ENHACEMENT OF INTERNAL COMBUSTION ENGINES PERFORMANCE USING SOLAR HHO-SYSTEM

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ABSTRACT
This project recommends the use of a newly designed solar-oxyhydrogen system that will improve the general efficiency of a vehicle as well as the emissions released to the environment. Oxyhydrogen, mostly known as HHO, is a mixture of hydrogen and oxygen gases that can be produced through water electrolysis. The recommended design includes the use of flexible solar power panels place on the roof of the vehicle that have the capability of converting photovoltaic rays from the sun into electric power.

OBJECTIVE
The objective of this project is to work together as a team to study the advantages of the implementation of solar-oxyhydrogen systems into vehicles, with the objective of increasing the efficiency of the car at the same time that it will reduce the pollutant emissions to the environment. The team will study the current market alternatives to conventional internal combustion engines (such as hybrid vehicles) and will focus on the system mentioned above: equipment required, method, theory behind the method, and analysis of the efficiency and emissions to the environment.

ANALYSIS
Electrolysis, the most common way to produce HHO, consists of the interaction between a direct current and water, forming the desired gas. For this project, we are studying an ‘on demand’ system, that will produce HHO when needed, creating a lighter product. There are four steps in the process: Electrical source, HHO Production, Injection and Combustion of the mixture. Electricity will be the three GP-FLEX 200 solar panels installed on the roof of the vehicle. There will also be, a rechargeable battery and a charge controller, whose duty is to charge and discharge the battery. An Ogo21 Plate DC Cell was picked to create the HHO through electrolysis. This cell is able to provide a 5 liter per minute flow, enough to improve the efficiency of the car since only 0.25 per minute of HHO is required. As soon as the HHO is injected into the combustion chamber and mixed with the gas, the vehicle will follow a regular Otto Cycle like conventional vehicles do.

CONCLUSION
According to the Otto Cycle, efficiency depends on the compression ratio and the ratio of specific heats. Using a mixture of HHO and gasoline, the cycle occurs at a higher temperature, increasing the efficiency and therefore saving money for the consumer. Data made by Musah University with real tested engines proves that emissions of CO, CO₂, (for some speeds), Hydrocarbon and NOx are dramatically reduced by adding HHO into the mixture.

With this results, it is obvious that the addition of an Solar HHO System will increase efficiency and reduce the harmful emissions of the vehicle with a low cost investment, being able to compete against traditional hybrid cars.

REFERENCES