

# **Proceedings of the 13<sup>th</sup> International Conference on Clean Energy**

In Honor of **Dr. Veziroglu's** 90th Birthday

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**ISBN: 978-605-64806-0-7**

June 8-12, 2014  
WOW Istanbul Hotels & Convention Center  
Istanbul / Turkey

[www.icce2014.net](http://www.icce2014.net)

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## BENEFIT AND RESTRICTIONS RELATED TO THE APPLICATION OF NATURAL GAS AS ENGINE FUEL FOR CITY BUSES

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### ABSTRACT

Human activities, in particular transport, are partially responsible for the problem associated with the greenhouse effect, and therefore global warming. The transport sector is responsible for around of 25% of Carbon Dioxide emissions and consumes almost 50% of global oil production. Natural Gas as an alternative fuel has many advantages: lower costs, lower emissions because of more complete combustion, lower noise and longer engine life. The goal of the European Union is that alternative sources of energy represent 20% of total consumption by 2020. In many countries around the world, intensively growing consumption of energy produced from fossil fuels. The similar situation is related to the European Union, where the demand for energy is constantly increasing too. Because the resources are limited, the consequences are the dependence of the oil product which comes from politically unstable regions with increased costs. According to the global strategy we are seeking to solve these problems through a series of initiatives and innovations including the introduction of Natural Gas buses in city transport. If we take into account the existing situation in city transport, our strategic proposal is to begin by retrofitting diesel buses into bi-fuel or dedicated Natural Gas Vehicles. This paper analyzed some benefits, which summarized according to the authors' experiences about the introduction of the Compressed Natural Gas buses in urban transport in Kragujevac city. Regarding to the future, for us this is first step before starting new project related to the introduction of Hydrogen buses in city transport.

**Keywords:** CNG buses, Alternative fuels, Emission, City transport.

### 1. INTRODUCTION

In the last 50 years, transport systems have been characterized by a serious increase in the use of the private car and the parallel development of road infrastructure and parking space to accommodate it. The following are some of the most adverse effects of this form of dispersed development based on a high use of the private car:

- congestion, and the related losses in travel time and competitiveness,
- higher transport costs for the community,
- loss of valuable green spaces,
- higher consumption of energy for passenger transport,
- pollution, and related health problems,
- contribution to climate change,
- decreased quality of urban life,
- health problems due to the lack of physical exercise,
- social exclusion for those who can't afford to live close to the city center and do not have access to a private car

In April 2010, the European Commission (EC) released a Communication on a European strategy on clean and energy efficient vehicles and fuels. EC set out several policy measures to support the creation of a clean and energy efficient transport system that will contribute to achieving the Europe 2020 objectives with respect to reduction of Carbon Dioxide (CO<sub>2</sub>) emissions and increase the share of alternative fuels and renewable sources in transport (UN ECE 2012).

Generally, transport is responsible for about 32% of the EU's final energy use and 21% of CO<sub>2</sub> emissions. Public urban and sub-urban transport systems with buses are only responsible to a very low degree for local environmental pollution. As example, their energy consumption per travelled passenger/kilometer is one-third of that of a car, specifically as the number of such vehicles involved is extremely low. As consequence, regarding to the total CO<sub>2</sub> emissions, only 5% is generated by buses and coaches. Therefore, bus transport is not, in principle, an essential target in the fight against CO<sub>2</sub> (UN ECE 2012).

















