TFIAM 2017, Paris
Reducing NOx emissions & diesel v petrol

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Imperial College London
& data courtesy
Nick Molden &Emissions Analytics

UKIAM/AIM: work continuing

Have used Mike Hollands work to monetise health impacts

Focus on transport emissions & urban exposure

TFIAM 2016:

Lots of uncertainties for the future of the transport sector and the diesel car!

Shift from diesel to petrol

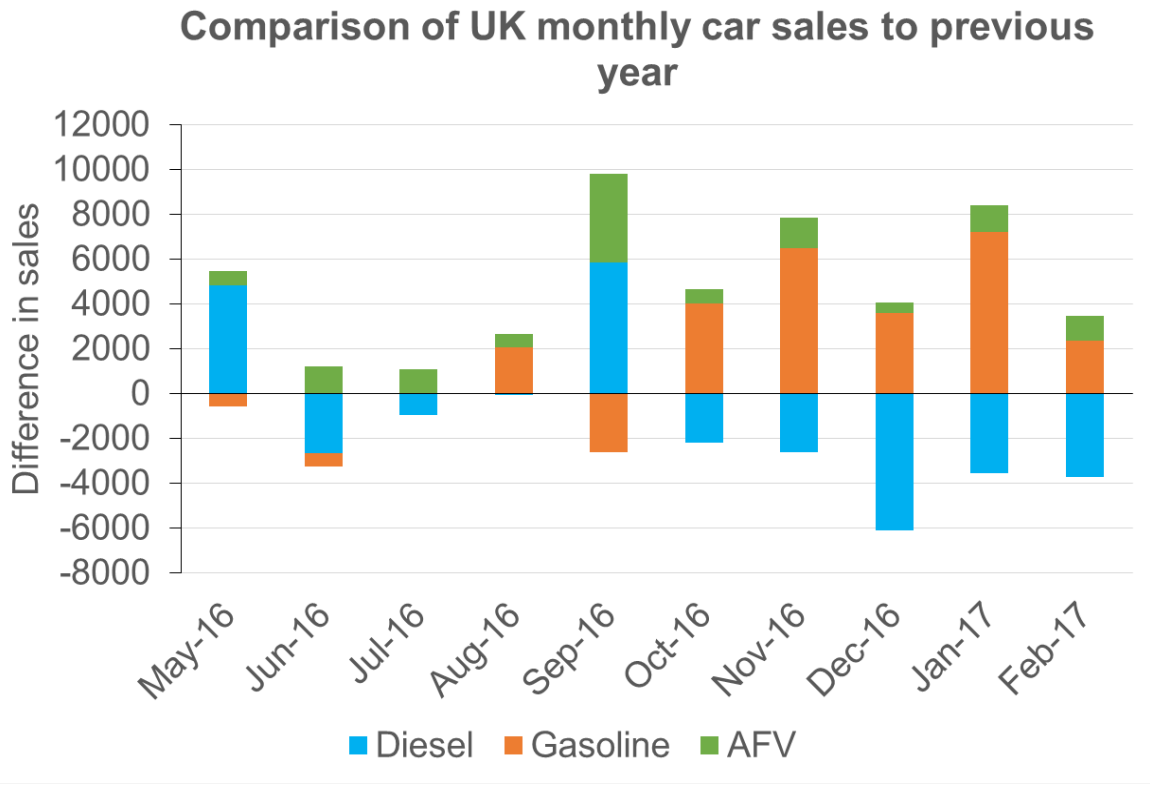
VW scandal

Public awareness NOx-health impacts

ULEZ London - Euro 6 diesel

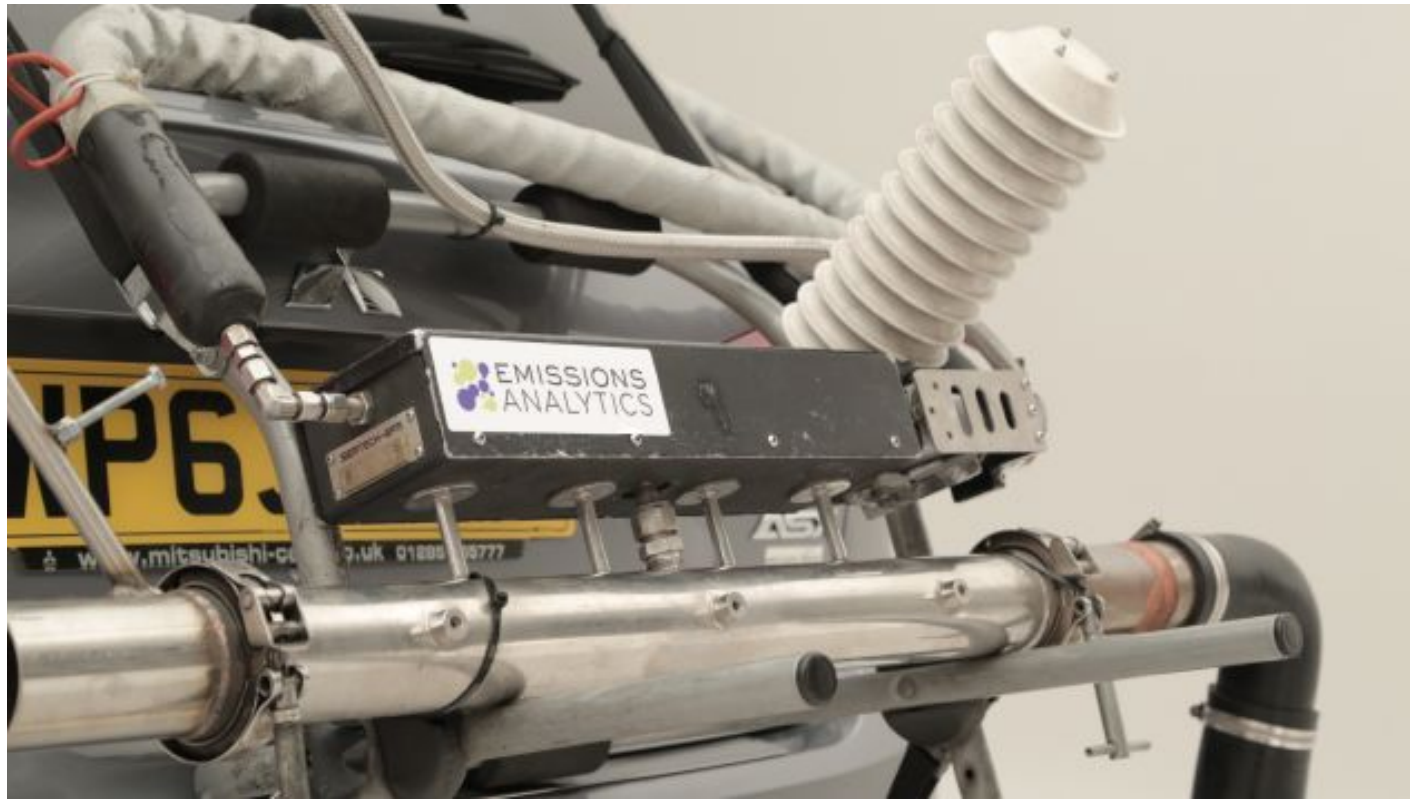
Grants scrappage old diesel cars

Higher rates parking etc for diesels



But what about CO2?

Real world NO_x and CO_2 emissions from150 Euro 5 and Euro 6 petrol and diesel passenger cars



Data courtesy of:

EMISSIONS ANALYTICS

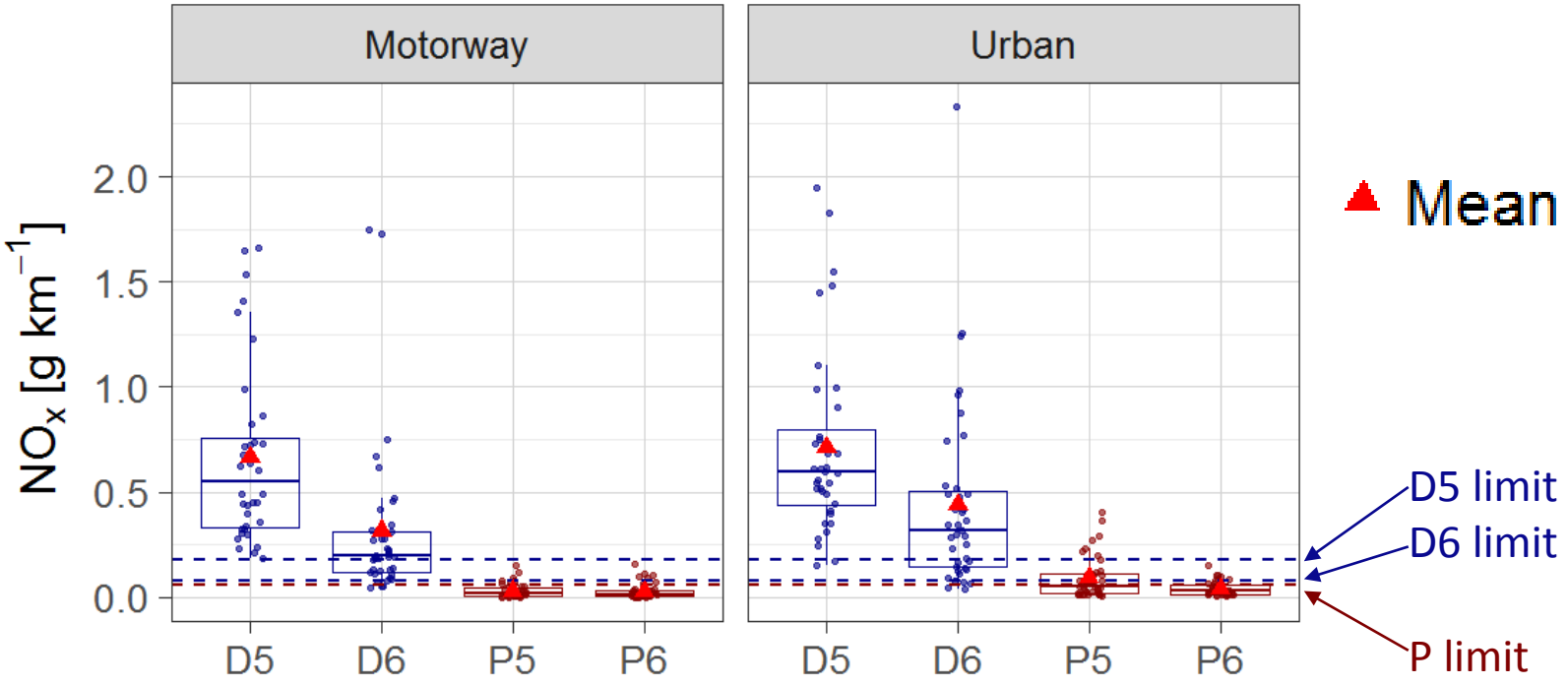
Analysis by Rosalind O'Driscoll

Methodology: Test characteristics

	Duration [s]	Distance [km]	Average speed [km h^{-1}]	% idle*	Average VSP [kW t^{-1}]	Range VSP [kW t^{-1}]
Urban section	1800	12.4 (sd. 0.4)	24.7 (sd. 0.7)	18.1 (sd. 2.7)	1.38 (sd.0.1)	-5.2 to 8.4
Motorway section	900	24.4 (sd. 1.1)	97.7 (sd. 4.5)	0.1 (sd. 0.2)	10.7 (sd. 0.9)	-5.7 to 27.0

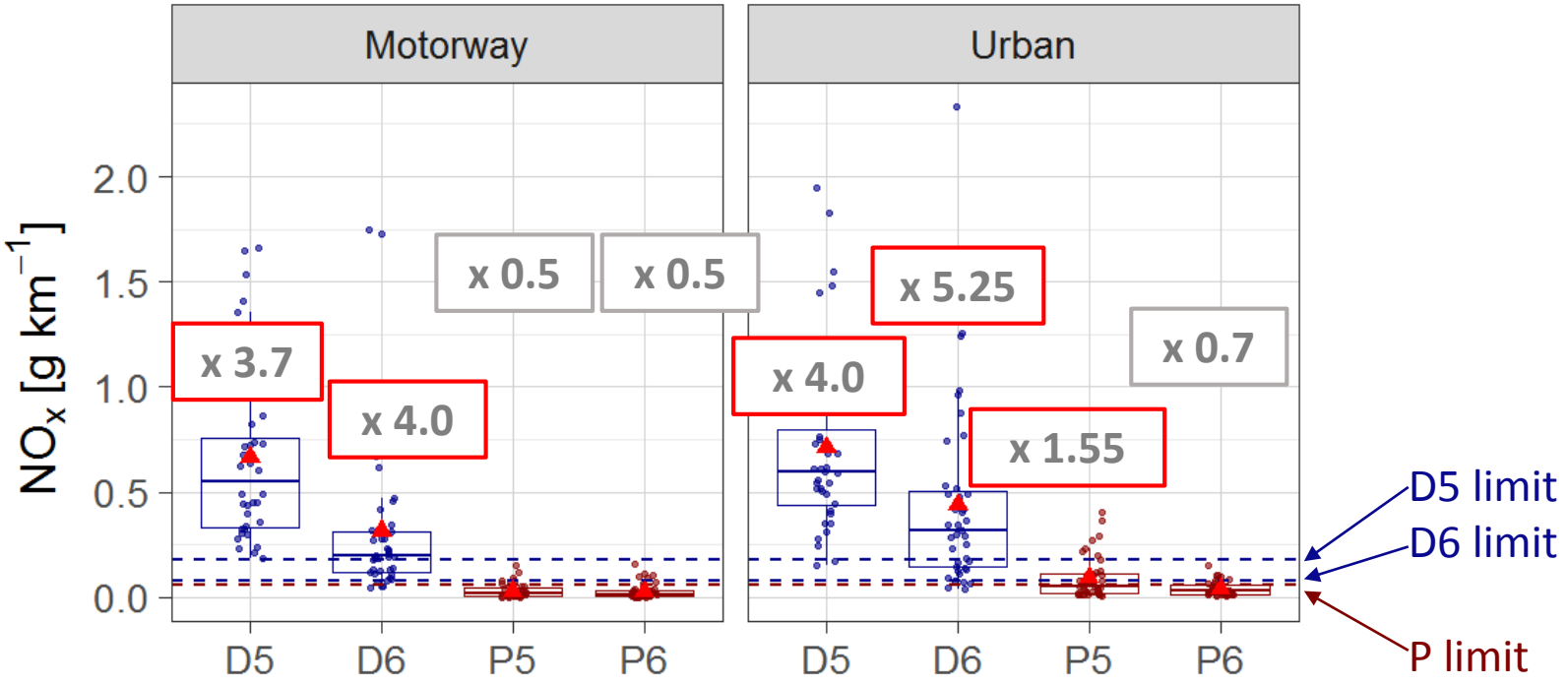
- **The urban section of the route is made up of A, B and C roads (UK) with speed limit of 50 km h^{-1}**
- **The motorway section of the route is made up of M roads (UK) with a speed limit of 110 km h^{-1}**

Results: NO_x emissions



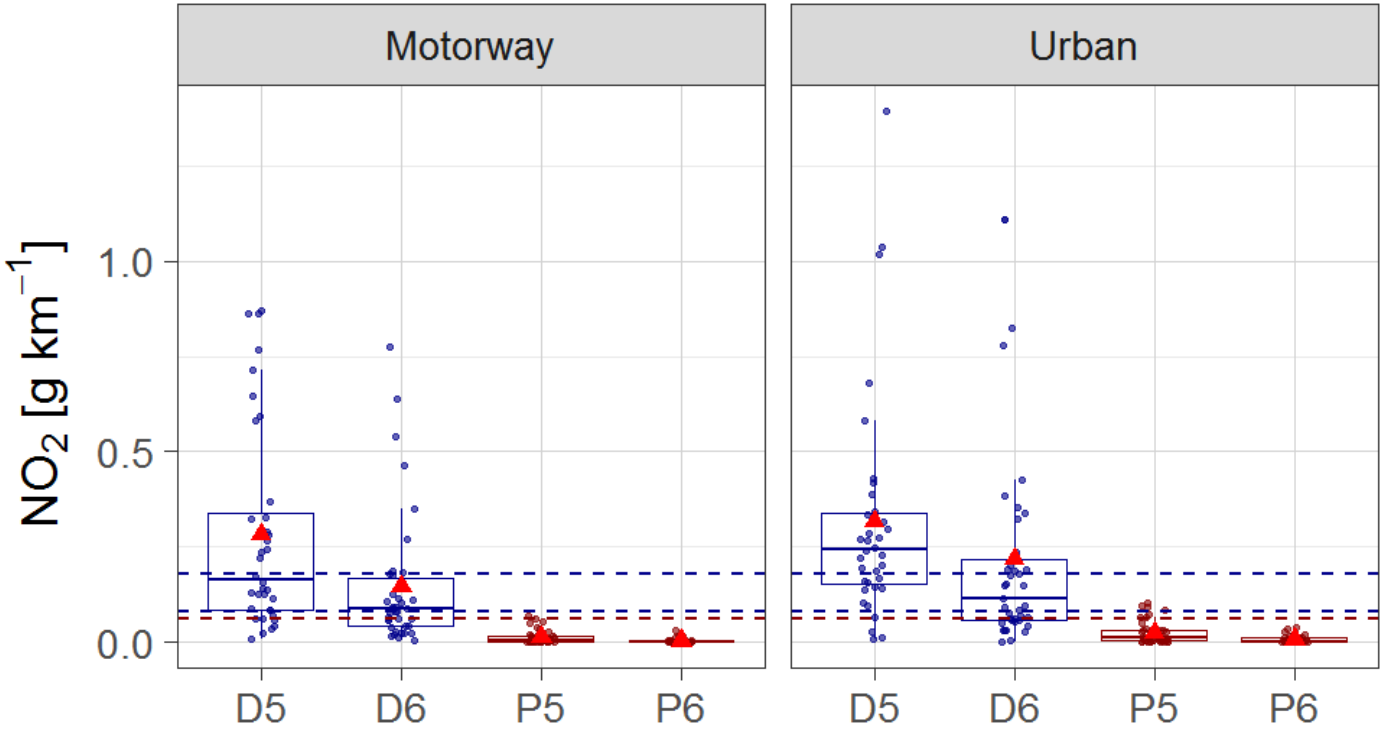
Mean NO_x [g km^{-1}]				
	D5	**D6**	**P5**	**P6**
Motorway	0.66	0.32	0.031	0.03
Urban	0.71	0.44	0.093	0.041

Results: NO_x conformity factors



- 4 D6 met the type approval limit on the urban section (~10%)
- 5 D6 met the type approval limit on the motorway section

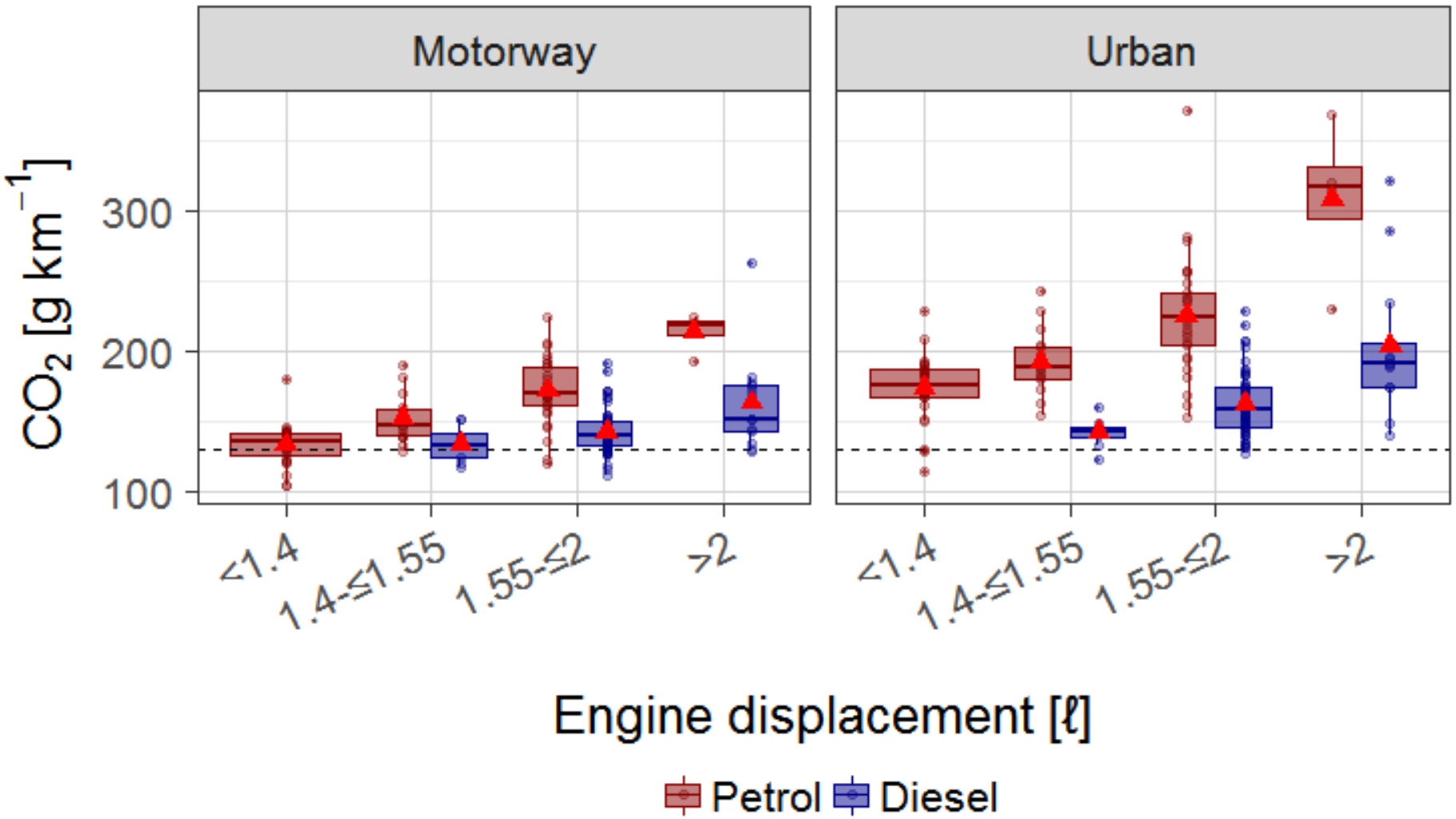
Results: NO_2 emissions



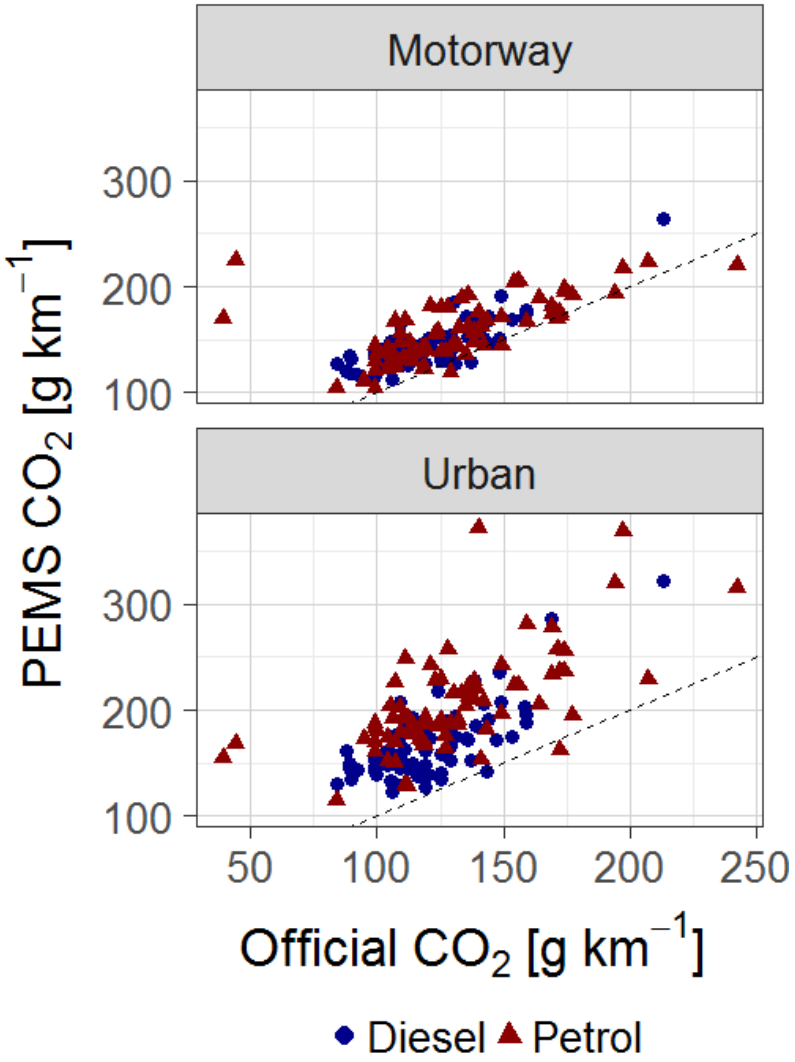
Increase in average NO_2 emissions from petrol to diesel

	Urban	Motorway
Euro 5	x 13.2	x 21.5
Euro 6	x 32.7	x 40.1

Results: CO_2 emissions



Results: CO_2 PEMS comparison to official estimates

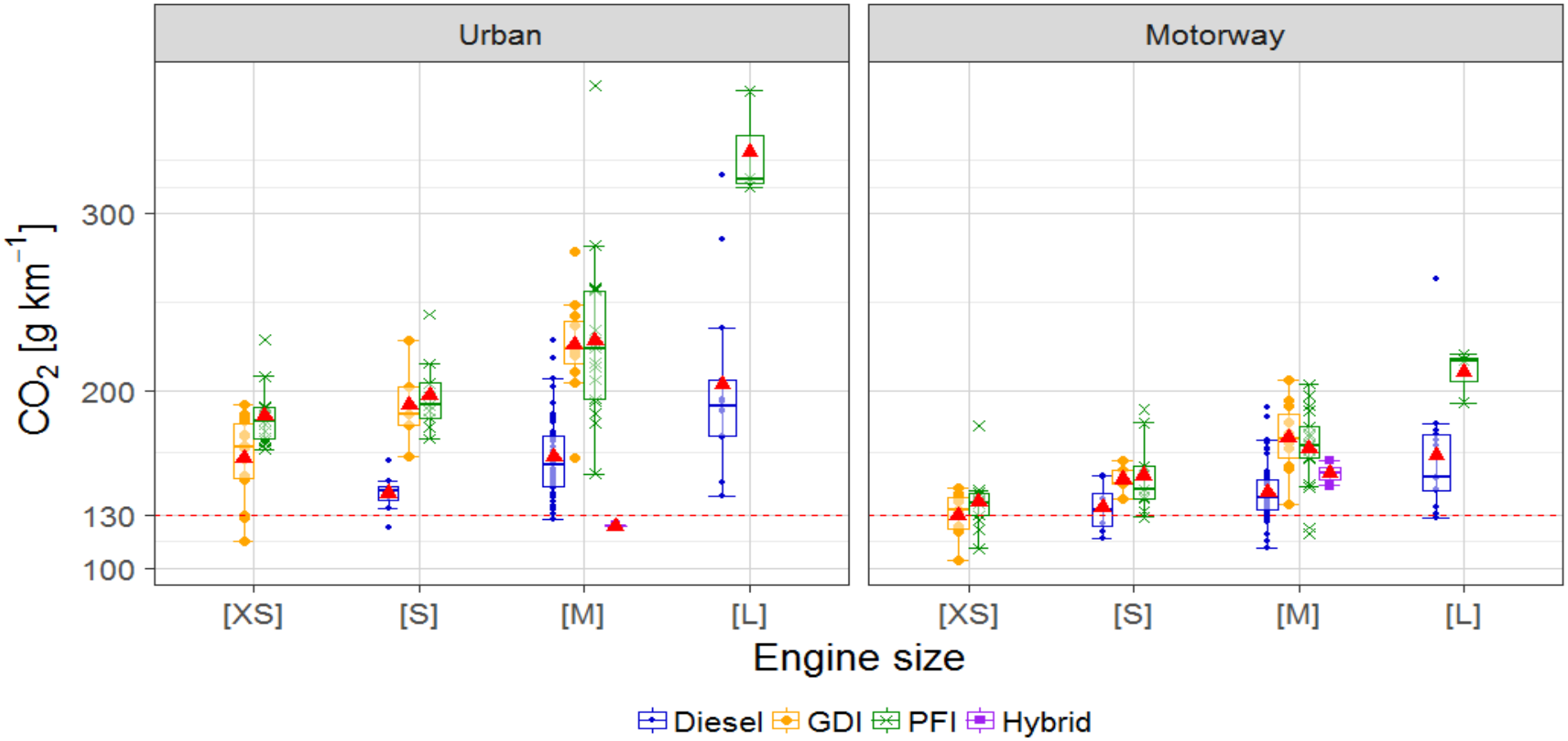


MOTORWAY

- **Diesel:** PEMS 22% higher
- **Petrol:** PEMS 28% higher

URBAN

- **Diesel:** PEMS 40% higher
- **Petrol:** PEMS 65% higher



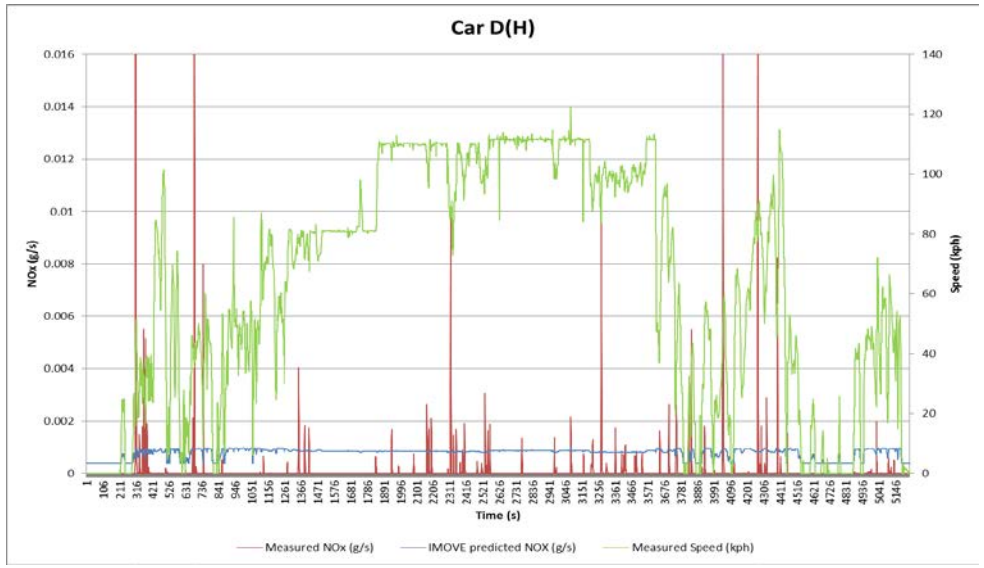
Urban and motorway CO_2 emissions by engine displacement (dashed line 130 g CO_2 km^{-1} limit, red triangle mean)

What was the best car analysed?

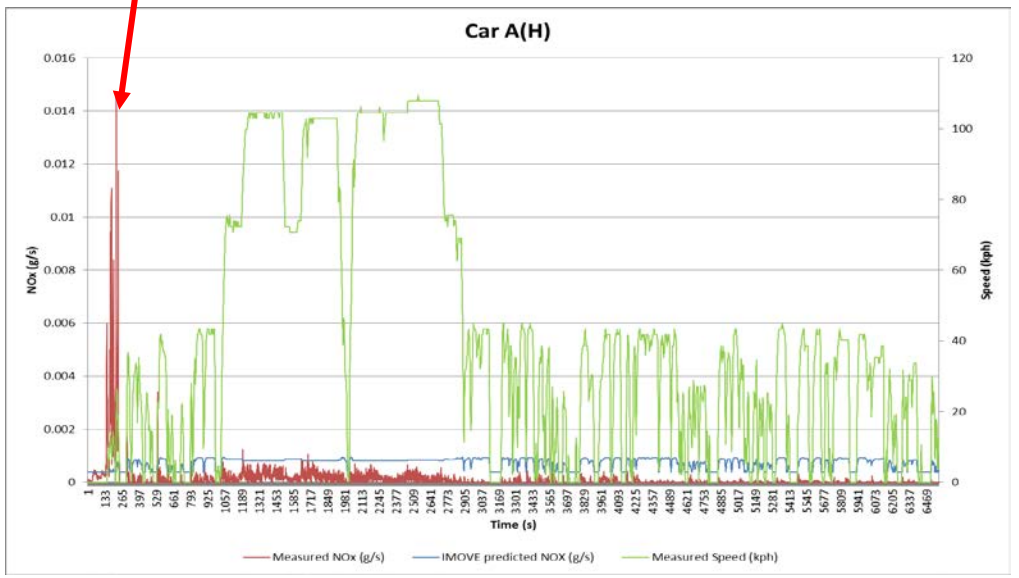
NOx emissions: urban .002 g/km ; motorway similarly low

CO2 emissions: urban 124 g/km ; motorway 154 g/km

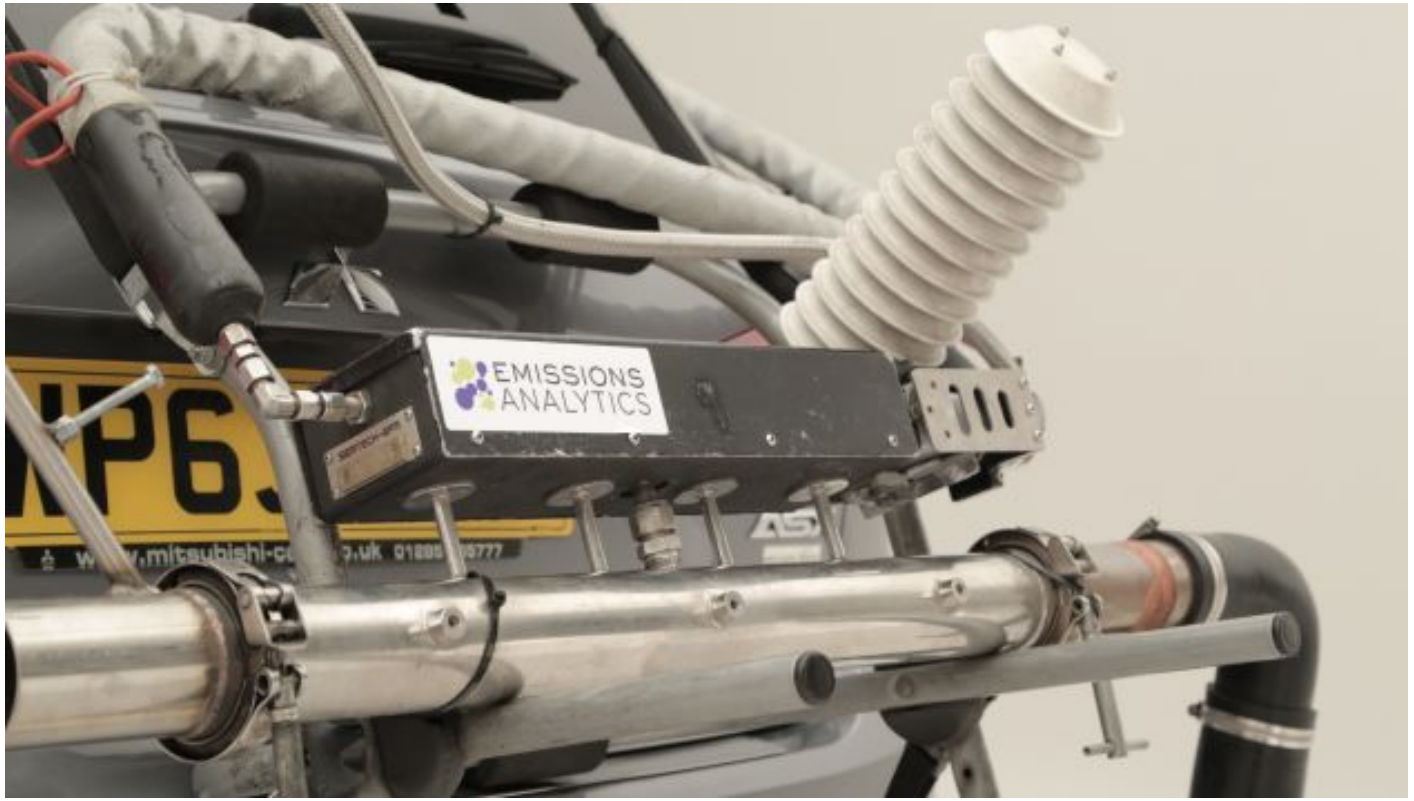
This was a petrol hybrid, but not all petrol hybrids like this!



Cold start



Thanks to Emissions Analytics for data-
also currently analysing data from EA for 22 vans (laden and unladen)

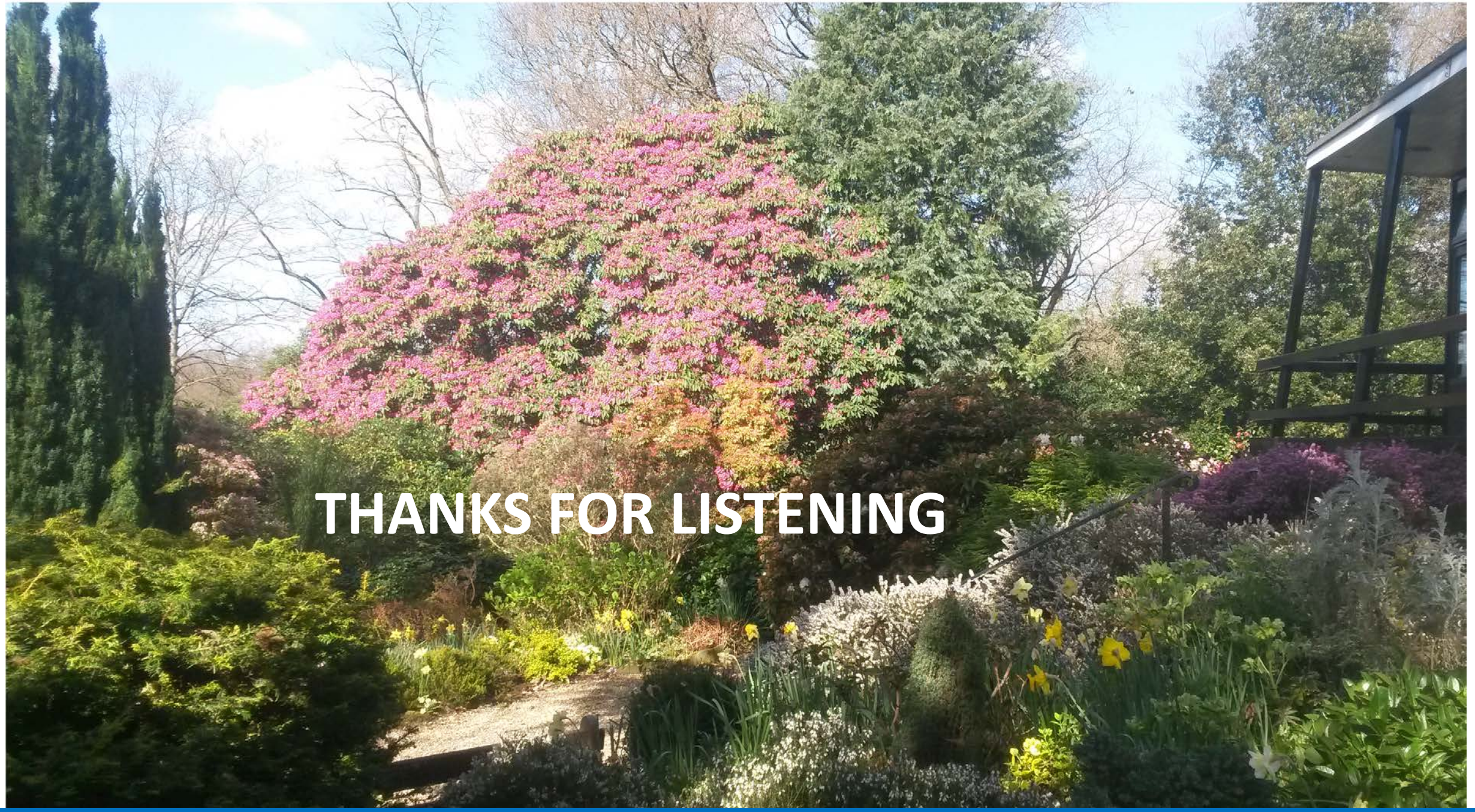


Real world emissions; Emissions Analytics- now ~800 cars tested

EQUA index where cars graded in emission bands:

www.equaindex.com

Mayors of London & Paris approving this for use as a vehicle checker when purchasing a car.


THANKS FOR LISTENING