

The integration of road network and vehicle emissions modelling

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Road network modelling has been in development since the 1950's, with modern day techniques offering levels of sophistication that allow large dense networks to be modelled in a reliable and accurate manner. In more recent times with the focus on the environment in terms of greenhouse gas (GHG) and air toxic emissions, accurate and reliable modelling of vehicle emissions needs to occur when transport policy options are being evaluated.

Unfortunately internationally, and especially nationally, the level of sophistication of vehicle emissions modelling is not comparable with that of road network modelling. Hence emissions outputs usually rely heavily on the robustness of the assumptions and approximations used.

Advances in road network modelling have now produced a hierarchy of transport models, from macro (or national) level down to nano (personal travel). The modeller needs to decide the level of modelling and data sets to best evaluate transport policy options. However if emissions modelling is required Australian modellers have only macro level national emissions models, such as those published in the national GHG inventory. For example, no nationally recognised or published vehicle emission meso/micro/nano models incorporate average speed or vehicle driving phase. International meso/micro models exist but have not been calibrated to the Australian vehicle fleet or conditions.

This paper will show that in Australia, for the purposes of vehicle emissions inventory modelling, as the level of sophistication of the transport models increases the number of vehicle types and emissions that are able to be evaluated actually decreases. However with the application of international vehicle emission models properly calibrated with published Australia data, a comparable hierarchy of vehicle emissions models can be developed and implemented. These would provide results that could be used to reliably assess the emissions outcomes of transport planning policy options.