

COMPARATIVE STUDY ON EXHAUST EMISSIONS FROM DIESEL AND COMPRESSED NATURAL GAS POWERED URBAN BUSES

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ABSTRACT

A couple of years ago, ADEME engaged in programs dedicated to emissions studies of the exhaust from urban buses. The measures associated with the reduction of atmospheric and noise pollution have particular importance in the sector of urban buses. In many cases, they illustrate the city's environmental image and contribute to reinforcing the attractiveness of public transport. France's fleet in service, presently put at about 14,000 units, consumes about 2 percent of the total energy of city transport. It causes about 2 percent of the HC emissions and from 4 to 6 percent of the NO_x emissions and particles. These vehicles typically have a long life span (about 15 years) and are relatively expensive to buy, about €150,000 per unit.

Several technical solutions were evaluated to quantify, on a real-condition cycle for buses, pollutant emissions and fuel consumption on one hand and reliability and cost in real existing fleets on the other hand.

This paper presents the main preliminary results on exhaust emissions from urban buses for two different cases:

- existing diesel buses, with fuel modifications (diesel with low-sulfur content, diesel with water emulsion, and biodiesel [30 percent oil ester in standard diesel fuel]) and
 - renovated CNG-powered Euro II bus fleet
- over representative driving cycles, set up by ADEME and partners. On these cycles, pollutants (regulated and unregulated) were measured as well as fuel consumption at the beginning of a program and 1 year after to quantify reliability and increase/decrease of pollutant emissions.

At the same time, some aftertreatment technologies were tested under real conditions and in several vehicles. Information such as fuel consumption, lubricant analysis, and problems of the technology were followed during a 1-year program.

On the overall level, it is the combination of various action, pollution reduction, and renewal that will make it possible to meet the technological challenge of reducing emissions and fuel consumption by urban bus networks.