

Air Quality Impacts in Cities

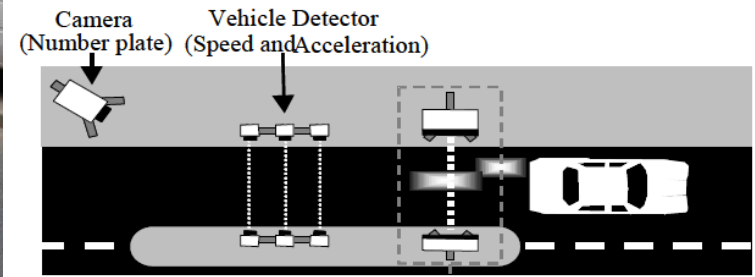
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Key Issues Facing Councils

- **Air Quality Targets**
 - Unlikely to achieve with current Euro Standards
 - Infraction proceedings (NO_x) on UK by EU
 - The Cost of Poor Air
- **Understanding the issue**
 - Theoretical vs Real Life
 - How technology works vs drive cycle
 - Vested interests can prevent change

Real Life Emission Results



- Used ANPR to match Euro Standard to Vehicle Results
- 5 different locations across the City (08:00-18:00)
- 10 separate days (between April to June 2013)
- Over 28,000 vehicle data sets
- Measure speed and acceleration, altitude and slope
- Test for NO_x, CO, HC, PM & CO₂ using IR/UV beam
- Cars 71%, Taxis 4%, LGV 17%, Trucks 2%, Buses 6%

Tested Vehicle Profiles

Table 7: Observed vehicle fleet proportions (%): vehicle/fuel type and Euro standard.

EURO Standard	CAR				Taxi				LGV		OGV	Bus		COACH
	Petrol	Diesel	Hybrid	Hybrid Diesel	Petrol	Diesel	Hybrid	Hybrid Diesel	Petrol	Diesel	Diesel	Diesel	Hybrid Diesel	Diesel
Euro 0	0.20	0.025	0	0	0.00	0.28	0	0	0.028	0.021	0.007	0.007	0	0
Euro 1	0.34	0.11	0	0	0.00	0.032	0	0	0	0.14	0.09	0.011	0	0
Euro 2	4.17	0.65	0	0	0.00	0.021	0	0	0.032	0.48	0.22	1.76	0	0
Euro 3	15.41	6.24	0.01	0	0.014	0.99	0.00	0	0.11	4.17	0.79	1.39	0	0
Euro 4	14.74	11.69	0.057	0	0.082	2.18	0.00	0	0.04	6.93	0.65	1.32	0	0.028
Euro 5	6.58	10.26	0.31	0.007	0.00	0.18	0.0035	0	0.02	5.07	0.69	1.02	0.36	0
Euro 6	0.01	0.03	0	0	0.00	0.00	0.00	0	0.00	0.00	0.01	0	0	0
Total (%)	41.45	28.99	0.37	0.01	0.10	3.68	0.0035	0	0.23	16.81			5.50	0.36
GRAND TOTAL (%)	70.83				3.79				17.05		2.45	5.86		0.028

Tested Vehicle Profiles

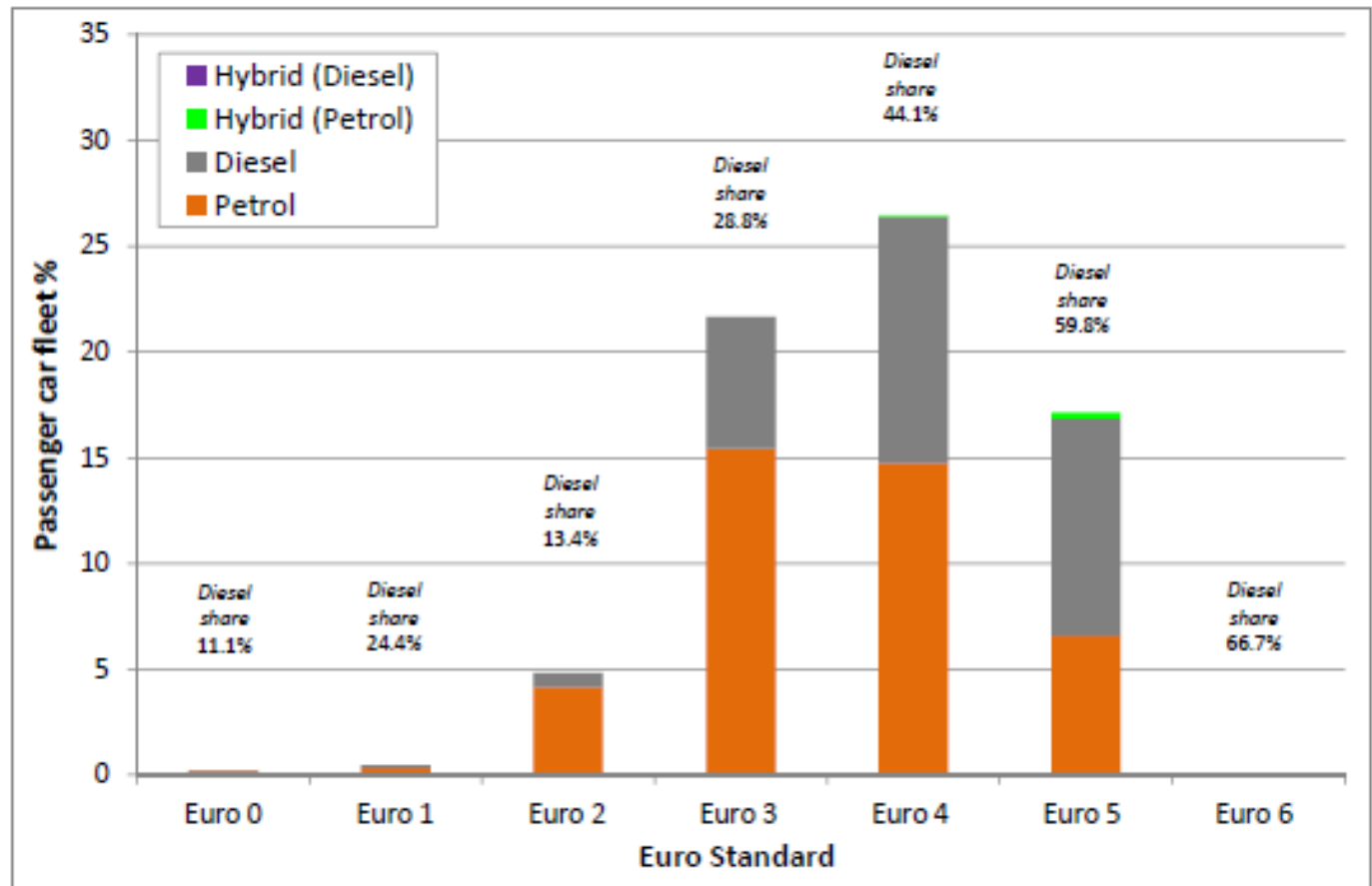


Figure 4: Observed passenger car fleet proportions, broken down by Euro standard and fuel type.

Outcomes

- Euro V single buses worse than Euro III
- Euro V double deck similar to Euro III
- Diesel Oxycats and Particulate traps increase tailpipe NO₂
- De-No_x equipment underperforms in urban driving
- Lab drive cycle tests do not replicate real life urban driving results
- Understanding of how SCRT works backs up these findings

These results match other pan European findings

Air Quality Benefits

- Switching this City's Buses and specific Council fleet vehicles to CNG/Biomethane would save over 100te NO_x annually
- Natural Gas Engines are a 'fit and forget' solution – no onwards maintenance and operational nuances
- Drive cycle changes do not affect AQ emissions in same way as diesel does
- Hybrid buses do deliver some savings when they are operational but can't match CNG

What are we waiting for?