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## **STATISTICAL ANALYSIS OF THE HUNGARIAN VEHICLE FLEET WITH SPECIAL EMPHASIS ON EMISSIONS**

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### **OVERVIEW**

The aim of this paper is to investigate the environmental trends of the Hungarian vehicle fleet between 2000 and 2008. In 2001 the number of vehicles in Hungary increased but sadly the number of cheaper and 9-18 years old cars had grown. In 2004 a decreasing number of older vehicles with spark ignition engines and younger vehicles with compression engines were to be noticed. In 2005 the average age of vehicles with compression engines decreased significantly. The characteristics of the trends of the changes in the Hungarian vehicle fleet between 2000 and 2008 are the decreasing age and the increasing number of vehicles with compression engines. The utilization of renewable alternative energy sources like liquid bio-fuels [1], [2] or gaseous fuels are very low nowadays in Hungary. Renewable gaseous fuels like biogases or hydrogen utilized in gas engines in the future can be an alternative and effective way to fulfill remarkable part of domestic demands [3], [4], [5], [6], [7]

### **METHODS**

The basis of the investigation was the yearly database of Hungarian vehicle fleet between 2002-2008. A meta database has been created in MS-ACCESS by the authors to analyse the trends of Hungarian vehicle fleet. Large number of queries has been done. Not only the trends were investigated but with the help of depth analysis of time series the flow of phenomenon was also investigated. The total vehicle fleet horizontally (buses, trucks, passenger cars) and vertically (Liquid Propane Gas, Compressed Natural Gas, Spark Ignition Internal Combustion Engine, Compression Ignition Internal Combustion Engine) were analysed.

### **RESULTS**

Due to the dramatic events of last few years: the very fast energy demand growth, the artificially stimulated economics, the banking and economic crisis, the largest in modern history energy price shock and following global recession, the growing evidence of global warming make an unique opportunity for investigate the Hungarian vehicle fleet in order to prepare the greening strategies of the fleet. Due to the large number of queries an age-tree could have been built up by the authors. Analysing the statistical data of the Hungarian vehicle fleet participating in road transport between 2000 and 2008 it can be concluded that the vehicle fleet is getting slightly younger and – in line with international tendencies – the share of compression engine vehicles is gradually increasing due to the modernisation of these engines. 2001 saw a vital expansion of the vehicle fleet but unfortunately cheaper vehicles of an age between 9-18 years were put into circulation. A minor decrease in the number of ignition engine vehicles from before 1990 can be witnessed in 2002 and 2003. In 2005 a further drop in the number of older, ignition engine vehicles can be observed, while the vehicle fleet is getting younger in a significantly quicker rhythm regarding the compression engine vehicles, due to a number of young, 4-5 years old compression engine vehicles being put into circulation. In 2006 the aging of the ignition engine vehicle fleet and an essential increase in the number of 22-27 year old vehicles can be witnessed. The change in the age of

the vehicle fleet is slight in 2007. Finally 2008 saw the vehicle fleet getting younger due to the drop in the number of ignition engine vehicles manufactured before 1990.

## CONCLUSION

Changes in the environment (and within that the climate) and the human actions influencing these are related to the society and economy. Transport needs to be sufficient within the space defined by social, economic and environmental factors so as to satisfy the mobility needs of society in an economically efficient and environment-friendly way [8]. The explosion in scientific and technical development seen in the last century has provided humanity with such tools and technical solutions which multiply the impacts of influencing the environment exceedingly. Satisfying the growing needs for consumption inevitably damages the environment while the decrease of environmental pollution is a fundamental prerequisite of survival [9]. Minimizing environmental load, pollution and accidents caused by road transport and by the development and maintenance of road transport infrastructure is a just demand of society [10], [11]. Road transport is the main “culprit” in the transport sector. The aim of the present paper is to statistically analyse and determine the trends characteristic of the Hungarian vehicle fleet participating in road transport. As we endeavoured to statistically investigate the Hungarian vehicle fleet in the period between 2000 and 2008 with special emphasis on emission, we examined the environmental classes, age and type of engine of the vehicles.

## ACKNOWLEDGEMENT

The analyses have been carried out on the basis of registration data from the National Road Transport Vehicles Register (DELTA Informatics Plc.).

The authors gratefully acknowledge the support of the National Scientific Research Fund (OTKA CNK 78168).

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