

# Alternative Energy

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### Analysis of Engine Performance with NGV

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#### **ABSTRACT**

This paper presents experimental results carried out to evaluate brake thermal efficiency and fuel consumption by gasoline and compressed natural gas (CNG). In this experiment, a 4-cylinders gasoline engine has been modified to bi-fuel engine, then the engine is operated for the condition of fixed load condition to obtain same brake power output from both fuels and all the corresponding results such as fuel flow rate and brake thermal efficiency have been measured for evaluation. The test results show that gasoline has higher fuel consumption and brake thermal efficiency than CNG. Details results including fuel consumption and brake thermal efficiency have been discussed in this paper.

#### **INTRODUCTION**

Natural gas vehicle (NGV) is not new in the industry; however, it is becoming an uprising issue because of its advantages compared to gasoline. The increasing number of vehicles from million of cars and light-duty trucks, almost exclusively operating on gasoline and diesel fuel, are major contributors to severe environmental problems such as global warming, haze and acid rain. The major sources of particulates (small unburned particles of hydrocarbons and sulfur) and nitrogen oxides are from diesel fuel that being used by heavy duty trucks and buses also caused emissions and these particulates have cancer-causing potential and it could cause significant respiratory problems.

Alternate vehicle fuels such as natural gas have long been proposed as a way to provide significant air quality benefits over gasoline fuels. Significant advances have been made in the past few years that have highlighted the efficiency and emission potential of NGV. In transportation sector, natural gas is becoming more important because it is more environmentally friendly, safer and lower fuel cost compared to gasoline power vehicle. NGV was found to give NO<sub>x</sub> emission of about 75% less and produced approximately 35% less CO<sub>2</sub>, compared to conventional gasoline vehicles. Natural gas also has low well-to-wheel emissions, except for hydrocarbons that escape throughout the fuel chain. Lighter than air, with a high ignition temperature, it has better safety characteristics than gasoline, although a risk of explosion exists in closed spaces. In addition, in response to the high fuel prices of gasoline nowadays, it insisted the drivers to use alternative fuels like natural gas which is cheaper than gasoline.