

THE ROLE OF TECHNOLOGY IN AIR QUALITY MANAGEMENT: PAST, PRESENT AND FUTURE CHALLENGES

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We are accustomed to the freedoms we enjoy as part of modern society but we often overlook how much we take for granted the freedom to travel. This freedom is implicit in our ideas about economic growth and indeed, much that our society depends on, also depends on our ability to move goods and ourselves around at will. However, there is an environmental consequence to this freedom and in order to help make it more sustainable technologies have developed, and continue to develop, to ameliorate the negative impacts. This is very apparent in the area of air quality and emissions. The problems of urban air quality experienced in cities today can be blamed on numerous factors but transport is acknowledged to be significant. Vehicle numbers and mileages grow inexorably as we get wealthier and air quality at times seems an intractable problem. It is instructive to see what has been achieved because this helps to give us some comfort that further advances can be made and new technologies developed and introduced. The use of heterogeneous catalyst technology to control the emission of toxic pollutants resulting from the combustion of fossil fuels in transport provides a great example. This paper will discuss the background to vehicle emissions control to illustrate the nature of the challenges that have been faced and overcome in the past 30 years. We will see the critical role played by regulation and implicitly therefore by policy makers. There are new challenges and these will be reviewed. Specifically the paper will focus on two issues - firstly the increasing problem posed by suspended particulate matter in urban air and secondly the emissions consequences of lean combustion technologies which are implied in the desire for lower CO₂ emitting vehicles. We will touch on the importance of fuels and engine control strategies as components of a matrix of factors which needs to be orchestrated to achieve cost effective solutions that allow the vehicle industry to continue to deliver the popular mobility we all crave. Decades from today we will need to have solved a range of different but related issues in order to proceed towards the so-called 'hydrogen economy'. It will, however, be many years before we can relax faced with the impact of the internal combustion engine on air quality.