/Natural Gas Trucks
 Influencing consumer behaviour
 Clean Vehicle Technology Fund
 Low Carbon Truck Accreditation
 Technology Roadmaps

There are various national policy drivers for low emission vehicles in the UK

Reducing CO₂ emissions from road transport, achieve targets set in Carbon Plan



Reducing NOx/PM emissions from road transport, safeguarding public health



Improving energy security, reducing reliance on fossil fuels



Economic development and job creation – via automotive sector

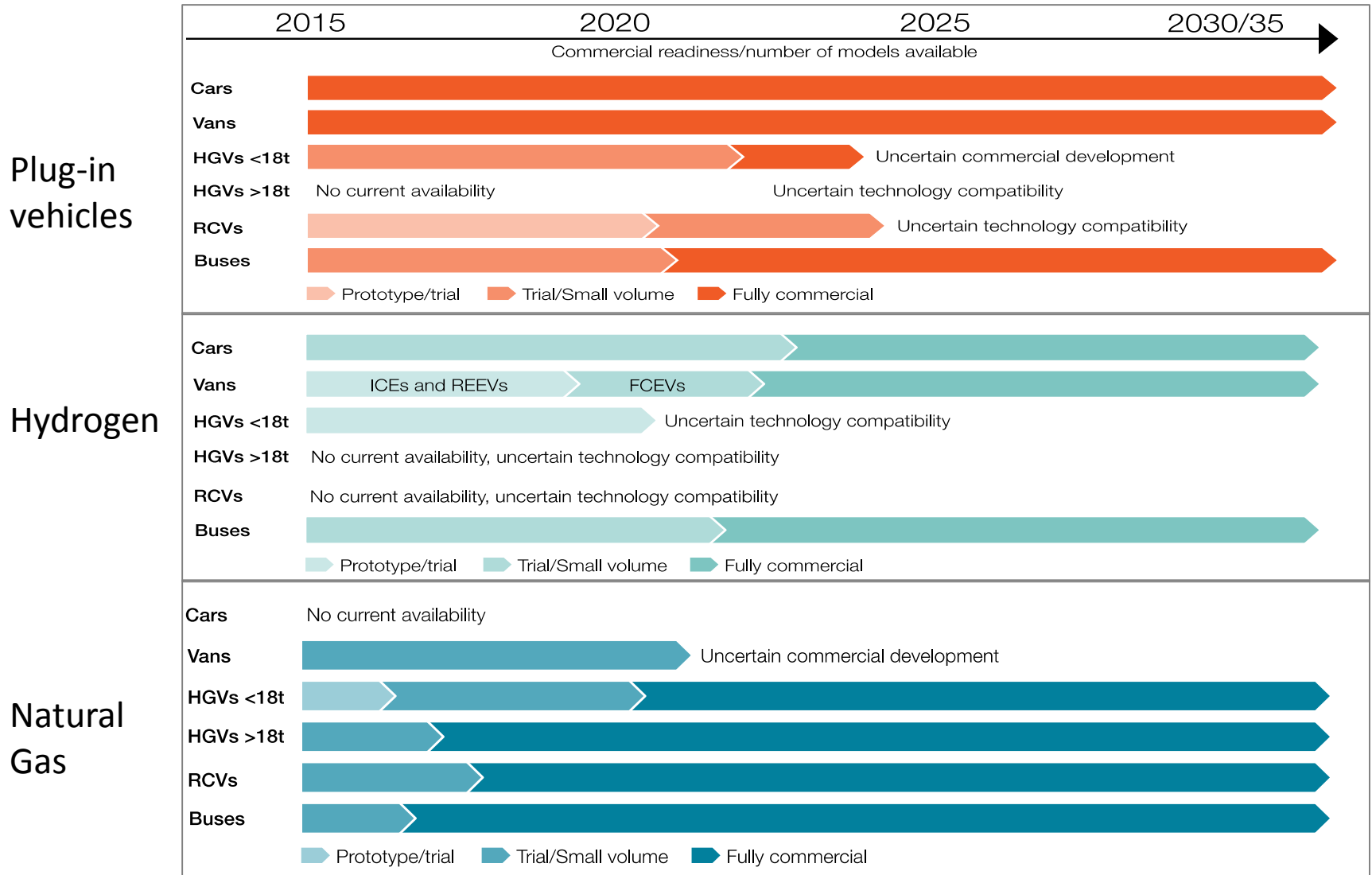


Low Emission Vehicle – Definition

- No official definition but would aim to achieve low to very low air pollution and CO₂ emissions.
- Portfolio of fuel and technology options – no silver bullet!
- **Alternative fuels – natural gas, LPG, hydrogen, sustainable biofuels**
- **Advanced powertrain technologies – battery electric, range extended, plug-in hybrids (ULEVs), hydrogen fuel cell**
- **Efficient internal combustion engines**
- **Internal combustion engines which meet latest Euro Standards (Euro 6)**
- There are multiple standards for different vehicle types e.g. Euro Standards and EU New Car CO₂ Regulations, national standards for funding eligibility

Targets and standards for LEVs are not static – these require regular periodic review and updating in national and local policy

Availability and Market Projection of A Selection of Technologies and Fuels

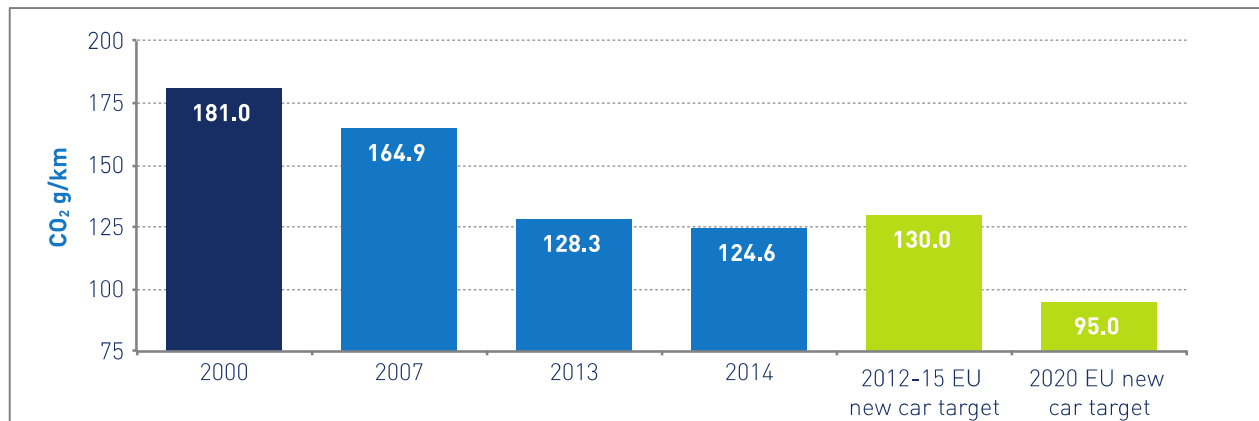


FCEV: Fuel Cell Electric Vehicle
HGV: Heavy Goods Vehicles
ICE: Internal Combustion Engine
RCV: Refuse Collection Vehicle
RE-EV: Range Extended EV

European Policy – Euro Standards and New CO₂ Regulations for Cars

Euro standard	Introduction date		Emission limits		
	New approvals	All new registrations	Petrol NOx	Diesel NOx	Diesel PM
Euro-1	1 July 1992	31 December 1992	0.97g/km*	0.97g/km*	0.14g/km
Euro-2	1 January 1996	1 January 1997	0.5g/km*	0.9g/km* (direct injection)	0.1g/km
Euro-3	1 January 2000	1 January 2001	0.15g/km	0.5g/km	0.05g/km
Euro-4	1 January 2005	1 January 2006	0.08g/km	0.25g/km	0.025g/km
Euro-5	1 September 2009	1 January 2011	0.06g/km	0.18g/km	0.005g/km
Euro-6	1 September 2014	1 September 2015	0.06g/km	0.08g/km	0.0045g/km

European Emission Standards – Cars

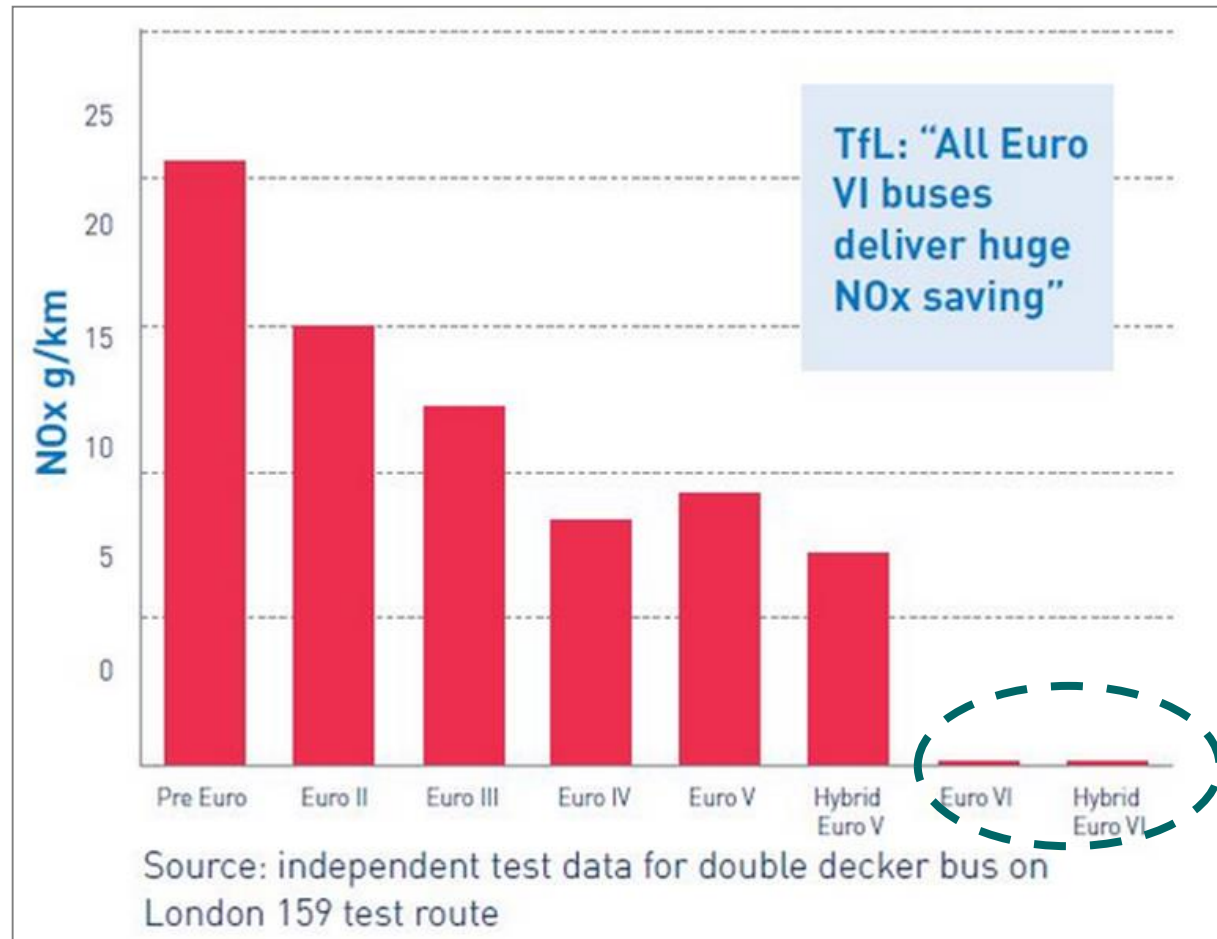


Average new car CO₂ vs EU new car targets

Accompanying set of standards for light commercial vehicles

Real world testing of Euro VI shows high NOx emission reductions

*Independent real-world testing by TfL shows:
Euro VI 95% less than Euro V
NOx emissions can be lower than the Euro VI car limits (0.08g/km)*



The emissions reductions seen in buses are being achieved with a worldwide harmonised test cycle and real world testing with portable emissions measurement systems (PEMS). Similar process expected from LDVs.

National Policy Framework

TRANSPORT	PLANNING	AIR QUALITY	CLIMATE CHANGE	PROCUREMENT
Local Transport Act 2008	National Planning Policy Framework	Environment Act 1995 The Air Quality Standards Regulations 2010 Mayor's Air Quality Strategy 2010	Climate Change Act 2008	The Government Buying Standards For Transport (Vehicles) 2012
Road Traffic Regulation Act 1984	Permitted Development Rights 2011	Local Government Act 2000	Fuel economy labelling and CO ₂ emission based car taxation	Cleaner Road Transport Vehicles Regulations 2011
Road Vehicle (Construction and Use) Regulation 1986	Section 106 of Town and Country Planning Act 1990/ Section 75 of Town and Country Planning (Scotland) Act 1997	Driving the future today: a strategy for ultra low emission vehicles in the UK: £500 million funding package to support uptake of ULEVs from 2015 to 2020 – grants for cars, taxis, vans, buses, motorcycles and infrastructure		
Localism Bill 2010-11	Community Infrastructure Levy (CIL) 2010	Health and Social Care Act 2012		
Local Transport White Paper 2011				



Office for Low
Emission Vehicles



Department
for Transport



HM TREASURY

LowC^{VP}
Low Carbon Vehicle Partnership

A multitude of barriers exist precluding the wide scale uptake of alternative fuels and ULEVs

	Van Operators	Buses Operators	Public
General	<ul style="list-style-type: none"> Lack of available vehicles especially higher payloads Lack of information about financial benefits and suitability of different fuels and technologies Lack of information sharing between fleet operators 	<ul style="list-style-type: none"> Lack of data on real world performance of low emission buses 	
Electric /Plug-in hybrids	<ul style="list-style-type: none"> Higher capital cost Uncertainty in total cost ownership Battery life/replacement cost Payload penalty Range limitation Resale value Uncertainty in performance 	<ul style="list-style-type: none"> Higher upfront cost Battery life and replacement cost Real world performance Uncertainty in performance/reliability 	<ul style="list-style-type: none"> Performance/reliability Higher purchase cost Battery life Range anxiety/lack of public refuelling Recharge time Lack of awareness and acceptance
Natural gas/biomethane	<ul style="list-style-type: none"> Lack of refuelling stations Uncertainty in performance/reliability 	<ul style="list-style-type: none"> Cost of infrastructure Uncertainty on performance/reliability 	

National and local policy can assist generate demand by public and fleet operators

Policies For Plug-in Light Duty Vehicles

OLEV funding for 2015-2020

- £200 million for the continuation of consumer grants to support ULEV uptake, with the current £5,000 grant remaining in place until at least 50,000 ULEVs have been sold or 2017.
- £30 million to support other vehicles types including vans, continuation for £8000 plug-in van grant
- £35 million city scheme
- £20 million taxis
- £100 R&D

Accompanying policies/initiatives

- EVs are exempt from the Vehicle Excise Duty
- No fuel duty on electricity
- Car fuel economy labels – EV and PHEV
- Go Ultra Low Campaign
- £5 million government procurement programme.



Eligibility Criteria for OLEV PiV Grants

Plug-in car grant:

- Category 1: CO2 emissions of less than 50g/km and a zero emission range of at least 70 miles.
- Category 2: CO2 emissions of less than 50g/km and a zero emission range between 10 and 69 miles.
- Category 3: CO2 emissions of 50-75g/km and a zero emission range of at least 20 miles.

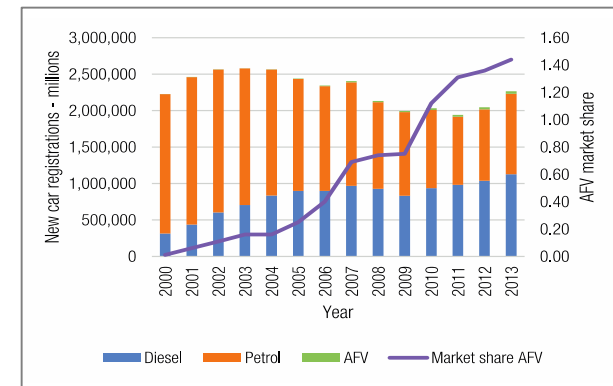
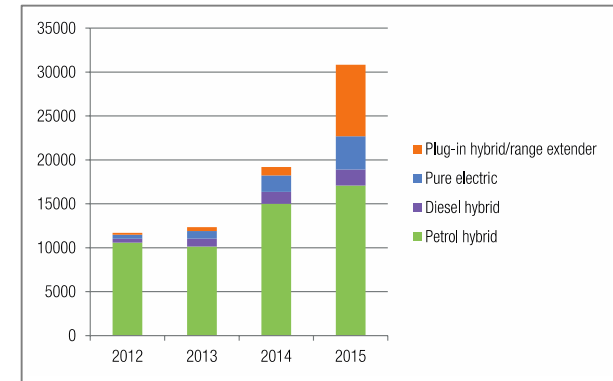
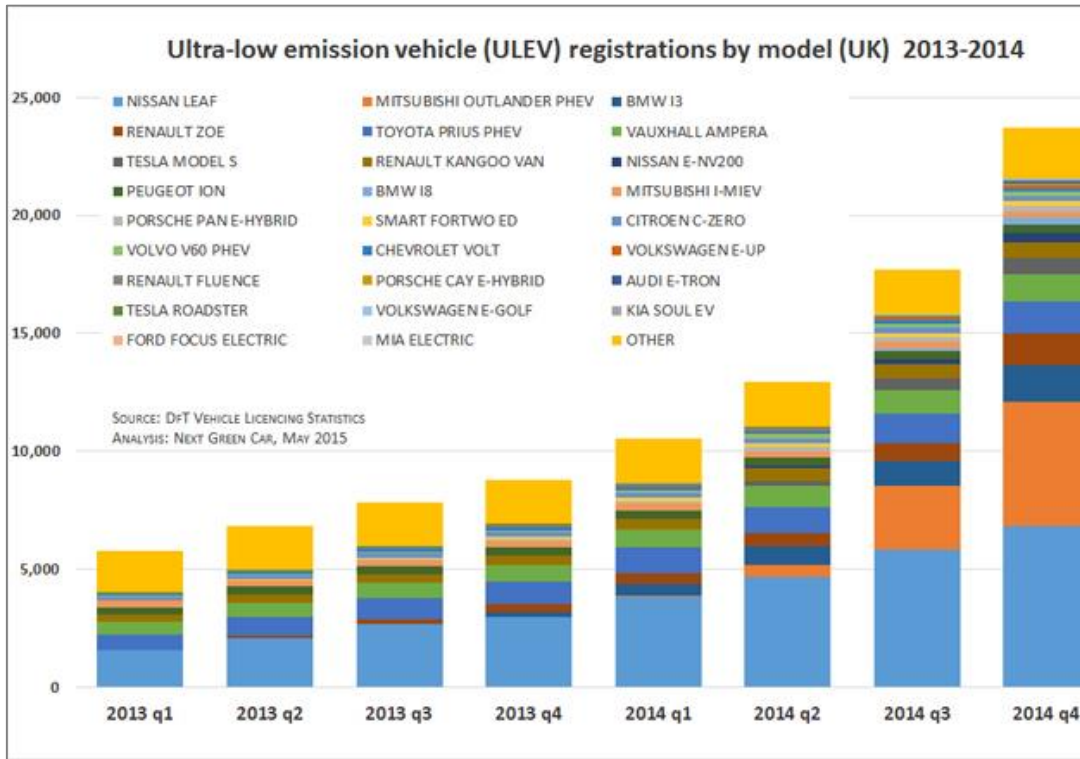
Plug-in taxi grant:

- Taxis are required to meet the same criteria as those set for the plug-in car grant

Plug-in van grant:

- Vehicles must be less than 3.5 tonnes and emit less than 75g/km with a zero emission range of at least 60 miles.

Current Plug-in Car Market



Current Plug-in Van and Taxi Markets

- Plug-in vans: 0.2% new van sales, low uptake
- Limited products - 9 electric van models and 1 REEV. Renault Kangoo highest sales.
- Plug-in taxi: recently entered the market, very low volume



Mercedes Benz Vito Taxi



Fraser Nash Metrocab



Nissan e-NV200

Note: There are other options for vans and taxis – including natural gas and LPG

Establishing Infrastructure

Electric Vehicles

OLEV National EV Infrastructure Strategy

- 500+ rapid chargers by April 2015
- Homes ,train stations, public sector
- Plugged-in Places

OLEV - £32 million fund for installation of charging infrastructure:

- £15 million to continue the Electric Vehicle Homecharge Scheme. drivers will receive a 75% grant of up to £700 towards installation
- £8 million to support public charging infrastructure across the UK
- £9 million to address other infrastructure

8523 charging stations

3285 locations

1143 rapid charging stations

<https://www.zap-map.com/Information>

Hydrogen Vehicles

OLEV - £11 million hydrogen infrastructure

- £7m - install and run up to seven new hydrogen refuelling stations.
- £2m - upgrade existing hydrogen stations.
- £2m - acquisition of around 40 hydrogen-fuelled vehicles for the public sector.

UK H2 Mobility – proposes 60 stations by 2020

Natural Gas Vehicles

- OLEV/Innovate UK (2013) - Low Carbon Truck Trial funded 25 refuelling stations
- OLEV - £4m gas refuelling infrastructure

30 gas refueling stations

<http://www.gasvehiclehub.org>

National Policies – Low Emission Buses

Office of Low Emission Vehicles

- Low Emission Bus Scheme - £30 million to support purchase of low emission buses (*replaces Green Bus Fund*)

Department of Transport

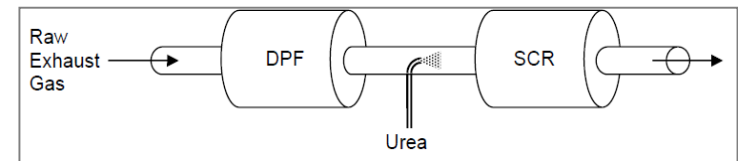
- Bus Operator Subsidy Scheme – LCEB Incentive (6p/km)

Clean Bus Technology Fund

- Retrofit technologies for buses

Clean Vehicle Technology Fund

- Retrofit technologies for range of vehicles



What Is A Low Emission Bus?

A Low Emission Bus (LEB) is defined by the government as “*producing 15% less Well-to-Wheel (WTW) GHG emissions compared with an equivalent Euro 5 diesel bus with the same passenger capacity and must meet the Euro 6 emission standard or proven equivalent.*”

Well to Tank + Tank to Wheel = Well-to-Wheel GHG emissions



GHG Emissions associated with fuel production



GHG and AQ Emissions associated with vehicle operation

LowCVP has developed a Low Emission Bus Accreditation Procedure based on independent vehicle emission testing and real world bus duty cycles.

GHGs of interest are Carbon Dioxide (CO₂), Methane(CH₄) and Nitrous Oxide (N₂O)

- Example of potential technologies for LEBs: hybrid, plug-in hybrid, flywheel hybrid, battery electric, biomethane, hydrogen fuel cell (if H₂ produced via renewable energy sources)

Local authorities can help compliment national policy and overcome barriers

