

Chapter 2

**ROAD TRAFFIC EMISSION AND FUEL CONSUMPTION
MODELLING: TRENDS, NEW DEVELOPMENTS
AND FUTURE CHALLENGES**

Robin Smit¹, Hussein Dia² and Lidia Morawska³

¹PAEHolmes, 59 Melbourne Street, South Brisbane,
Australia, QLD 4101, robin.smit@yahoo.com.au

²ITS Research Laboratory, School of Engineering,
The University of Queensland, Brisbane, Australia, QLD 4072

³School of Physical and Chemical Sciences, Queensland University of Technology,
International Laboratory for Air Quality and Health, 2 George Street,
Brisbane, Australia, QLD 4001

Abstract

This chapter investigates current models designed to predict air pollutant emissions and fuel consumption for road traffic. It will consist of two parts: 1) a review of current road traffic emission modelling around the world, and 2) expected direction of further model development (outlook). The review will use a model classification framework that facilitates a structured discussion of model features, complexity, model application and prediction accuracy. The outcomes from the review are then discussed in light of current developments with respect to emission measurements, traffic control and in-vehicle technology.

Introduction

Transport is a major source of air pollution and greenhouse gas emissions around the world, and its significance in this respect is increasing. The problems and issues relating to traffic are (perhaps) surprisingly similar in the affluent nations around the world. From an air quality perspective, road traffic is particularly significant since it emits large quantities of harmful chemicals close to populated areas. In fact, around the world, road traffic is the dominant anthropogenic source of air pollution in urban areas (e.g. Fenger 1999). We can