

## Reviewer's report

**Title:** Vehicle emissions and consumer information in car advertisements

**Version:** 1 **Date:** 8 January 2008

**Reviewer:** NN Clark

### Reviewer's report:

The paper is not acceptable in its present form. I believe that it may be acceptable with revision. One essential revision is that it should be shortened and reduced to presenting the factual data with a careful comparison to other data which are verified to be gained using equivalent methodology. Another essential revision is that the paper must properly consider the divide between greenhouse gases and criteria pollutants in that criteria pollutants are not unambiguously related to fuel consumption. More general comments, which the authors are urged to consider, are presented below.

This paper contains some interesting information on advertising trends, but (1) it requires that the authors check that emissions levels that are compared (with those from other nations) were gained using the same test cycle, (2) the paper could be shortened, and (3) the authors have a duty to distinguish greenhouse gases and criteria pollutants carefully for some future readers. The authors have assumed that fuel consumption and criteria pollutants (â##health effectsâ##) are closely linked, which is often not the case. CO<sub>2</sub> and fuel economy are closely linked, but diesel NO<sub>x</sub>/CO<sub>2</sub> ratios are usually far higher than for petrol cars with three-way catalysts.

In a few cases, large vehicles perform more useful work (carrying some goods or a higher passenger count). I have no idea how strong this function may be in NZ, but the authors could mention it.

In the abstract: I am not sure how the one end of the range can differ from the â##best.â## The range limits need to be defined.

This is based on my long-term personal belief: I am not sure what defines an â##excess deathâ## since ultimately all people die, and since ultimately the death rate must track the birth rate (with a lag). I can understand that ambient air quality effects could (and most likely do) shorten life, and be represented by a loss of â##person-yearsâ## in a community, but otherwise I am simply confused by the terminology â##excess death.â## I ask the authors to consider this, though it is a cited â##factâ## in this paper.

The quarter page criterion is reasonable but arbitrary. Is there any reason that this cut point was chosen?

The term ATV will imply a â##four wheelerâ## vehicle with a motorcycle engine to many international readers. I do not believe that this is the intended definition in this paper & the authors may wish to clarify this term in a NZ context.

The statement â##as poorer efficiency is directly associated to increased

emissions of air pollutants and greenhouse gases per kilometre travelled is simply not true for criteria pollutants. In many cases vehicles are regulated in units of g/km based on a specific cycle, so that the emissions must meet the same ceiling regardless of the fuel economy and regardless of vehicle and engine size (within a class). The authors need to address the certification standards for these vehicles and be sure of their statement. Criteria pollutants need not track greenhouse gases. Equivalent performance on a larger engine may imply poorer efficiency (especially for petrol engines) but lower NOx emissions, for example.

The authors need to state that they checked that the greenhouse gas ratings corresponded reasonably to the fuel economy...in other words that 44g of CO2 corresponded more or less to 14g of fuel.

If any advertisements were excluded for lack of data, any implied bias should be discussed.

lowest average engine capacity needs to be defined.

Are the authors assuming that the public cannot correlate carbon dioxide and fuel economy data (noting that they are linked)? Some manufacturers may omit the CO2 data if FE is declared.

It would demonstrate public responsibility if the authors were to distinguish greenhouse gases and criteria pollutants very clearly. They are being blurred by the media, and this paper might be used in derivative articles. And greenhouse rating requires definition at first use for international readers familiar with g/km units.

The authors started the paper with discussion of the consequences of poor air quality. The paper later states 'There was also little advertising for vehicles using fuels associated with lower greenhouse gas and other exhaust emissions per distance travelled (ie, diesel, LPG and electric/petrol mixes). While this is true, there is no accompanying acknowledgement that diesel vehicles, being inherently higher in NOx than petrol vehicles, spawn ozone production which leads to respiratory problems. There is a disconnect between the introduction and the body of the paper.

The significant increase in average engine size, where the size was given in the advertisements, is also problematic for this reason. While this may be true, better transmission management and evolving cylinder deactivation and valve timing strategies can negate the negative effects of larger displacement.

The average greenhouse rating was 5.1, where a score of five equates to an average CO2 emission level of 241-260 g/km [14]. In comparison, the fleet-wide average for European car makers in 2006 was 160 g/km [15]. The authors need to attest that the NZ and European numbers were gained for the same test cycle, otherwise the numbers are meaningless. I did not check on this issue.

Therefore the vehicles advertised in this study appear to be, on average, far more polluting than the current European ones. Again this may mislead some readers, who may associate polluting with health effects rather than

climate change. Please recall that I did not agree that there was a unique correlation between fuel consumed and pollutants produced. For the diesel vs. petrol case this relationship is certainly not true or simple. And **underpowered** petrol vehicles are more likely to go into enrichment mode and produce high carbon MONoxide (CO) levels. If auto makers were relieved of criteria emissions standards (particularly NOx), they could actually realize a modest fuel efficiency improvement in many cases. There is a tradeoff between NOx and CO2 in fleet selection that is well understood and is the basis of the fleet and fuel mix differences between Europe and the USA.

The authors need to be very clear on present differences (if any) between Australian and NZ motor vehicle emissions standards. These standards differ substantially across the globe, and are not always even comparable due to differences in measurement methods.

A contrast with sample advertisements from another country concerned about pollution and climate change would have been welcome. Otherwise these data are somewhat anecdotal.

**The range of other strategies include:** limiting hazardous components within fuel (eg, sulphur and benzene), promoting public transport, and promoting active transport such as walking and cycling. **This type of information** is obvious and seems inappropriate for a journal paper. It is as if the authors are editorializing to promote a vague agenda, without considering the complexities of passenger-demand models for transportation or the interactions of society, environment and commerce.

**Equity** needs to be defined in context.

**What next?:** Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.