CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34789

Project Title

Electric Vehicle Unplugged: Regenerative Acceleration Generator Technology to Extend the Mileage of an Electric Vehicle

Abstract

Objectives/Goals

With skyrocketing gasoline prices, it has become crucial to develop an energy efficient electric vehicle. The United States spent about $380 billion for imported petroleum last year. Over the next seven years, the federal government will spend $7.5 billion on policies to boost the electric vehicle industry. Besides, the influx of automobiles in today's world has tremendously increased the amount of pollution leading to global warming. Hence many eco-friendly technology companies are making Electric Vehicles. However, its short driving range and lengthy recharge time remains a key challenge. The objective of this innovation was to design and develop an efficient and cost effective system to extend the mileage by harnessing energy from renewable sources like the wind, using the Regenerative Acceleration Generator Technology.

Methods/Materials

This research involved designing and constructing a novel system, which is affordable to everyone. Five propellers mounted onto the front grille of the car, were attached to canon DC motors connected in serial to act as a generator. The voltage and current at various speeds were measured for every 5 miles increment in speed. An electronic circuit was built to charge and discharge three 1F super capacitors to trickle charge a battery. A 555 timer was used to oscillate this cycle every 1.5 seconds. This circuit was run for an hour, the battery was charged and the power generated was calculated. This cycle was repeated by varying the volt input to the circuit, corresponding to the different speeds of the car.

Results

The system was able to produce 30.1, 27.5, 25, and 20 volts, when the car was driving at 65, 60, 50, and 40 miles per hour and the energy equivalent to 68, 53, 43 and 28 Watt-hours were generated respectively. There was no significant difference in the drag ratio after analyzing the fuel cost data from the On Board Diagnostic II Scanner. The energy generated can be used to charge the second battery while the vehicle is in motion or provide a burst of energy to accelerate the vehicle when needed.

Conclusions/Discussion

This project successfully designed an efficient, smart and cost effective system to extend the mileage of electric vehicles by using the Regenerative Acceleration Generator Technology. This work is an important initial step in increasing the driving range of the EV, thereby revolutionizing the recharging industry and pioneering future research.

Summary Statement

An efficient and low cost system was designed to extend the mileage of electric vehicles using the Regenerative Acceleration Generator Technology, addressing vital issues like global warming and fuel dependency that impact the US economy.

Help Received

Dr. Ismail helped answer questions about the electrical circuit. Parents helped in obtaining the materials for the project.

Preliminary