

Autonomous Efficient Generator

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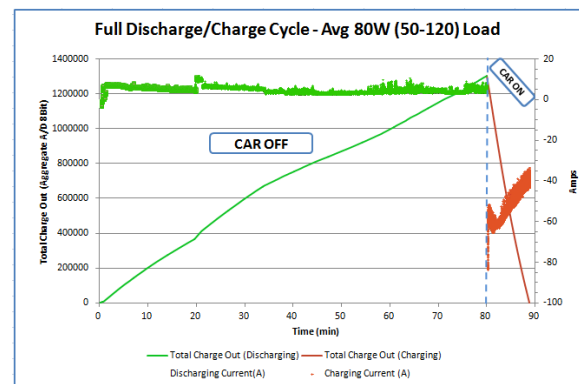
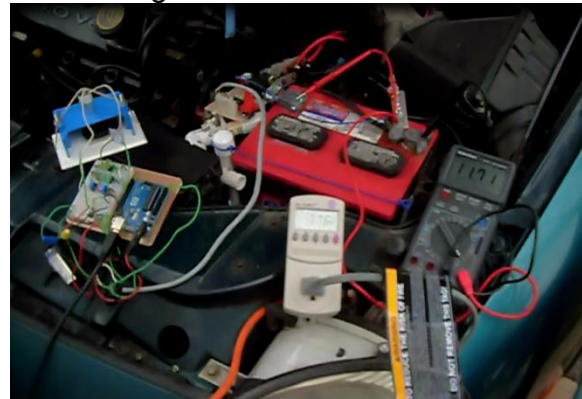
Introduction: The goal of this project is to improve the efficiency of generators by using a set of electrical storage elements along with a control system which starts and stops the generator depending on the state of these electrical storage elements. One application of this project is to configure an automobile to efficiently provide electrical energy capable of powering a sump pump and other electrically powered devices during emergencies, power outages, and special off-grid applications.

Motivation: Many people were without power after Superstorm Sandy, but installing a standby generator to handle such emergencies proves too expensive. Using an automobile as an electric generator can provide a lower cost, widely-available alternative.

And with proper automatic start/stop control of the auto engine, fuel consumption during the power outage is minimized.

Design: The design of the project is split into two parts: power distribution, and control system. Safe and efficient power distribution is accomplished using properly rated fuses, power connectors, and wire gauges to deliver the DC current and voltage being supplied by the battery and alternator to the DC-to-AC inverter. This wiring is connected at a junction where the battery connection and alternator connection meet. A hall-

effect sensor monitors the net current going into the battery. The control system comprised of a microcontroller device uses the knowledge of the current and the battery voltage to start and stop the car's engine as needed utilizing a solenoid to depress the mechanical button of a small wireless remote engine starter.



Conclusion:

The Autonomous Efficient Generator is capable of increasing the efficiency of electrical power generation. Our automobile-based prototype system can be used to power the critical circuits most needed by households during natural disasters and regional power outages (a sump pump, led lighting, furnace blower motor, communication circuits, refrigerator, etc.). It is low cost and fuel-efficient. A derivative product based upon our control system is an electronic device for monitoring and recharging a car battery, before the automobile needs to be jump-started.