

The Congestion Charge and Air Pollution – False Claims by TfL in Advertising

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The advertisement above was displayed in Cable Street, London E1 in early July 2006. It makes the claim that the Congestion Charge “is helping it happen”, implying that there are lower road traffic emissions within London (presumably within the Congestion Charge zone) as a result of the Congestion Charge tax. But that is simply not reflected in the facts. There has been no significant or consistent change in the general level of air pollution in central London since the Congestion Charge was introduced in February 2003. And bearing in mind that the improvements in vehicle technology should have produced some reductions during that period, in fact it is probably the case that the exact opposite is true – in other words vehicle emissions have actually increased.

The background and the real facts are given below:

1. Road traffic emissions result in air pollution, and these are typically analysed by studying the levels of nitrous oxides (NO₂, NO, and NO_x), Sulphur Dioxide (SO₂), Ozone (O₃), Carbon Monoxide (CO), and Particulates (PM₁₀ and PM_{2.5}). Carbon dioxide is also emitted but because of high background level this is difficult to measure and therefore is usually not analysed. A general

introduction to this subject can be seen on the London Air Quality Network web site at:
www.londonair.org.uk/london/asp/information.asp

2. An Appendix to this note shows the actual figures for a range of sites within the Congestion Charge Zone for periods before and after the charge was introduced. The data shows that at the sites within the Congestion Zone where measurements were taken in those periods, that although there were variations both up and down in the measures for individual pollutants, there were in fact more increases than decreases after the Congestion Charge was introduced. In addition, the average overall change was a rise of 2.5%.

3. It is of course necessary to take account of other possible changes that may have taken place in the environment or in the vehicles that cause pollution since the Congestion Charge was introduced. However the road network within the zone remains basically unchanged, particularly around the measuring sites from which the data in the Appendix is taken. But one major change is that the vehicle fleet has changed in both mix of types and in technology.

4. Many newer vehicles are now on the roads with better emission control technology in them (ie. more efficient engines etc), while older vehicles which are known to pollute more have been declining. This issue is discussed at some length in the Fourth Annual Monitoring Report published by TfL on the Congestion Charge Scheme and this can be seen on the internet at:
<http://www.tfl.gov.uk/tfl/cclondon/pdfs/FourthAnnualReportFinal.pdf>

Page 117 of that report (table 6.3) shows the TfL estimates of the change in pollutants due to “vehicle stock change” and the figures for the three major pollutants within the charge zone are: -5.5% for NOX, -9.2% for PM10 and -0.7% for CO2. These estimates are for the period 2002 to 2003, and they also forecast overall reductions in 2003 to 2004 although these are not separated into “vehicle stock changes” and others so it is difficult to be precise, although they say in the paragraph at the foot of page 117 that “this primarily reflects vehicle technology changes...” and they suggest that there is therefore a reduction of 6% in NOX and PM10 in the latter period.,

Therefore, the figures for reduction in NOX and PM10 for the whole period after the Congestion Charge was introduced may be approximately 11% and 15% respectively as a result of vehicle changes.

But no such change is apparent in the actual data shown in the Appendix, which rather suggests that far from the Congestion Charge improving matters, it has actually led to a situation where the improvements from vehicle stock changes are more than offset by the negative effects of the Congestion Charge.

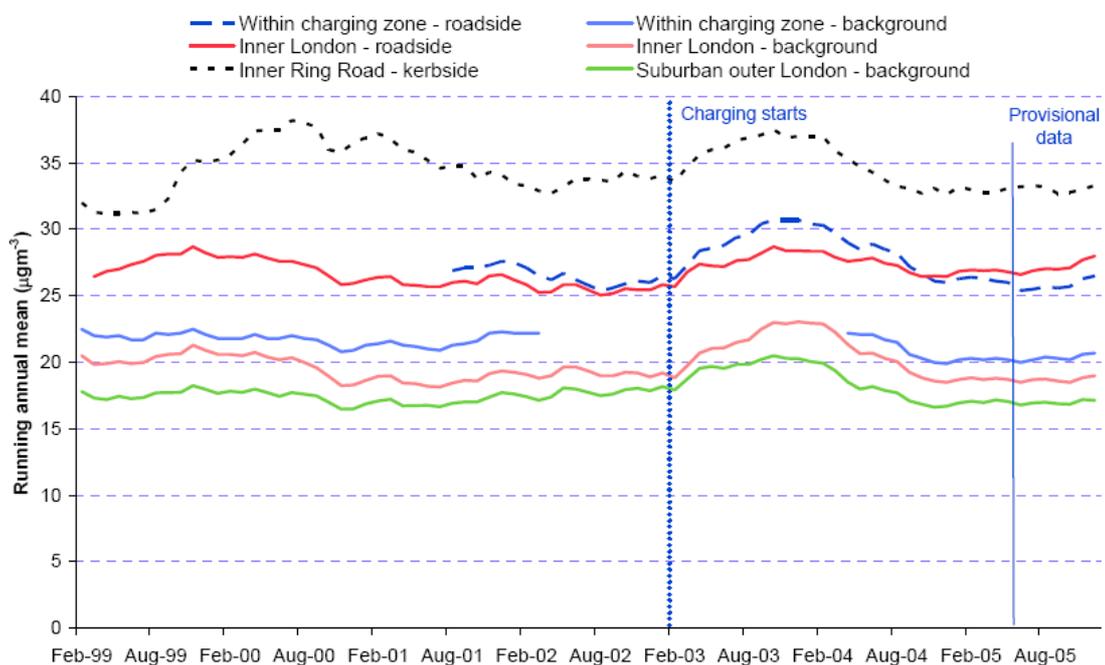
5. Another change during the period being examined is of course the change in the mix of vehicles, and the average speed of those vehicles (which affects the level of exhaust emissions). In respect of the former, the Fourth Annual Monitoring Report makes it clear that there was a reduction in private cars, and a substantial increase in the number of taxis and buses.

TfL have attempted to use the changes in vehicle numbers and speeds to estimate the air pollution changes. Why they did this is not clear, although it was obvious from earlier monitoring reports that the actual pollution had not fallen. For example, they blamed the increase in pollution in the year after the charge was introduced on “exceptional weather conditions”. But by the Third Annual Monitoring Report (see <http://www.tfl.gov.uk/tfl/cclondon/pdfs/ThirdAnnualReportFinal.pdf>

) they say “Air quality measurements for the case study area closely follow those for the rest of London and are not indicative of any specific or detrimental effects” – in other words, there was no difference perceived.

6. Page 119 of the Fourth Annual Monitoring Report shows the trends in actual levels for PM10 - although they don't say which sites are being reported, or provide the source data – however this chart (which is Figure 6.3) is shown below.

Figure 6.3 Running annual mean PM₁₀ concentrations at congestion charging indicator sites.

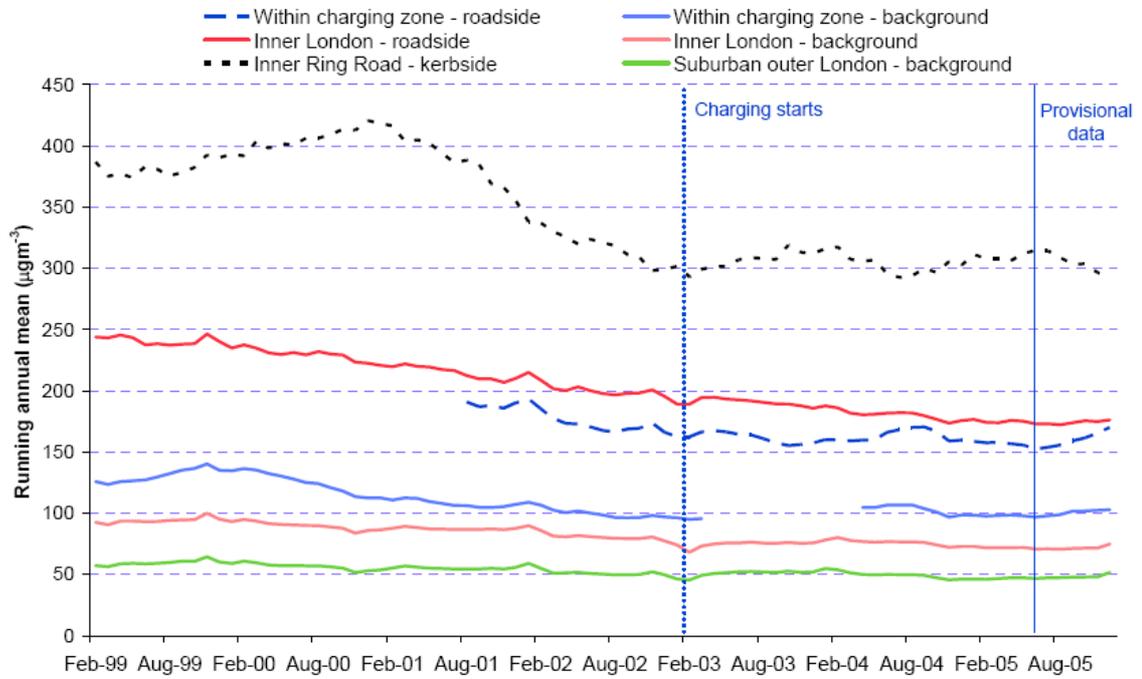


You can see from the “Within charging zone – roadside” figure that although there has been considerable variation in the figure, both before and after the charge was introduced, there is no discernable trend. And certainly any change is not likely to be statistically significant (although they don't provide us with the data to do any proper statistical analysis of course).

They do say on page 118 that: “This means that the substantial emissions reductions brought about by congestion charging within the charging zone would be very much diminished at air quality monitoring sites, and would therefore be difficult to detect in the medium-term.” However this is really nonsense – the reason why the changes are “difficult to detect”, which they concede, is of course because the changes are illusory.

The figures for NOX are shown in the TfL report in Figure 6.5 which is given below:

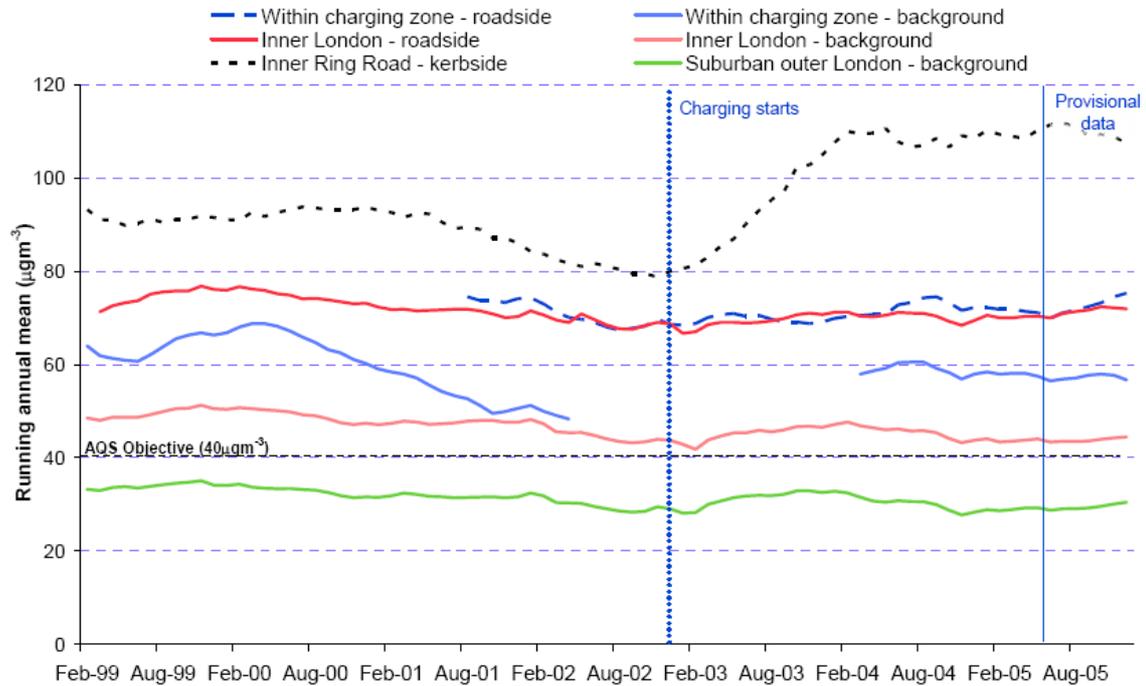
Figure 6.5 Running annual mean NO_x concentrations.



They claim a “steady decrease in NOX concentrations”, but that is not borne out by the chart if you actually look at the “within charging zone – roadside” line, and they concede that the data has “changed very little since 2002”.

The chart below taken from the report (Figure 6.6) shows the data for NO₂ levels:

Figure 6.6 Running annual mean NO₂ concentrations.



Again there is no obvious change since the Charge was introduced.

7. How do TfL manage to claim that air pollution has declined? They do this in paragraph 6.7 of the report and in Table 6.3 by basing it on estimates of pollution. They have used a model of the vehicle fleet mix, travel distances, vehicle technology changes, etc, to estimate how much pollution should have changed. But as with any scientific model, they should have validated that against some real numbers to ensure it had sound predictive effect, but this they have not done.

As to where their estimates have gone wrong, it is difficult to determine, but clearly producing estimates, that are not backed up by evidential data, does not prove that emissions have been reduced.

It is quite likely that the reason why the substantial reduction in pollution from vehicle improvements is not reflected in the actual measured pollution data is simply because the vehicle mix change has overwhelmed the benefit of both the vehicle technology improvements and the reduced amount of traffic. The increases in buses and taxis, which are known to be vastly more polluting than private cars, have probably overwhelmed the benefit from private car reductions, and the improved technology of vehicles. In addition, it is likely that the people who can afford to pay the Congestion Charge (or who live in central London and are exempt) are those who can afford expensive, highly polluting vehicles. So the reduction in number of private cars has had less impact than expected on their total emissions. TfL do not appear to have taken the latter factor into account.

8. In conclusion, there is certainly no proof in the latest report issued by TfL (and the offending advertisement was issued immediately after the Fourth Monitoring Report was published) that vehicle emissions have been reduced by the Congestion Charge. I have also supplied data to show that there has been no measurable improvement whatsoever. In addition, some improvement should have been obtained from vehicle technology changes alone, so the impact of the Congestion Charge appears to be negative rather than positive.

The advertisement is clearly erroneous. The Congestion Charge has not “helped” to reduce road traffic emissions. If anything it has hindered the reduction as a result of factors such as the changed vehicle mix.

Indeed the whole concept of the advertisement is unsound because it is arguable that road traffic emissions are not falling at all – the data does not suggest they are to a significant extent, particularly in the last two years.

Appendix – Actual Emission Levels at Sites within the Congestion Charge Zone, before and after the Congestion Charge tax was introduced.

The following information is taken from web site of the London Air Quality Network (www.londonair.org.uk) which is the body which monitors air quality levels within London and on which presumably the TfL “actual” figures in the Fourth Annual Monitoring Report are based. There were three sites specifically examined as being those within the Congestion Charge Zone and for which the most data is available (not all figures for all pollutants are collected at all sites – there has been no “selection” of data to fit the case). The sites are:

1. Bloomsbury AURN
2. Camden 3 – Shaftesbury Avenue
3. City of London – Senator House

The figures given are the 24 hour means for those sites for the period 01/01/2000 to 01/01/2003 (ie. the “Before” data) and for the period 01/03/2003 to 01/12/2005 (ie. the “After” data). Pollutants are generally given in micrograms per cubic metre (uk/m³). The data is as follows:

Pollutant	Site Number	Before	After	% Change	Increase or Decrease
NO ₂	1	54.8	57.4	+4.5	Increase
	2	71.5	72.4	+1.2	Increase
	3	52.2	52.2	0	No change
SO ₂	1	63.9	32.8	-48.6	Decrease
	3	27.8	33.8	+21.6	Increase
CO	1	2.2	2.1	-4.5	Decrease
O ₃	1	97.4	101.8	+4.8	Increase
	3	69.9	117.4	+67.9	Increase
PM ₁₀	1	101.1	80.1	-20.7	Decrease
	2	89.9	110.4	+22.8	Increase
PM _{2.5}	1	119.8	54.1	-54.8	Decrease
NO	1	403.5	369.9	-8.3	Decrease
	2	593.8	456.4	-23.1	Increase
	3	274.5	405.7	+47.8	Increase
NO _X	1	487.6	486.3	0	No change
	2	736.1	595.3	-19.1	Decrease
	3	354.9	538.7	+51.7	Increase

As you can see from the above table, there were 8 measures that increased and 7 measures that decreased, with no significant change in 2. This hardly suggests that there has been a general decrease in pollution levels, but in fact the exact opposite. Likewise if you average out all the increases and decreases, the resulting figure is an increase of 2.5%.