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Environmental Impacts from Transport

□ Air Pollution:-

- Before 1970's urban air pollution was dominated by combustion of fossil fuels (Visible pollution/smog's)
- Since 1970's, urban air pollution has become dominated by transport emissions. (Less visible, NO₂/particulates)
- Urban air quality has significantly improved since Industrial Revolution up to year 2000.
- Since 2000, air quality levels in Leeds have remained static & now showing signs of worsening again.
- Leeds has declared 6 Air Quality Management Areas
- Annual health burden for Leeds ~ £100 million/poor AQ

Environmental Impacts from Transport

□ Climate Change:-

- Road transport produces 24% of total UK emissions of CO₂, (2.28 million tonnes from W Yorks)
- Transport is now the only major sector where emissions are presently not falling
- Emergency global situation, GHG's still increasing
- Must consider cumulative effect of emissions/time
- UK & World Governments still assume +2C could be avoided, resulting to moderate Climate Change (No Chance!)
- Present projections indicate +3.5 - 4C (Dangerous feedbacks)

Environmental Impacts from Transport

□ Environmental Noise:-

- 50% of the UK population are exposed to noise levels above the WHO guideline for noise: L(Aeq)16hr 55dB(A)
- Road transport accounts for approximately 90% of background noise levels across England.
- The DEFRA Road Noise Map for W Yorks identifies 850 Priority dwellings where noise levels > L10(18hr) 76dB(A)
- Traffic noise causes nuisance, sleep disturbance & stress related health problems
- Main noise sources: engine, exhaust, body panels, tyres



Low Emission Vehicle Technologies

□ Low Emission Vehicles (LEV's):-

- There is an urgent need to promote LEV's capable of reducing emissions of air pollutants, GHG's & noise
- There are several types of LEV technology available today
- DfT Research suggests LTP measures from 2010 - 2050 may provide 30% carbon savings, whilst 70% likely from LEV's
- Must act now to promote LEV's & supporting infrastructure
- Need to show LEV's are efficient & with time premium costs will fall



Low Emission Vehicle Technologies (1)

□ Stop/Start/Eco-Motion:

- ICE with stop/start system, reduced body drag, low energy tyres.
- Mass production petrol/diesel cars & light vans, <5% Premium cost
- WTW ~ 15% reduction in CO₂ & air pollutants, reduced idling noise

□ Mild/Full Hybrid:

- ICE assisted by battery/capacity electric drive technology
- Optimum engine speed/gear selection & Regenerative braking
- Mass production for mild hybrids/limited for some full hybrids
- Premium cost 15% for mild hybrid, approx 50%+ for full hybrids
- **Mild hybrid:** WTW CO₂ 15-20% reduction, 20-30% reduction in air pollutants, quieter acceleration
- **Full hybrid:** WTW CO₂ 25-35% reduction, 30-50% reduction in air pollutants, quieter acceleration. Eg. Series 7 bus.



Low Emission Vehicle Technologies (2)

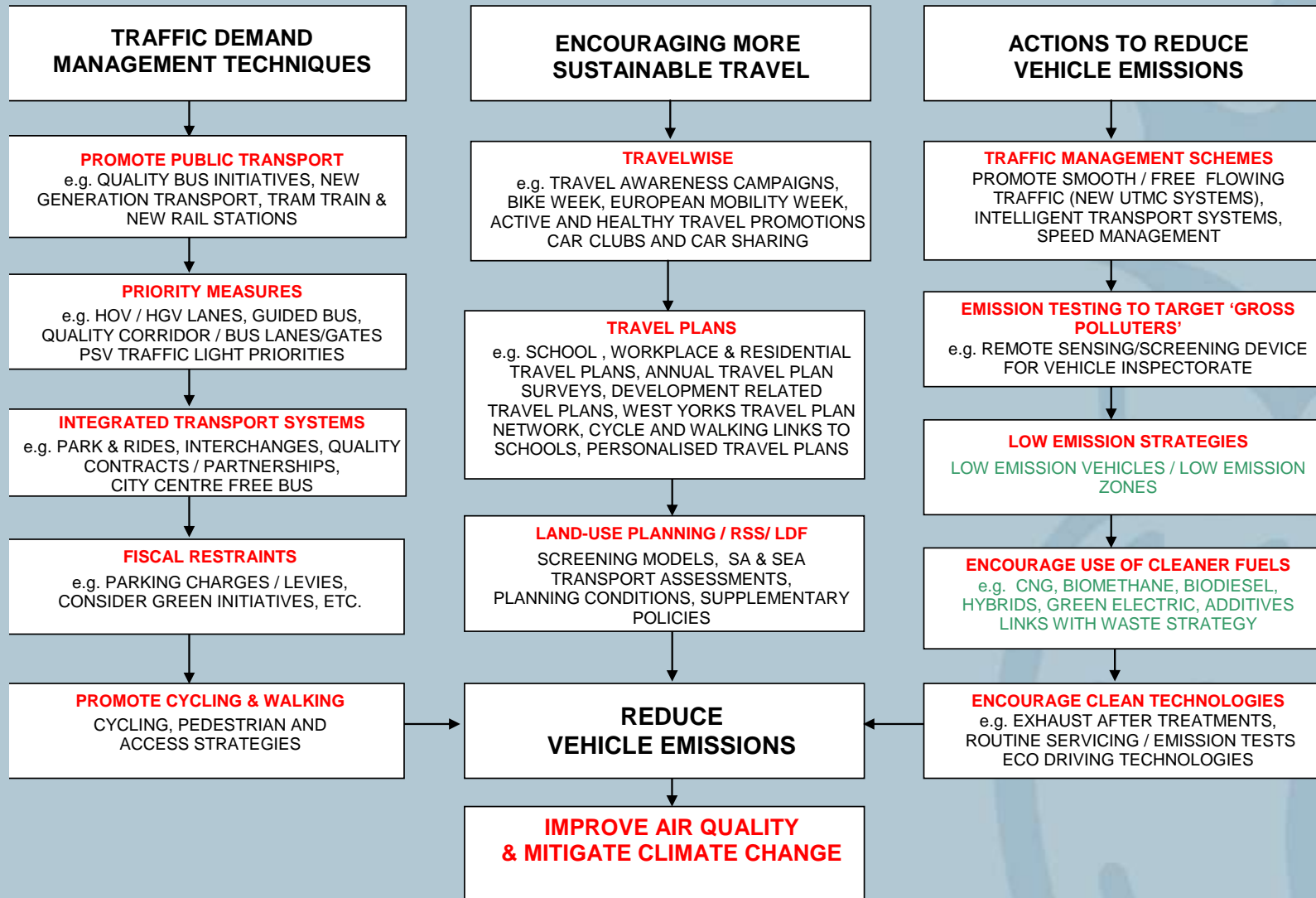
□ Electric:

- Batteries power electric drive motors
- Mass production for some cars, limited for LGV's, HGV's & Buses.
- High premium cost at present, 50-100%, but very cheap to run
- Developing recharging network
- WTW CO₂ reduction 25-30% from National Grid, up to 80% if powered from sun/photovoltaic's
- Zero air pollutants at source, very quiet operation (Potential issue!)

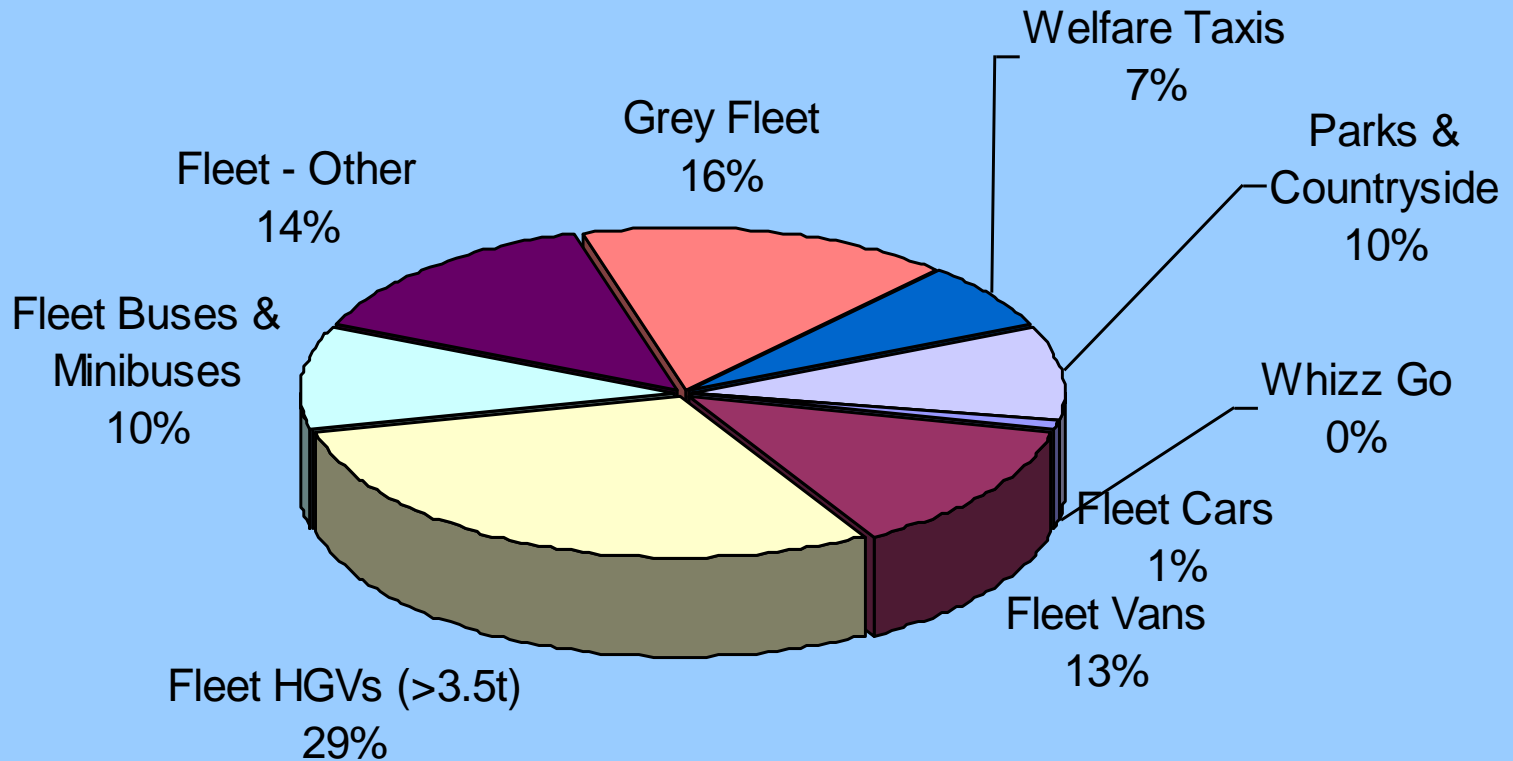
□ Gas Powered (CNG/Biomethane)

- ICE (Spark) fuelled by CNG/Biomethane/LPG)
- Limited production for all vehicle types.
- Premium cost: Car 15%, LGV 25%, HGV 30%, Bus 20%
- Very limited refuelling infrastructure for CNG/BM
- WTW CO₂ reduction 20% for CNG, 60-80% reduction for CBM
- Approx 97% & 47% reduction for PM₁₀ & NO_x, 6-11 dB(A) quieter

LEEDS TRANSPORT INITIATIVES TO REDUCE VEHICLE EMISSIONS



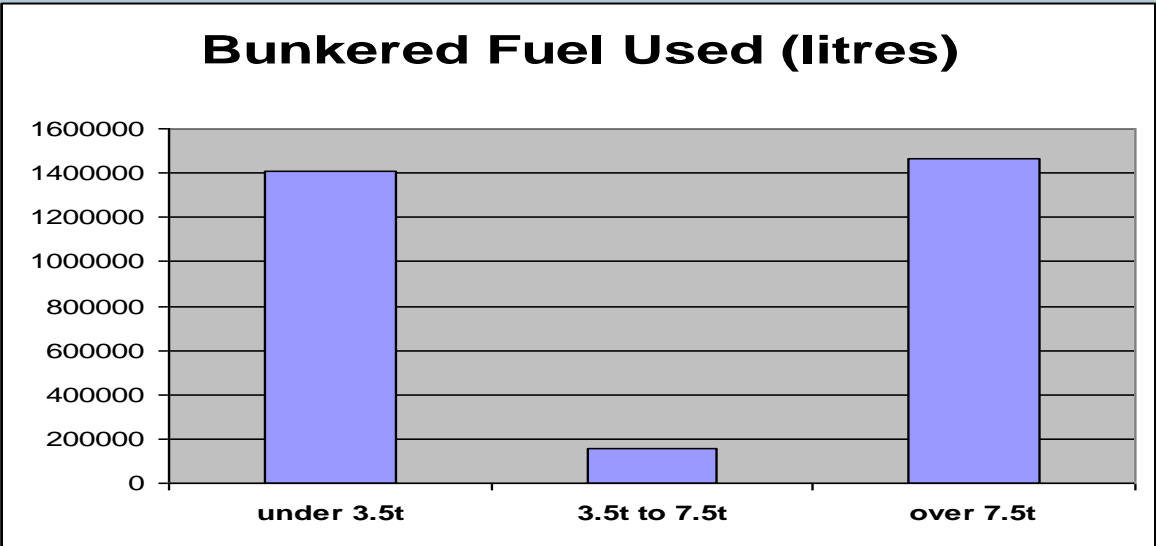
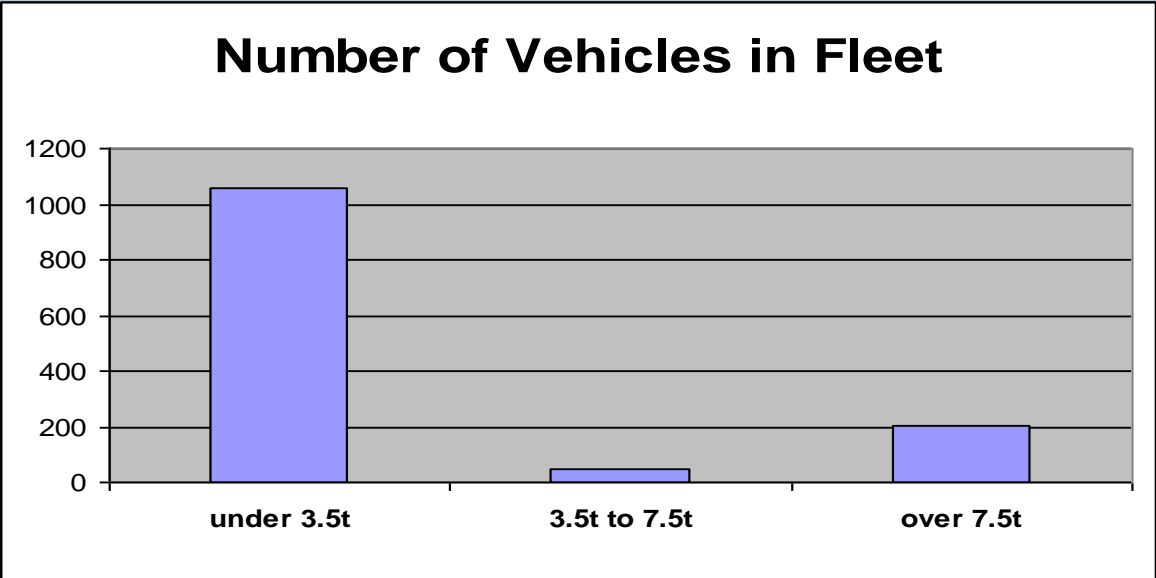
Leeds City Council Business Transport Carbon Emissions 14,477 Tonnes in 2007



RCV's Ave. 3.5mpg, 6% of fleet uses 25% of fuel



Fuel Consumption by Vehicle Type



Leeds Biomethane Trial for RCV's

- ❑ Assessed performance of Dedicated Biomethane & Dual-Fuel Engine Technology applied to 26 tonne Refuse Collection Vehicles (RCV)
- ❑ The Biomethane RCV performed tasks well against diesel RCV
- ❑ Annual WTW CO2 savings ~ 32 tonnes, based on Biomethane from Surrey Landfill
- ❑ Annual Tailpipe CO2 savings ~ 7.6 tonnes
- ❑ Substantial reductions in air pollutants & noise
- ❑ The Dual-Fuel (Diesel/gas) application did not perform well, this technology is best suited for long haul



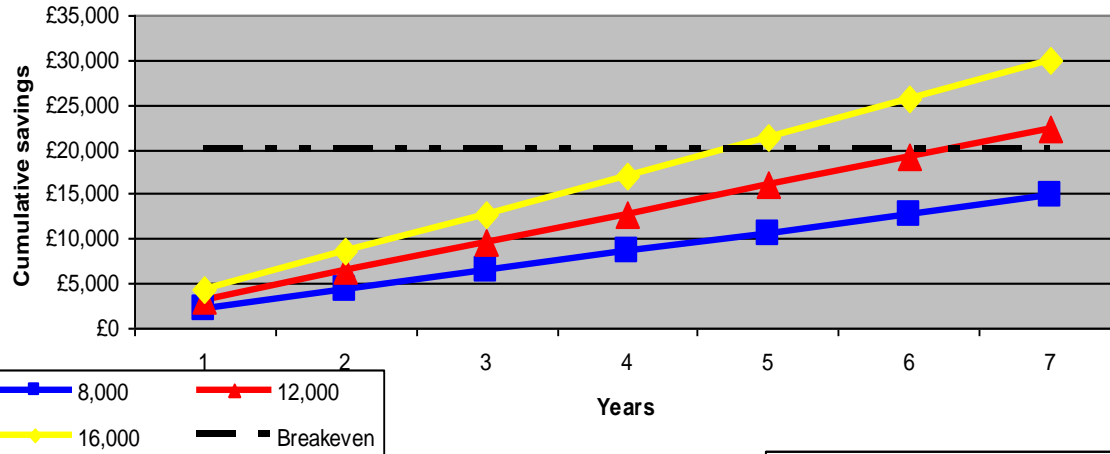


Mercedes Econic RCV (As seen on BBC Look North)



RCV Breakevens for LBM/LNG

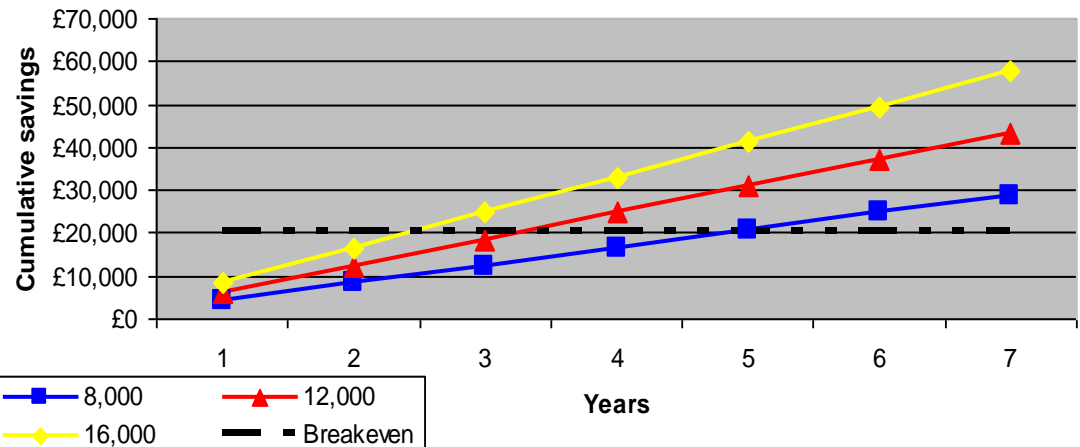
Breakeven Periods based on Annual Mileage
Example - Diesel at £1.05/litre and LBM at £1.10/kilo



Change in Service Delivery, less RCV's, now travel further, approx 14K miles

❖ Low volumes of LBM currently attracts a delivery charge over and above the base price, LNG doesn't

Breakeven Periods based on Annual Mileage
Example - Diesel at £1.05/litre and LNG at 90p/kilo



Gas RCV Refuelling at Leeds LBM Station Opened (24/3/2011)



Low Carbon Vehicle Procurement Programme (LCVPP)

- DfT set up the LCVPP to accelerate the introduction of lower carbon technologies onto the UK vehicle market.
- Opportunity to demonstrate the real-world performance of low carbon technologies in high profile public sector fleets.
- £20m available to meet premium costs of procuring LC vehicles
- Under the LCVPP, Leeds currently trialling:-
 - 19no. Diesel Electric Hybrids (Ashwoods/Ford Transit
 - 5no. All electric plug ins (Smiths / Ford Transit)
- Monitoring performance against diesel variants (Good start!)



LCVPP: Recharging of Smith's Electric & Ashwood's Hybrid Transit Van



Initiatives to Promote EV's

- LCC has signed up to the Plugged in Yorkshire (PIY) project:-
 - Aims to provide European matched funding for EV recharging
 - Targeted towards SME's & some Local Authorities
- Working with the EST & Tadea Sustainable Energy Solutions
- Agreed to install of Photovoltaic's on roof structures of car parks & LCC buildings.
- Tadea is non profit making company, would pay for installation & recharging points, in return for negotiated % of Feed in Tariff
- 16 buildings & 2 car parks are being considered
- Possible partnership with Siemens & a local company called Voltex, who could advice on 'Smart Grid' recharging systems



Other LCC Initiatives for LEV's

- ❑ Waste Strategy links, potential use of Energy from Waste & AD. (Sources of Green electricity/Biomethane)
- ❑ Metro/First/Volvo/LCC Green Bus Fund: Successful Hybrid bus trials on A61 Guided Bus corridor. A fleet of 22 hybrid double decker buses (£6.2m) will operate by late 2011. (Series 7 Service)
- ❑ Establish optimum 3rd Party use of gas station (YAS, ENE Homes)
- ❑ Assess best viable options for BM/NG (Liquid or compressed), working with DEFRA/DfT/DEC
- ❑ Environmental Benchmarking of 26 LCC LEV's by Leeds Uni/ITS MSc/PhD student
- ❑ Trialled tyre pressure sensors, often seized, now checked daily
- ❑ Fleet driver training, MiDAS & SAFED Eco-driving, use of Masternaut journey planning, City Car Club etc.

Summary of Presentation

- **Urgent action is needed to reduce Transport related GHG's, air pollutants & noise emissions**
- **LEV's will require supporting Infrastructure Networks (Consider shared use)**
- **Group Procurement & increased fossil fuel cost will greatly improve economic viability of LEV's**
- **Widespread use of LEV's will mitigate Climate Change, improve local air quality & noise climate**

