Design And Fabrication of Hybrid Car

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Abstract- *Here, we manufacture hybrid vehicles that use double power technology. Today, new vehicle technologies are being announced in the automotive sector. The system uses electricity and wind to generate electrical energy to drive the vehicle. This vehicle system uses electricity instead of the fuel system. The shrinking oil and gas resources and environmental concerns have led the automotive industry to develop more efficient and clean vehicles to reduce fuel consumption and protect the environment. There is also growing interest in plug-in hybrid electric vehicles (PHEVs) due to energy security and greenhouse gas emissions issues, as well as low electricity prices. As battery capacity and all-electric range of PHEVs increase, some PHEVs or EVs may require quick charging. This paper proposes two sources of energy: photovoltaic (PV) and wind energy. This paper proposes two sources of energy: photovoltaic (PV) and wind energy. As battery capacity and all-electric range of PHEVs increase, some PHEVs or EVs may require quick charging. A charging station architecture for municipal parking decks has been proposed, featuring a DC micro grid connected to a bidirectional DCDC converter charger, a distributed renewable energy power plant, and energy storage. Wind and solar energy are freely available and eco-friendly. The combination of energy sources provides more reliable performance than either energy source alone. These hybrid vehicles are oil independent. Based on research and other discoveries, hybrid cars will become popular and people will be interested in it. Therefore, this study is more important when considering current investments from both the government and the automotive industry.*

Keywords- plug-in hybrid electric vehicles, Photovoltaic, Fabrication, Hybrid Electric Vehicle.

I. INTRODUCTION

Energy is the light and radiant heat from the Sun that affects and sustains the Earth's climate and weather. Electric power is sometimes used as a synonym for energy, more specifically to refer to electricity produced by radiation. Since ancient times, energy has been used by humans through various technologies. Radiation, along with secondary resources such as wind, wave, hydro and biomass, make up the bulk of the stream of renewable energy available on Earth.

Energy technology can provide power generation from heat engines or solar power, space heating and cooling in active and passive buildings. Drinking water by distillation and disinfection, sunlight, hot water, heat energy for cooking, high temperature process heat for industrial use. Sunlight can be converted to electricity using photovoltaic (PV), condensing power (CSP), and various experimental techniques. PV has been used primarily to power small and medium-sized applications, from single-cell powered handheld computers to off-the-grid homes powered by photovoltaic arrays.

The term "photovoltaic" means "light" in Greek (phos) and electricity in "voltaic", derived from the Italian physicist's name volta, and then to the unit of electric potential, Volt.

A cell or solar cell (PV) is a device that uses the photoelectric effect to convert light into direct current. The first cell was built by Charles Fritts in the 1880s. The Serencell prototype converted less than 1% of the incident light into electricity, but both Ernst Wernervon Siemens and James Clerk Maxwell recognized the importance of this discovery.

RENEWABLE ENERGY:

In 2006, about 18% of global final energy consumption came from renewable, with 13% coming from traditional biomass, such as wood-burning. In 2006, about 18% of the world's final energy consumption came from renewable energy and 13% from traditional biomass. B. Firewood grilling. Hydropower was the second largest source of renewable energy at 3%, followed by hot water / heating at 1.3%. State-of-the-art technologies such as geothermal energy, wind power, electricity and ocean energy together provided about 0.8% of final energy consumption. Concerns about climate change; rising oil prices, peak oil, and increased government support are driving renewable energy laws, incentives, and commercialization. European Union leaders said in March 2007 that by 2020, 20% of their energy would be renewable fuel as part of a bid to reduce carbon emissions due to the will of global warming. In principle, we have agreed to procure from.

ENERGY

Electricity is generated directly from sunlight using solar cells. The term photovoltaic power refers to the voltage caused by light. Since most cells are made of some form of silicon semiconductor, most cells are made of silicon semiconductor material, so cells are made of semiconductor.

This is a hard material that looks dark blue or red. The blue cells consist of very fragile thin discs or squares. Red silicon is applied to the glass as a thin film. When the surface of silicon is exposed to sunlight, electricity is generated by a process called the photovoltaic effect, similar to physics.

Each silicon cell produces about 0.5V, so only multiple batteries are needed to increase the voltage. The cells are connected to each other to produce a higher voltage that is more useful. Because they are connected in this way, they are often called panels, but vendors call them cell modules. PV module or just PV module.

A cell or photovoltaic cell is a large area electronic device that converts energy into electricity through the photovoltaic effect. Photovoltaics is a field of technology and research related to the use of cells as energy. The term cell may be reserved for devices specifically designed to collect energy from sunlight, while the term solar cell is used when no source is specified. Arrays of cells are used to create modules or photovoltaic arrays.

II. BACKGROUND STUDY

B.Sivaprasad, O.Felix, K.Suresh, G.Pradeep Kumar Reddy and E.Mahesh [1] The term cell may be reserved for devices specifically designed to collect energy from sunlight, while the term solar cell is used when no source is specified. Most of the energy stored in these wind movements is in the highlands where continuous wind speeds in excess of 160 km / h (100 mph) occur. Differential warming drives the Earth's atmospheric convective system, which extends from the surface of the Earth to the stratosphere. The stratosphere acts as a virtual ceiling. Large wind farms are connected to the power grid. Individual turbines can power isolated sites. Windmills use wind energy directly as mechanical energy to pump water and grind grains.

L. Ni [2] Traditional high capacity series connected battery strings have some problems due to battery cell imbalance. B. Cell damage, reliability and safety concerns due to overcharging oroverdischarging. The conventional approach to solve these problems includes the battery monitoring system "BMS". And cell equalization circuit. With the BMS battery pack, performance is limited by the weakest cell in the string. Cell equalizers are limited by the circuit's current rating, equalization speed, and additional cost and weight. A new concept for distributed energy storage (DESD) modules. Instead of using a high-power DCDC converter connected to the entire battery string, a distributed high-voltage gain, high-frequency, high-efficiency bidirectional DCDC converter is integrated into a small battery pack to form a DESD module, respectively. The module outputs are connected in parallel to form a battery energy storage.

J. C. King [3] Variable speed control of the generator improves the energy efficiency of the vehicle and reduces the load on the battery compared to constant speed control. Such controls are very sensitive due to non-linearity. In plug-in hybrid vehicles, the wide range of battery voltage fluctuations, in addition to the apparent inherent non-linearity of variable speeds, adds to the complexity of controller design. In addition, in our case, in order to use the variable speed feature, the load on the generator has to follow the load on the vehicle, so there is a temporary limit. Equivalent applications typically use a high frequency control strategy based on the generator's three-phase current and voltage detection on the electrical side. This article explores low frequency power control strategies through a model-based approach to a particular power electronics vehicle architecture.

C. Nayanataral, P. Shanmugapriyal, G. Gurusivakumar and B. Thiruvenkadam [4] This article explores low frequency power control strategies through a model-based approach to a particular power electronics vehicle architecture. This was considered the fastest way to build a first-level experimental vehicle for future use as a training vehicle for college students at the Power Electronics Laboratory. JIt was proposed to use an existing powertrain and connect it in tandem. The basis of the design principle was used to dimension the element to meet the proposed specifications of the vehicle and its driving cycle. The current source inverter was simulated at the Power Electronics Laboratory used in series hybrid electric vehicles.

L. Chen, G. Xi and J. Sun [5] Model reference control (MRC) methods have been proposed to regulate engine torque, engine torque, and clutch torque to manage transients. The control system is overworked in the sense that it can manipulate three inputs (that is, three torques) to control two outputs (angular velocities on either side of the clutch). Analyze the impact of using different input combinations to take advantage of the system's overworking capabilities and determine the sensitivity of performance to different design elements. Simulation and test results for SPHEV buses show that MRC reduces torque interruptions, vehicle jerk, and friction loss compared to traditional operating methods.

De-xing, Z. Yuan and L. Teng [6] This hybrid electric vehicle uses a power split planetary gear system to combine the benefits of both in-line and parallel hybrid vehicles. In this task, you will develop a dynamic model and apply it to optimal control development. Dynamic programming (DP) is used to minimize the combination of fuel economy and selected emission types in a particular driving cycle. A trade-off study between fuel consumption and emissions was performed compared to the simulation results performed in ADVISOR. It has been found that significant reductions in emissions can be achieved at the expense of a slight increase in fuel consumption.

W. Zhou, C. Zhang and J. Li [7] Consider two optimal power management strategies for production plug-in school buses (ie, BL strategy and CD / CS strategy). The fuel performance of these two strategies is Compare the fuel performance of these two strategies. This study applies a dynamic programming approach that can produce optimal solutions globally to ensure fair comparisons. Simulation results show that the difference in optimal fuel economy achieved by these two energy management strategies is very small in the plug-in series powertrain.

M. Uno, H. Toyota [8] We propose an energy storage system based on supercapacitors that can realize high efficiency and high energy utilization of supercapacitors (SC). The system consists of a voltage equalizer and a selective intermediate tap. Output voltage fluctuations are limited to a certain range by selective intermediate taps, but SC voltage imbalances due to charging / discharging through these taps are minimized by the equalizer. This paper presents the working principles and experimental performance of the proposed energy storage system.

Hong-Sun Park, Chong-Eun Kim, Gun-Woo Moon, Joong-Hui Lee, Jeon Keun Oh [9] This document proposes a charge balance method for HEV lithium-ion battery systems. In this scheme, all primary windings are connected in series with a parallel bidirectional switch to provide balanced energy from the entire battery string to a particular overcharge cell. In addition, optimal rated power design rules are proposed according to the equalization time and unbalanced SOC distribution to achieve the minimum size of the equalization circuit using the proposed cell balancing method. The prototype 4-cell HEV lithium-ion battery system delivers excellent charge balancing performance while maintaining a significantly reduced cell balancing circuit size.

A. Hande, T.A. Stuart [10] This technique uses a new selective boost equalizer that detects the battery in either a very low charge state (SOC) or a very high SOC. In this system, a set of electromechanical relays is connected to the matrix to deliver boost current to a weaker battery. A 32-bit microcontroller is used to control the relay circuit and the boost current is supplied by another boost charger. As soon as a low battery is detected, a special "round robin" algorithm schedules the battery at a specific boost time. The equalizer was tested with a pack of 12 12V, 93 amp-hour NiMH batteries connected in series. Test results show that the equalizer was able to rebalance artificially unbalanced packets and increase capacity by 27% within 6 charge / discharge cycles. By using the "round robin" algorithm, the number of cycles required to rebalance packets has been significantly reduced.

III. PROPSED METHODOLOGY

The panel consists of a series of silicon cells. When the panel is exposed to sunlight, a voltage signal is generated and passed to the charging circuit. The voltage generated increases depending on the size of the panel. The charging circuit collects voltage signals from the circuit board and stores them in the battery. The blade of the wind turbine is connected to the PMDC motor shaft. The PMDC motor produces energy in response to the flow of air that turns the blades of the wind turbine, and the generated energy is stored in the battery of the control unit. Battery power is used to control hybrid cars. The front side of the hybrid car one rack & pinion arrangement is fixed. The pinion is directly connected to the steering shaft. We rotate the pinion in right side the two front wheels are turn right side, and we rotate the pinion in left side the two front wheels are turn left side. The rack and pinion assembly allows you to easily control the orientation of the vehicle.

The vehicle we use is a robot vehicle. With the other components mounted on top, it acts as a chess board or base for all other components. The battery is mounted on the back and acts as energy storage. The fan is mounted on the front of the robot vehicle. The motor is mounted on the back of the fan. A truncated cone is mounted in front of the fan to increase the efficiency of the fan. The solar panel is mounted on top of the battery. PCB (printed circuit board) is installed between the fan and the battery to control the entire circuit. LED. Used for demo purposes.

To save energy and use it optimally, we design vehicles that run on batteries that are charged by a free energy source. To this end, we planned to use energy resources and store this energy in batteries. To do this, we first checked the required voltage and wind energy from the solar panels. To do this, we first identified the required voltage and wind energy from the solar panels. Then, if necessary, I connected the solar panels and the wind power generator motor. For demonstration purposes, the project will use LED panels to show the energy coming. But in reality, this energy corresponds to the battery voltage value and is used to charge the battery and then to drive the car.

To build a remote control robot, I chose a Philips remote control that works with the RC5 protocol, then checked this protocol and learned how it works. To receive this IR signal from the remote control, use the TSOP1738 operating at a frequency of 38kHz, take the data signal from the remote control and pass it to the controller little by little. The controller is then programmed to receive the bits of the TSOP and provide the appropriate output according to the signal.

For small motors, alternative structures featuring "coreless" armature windings are often used. This structure relies on the coil wire itself for structural integrity. As a result, the armature becomes hollow and permanent magnets can be attached to the inside of the rotor coil. Coreless DC motors have much lower armature inductance than comparable sized core motors, extending the life of brushes and commutators.

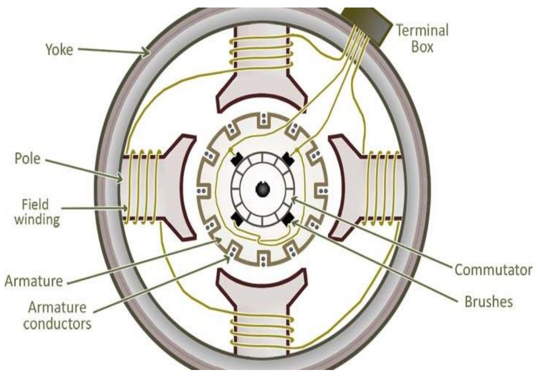

FIG 1. Core Design

The coreless design also allows manufacturers to build smaller motors. At the same time, coreless motors tend to overheat due to the lack of iron in the rotor. For this reason, this type of structure is typically used only for small low power motors. Projectors will most commonly see coreless DC motors in the form of pager motors

A) WIND BLADE

The wind blade is used to transform the wind power thru the electric power through the usage of the dynamo or generator. The wind blade is hooked up to the only shaft and this shaft is hooked up to the dynamo shaft or generator shaft.

B) RELAY

The relay is an electric switch. The current flowing through the relay coil creates a magnetic field that attracts the lever and changes the contacts of the switch. The coil current can be turned on or off. Therefore, the relay has two switching positions, which is a changeover switch. Relays allow one circuit to switch between the second circuit. It may be completely separate from the first circuit. The connection is magnetic and mechanical. The coil of the relay carries a relatively large current. It is typically 30mA for 12V relays, but can reach 100mA for relays designed to operate at lower voltages. Most ICs (chips) cannot supply this current, and transistors are typically used to boost small IC currents to the large values required for relay coils. The maximum output current of the popular 555 timer IC is 200mA, and these devices can power the relay coil directly without amplification.

C) BATTERY

Our project uses rechargeable batteries. It is rechargeable. A battery is one or more electrochemical cells that store chemical energy and make it available as electricity. There are two types of batteries, primary batteries (disposable) and secondary batteries (rechargeable), both of which convert chemical energy into electrical energy. Primary batteries can only be used once because they run out of chemicals in an irreversible reaction. Rechargeable batteries can be recharged because the chemical reaction used is reversible. They are recharged by passing the charge current through the battery, but in the opposite direction of the discharge current. Rechargeable batteries, also known as rechargeable batteries, can be charged and discharged many times before they are exhausted. Some batteries can be recycled when they are used up.

Batteries are becoming more popular as they become portable and serve many purposes. The use of batteries has caused many environmental problems, including B. Toxic metal contamination. A battery is a device that directly converts chemical energy into electrical energy and consists of one or more voltaic batteries. Each voltaic battery consists of two half-cells connected in series by a conductive electrolyte.

One half-cell is the positive and the other is the negative. The electrodes do not touch, but are electrically connected via a solid or liquid electrolyte. The battery can be easily modeled as a complete voltage source with its own resistance. The resulting voltage across the load depends on the ratio of the battery's internal resistance to the resistance of the load. If the battery is new, its internal resistance is low, so the voltage across the load will be approximately equal to the voltage at the battery's internal voltage source. As the battery drains and the internal resistance increases, the voltage drop across the internal resistance increases, reducing the voltage between the terminals and reducing the battery's ability to supply current to the load.

D) MICRO CONTROLLER

Microcontrollers are destined to play an increasingly important role in revolutionizing different industries and influencing our daily lives more than anyone can imagine. Since its creation in the early 1980s, microcontrollers have been recognized as a universal building block for intelligent digital systems. It has a wide range of uses, from simple children's toys to highly complex spacecraft. Due to its versatility and many advantages, application domains have spread and become ubiquitous in all possible directions. The result is a need to arouse great interest and enthusiasm among students, teachers, and hands-on engineers, creating an urgent educational need to provide microcontroller-based system design and development knowledge. It identifies the key features that contribute to their tremendous impact. The urgent need for education created by them provides insight into a wide range of applications.

E) CONTROL UNIT

In our project the main device is a micro controller. It is used to control the whole unit of this project. The micro controller is connected to the control unit. The control unit is connected with the battery to get the power supply.

PANEL CALCUALTION:

VOLT = 12 V
WATT = 5 W
W = V X I
5 = 12 X I
I = 5/12
I = 420MA

BATTERY CALCULATION:

B_{AH}/C_I = 8 ah/420ma
= 19 hrs
To find the Current
Watt = 18 w
Volt = 12v
Current =?
P= V x I
18 =12 x I
I = 18/12 = 1.5 AMPS.

BATTERY USAGE WITH 1.5 AMPS

B_{AH}/I
8/1.5 = 5.3 hrs
TO CALCULATE THE SPEED OF THE VEHICEL:
Diameter of the wheel = 200mm
πd =3.14x200
= 628mm
Rpm = 30
= 30 x 628
= 18840
Therefore
= 18840 x 60/min
= 1.130400km/hr

CALCULATION FOR GEARS:

Power = 18 W
Speed = 30 rpm
DESIGN CALCULATION:
DIAMETER OF THE SHAFT FROM MOTOR TO GEAR:
Torque = (P X 60) / (2 X 3.14 X N)
Torque = (18X 60) / (2 X 3.14 X 30)
Torque = 5.72 Nm
Torque = 5.72 x 10^3 Nmm
The shaft is made of MS and its allowable shear stress = 42 MPa

Torque = 3.14 x fs x d^3 / 16
5.72 x 10^3 = 3.14 x 42 x d^3 / 16
D = 8.85 mm
The nearest standard size is d = 9 mm.

IV. RESULT AND DISCUSSION

FIG 2. WIND BLADE

The wind blade is connected to one shaft, which is attached to the dynamo shaft or generator shaft.

These are often the best solutions for motion control and power transfer applications where compact size, wide operating speed range, ability to adapt to different power sources, or low voltage safety aspects are important. The ability to generate high torque at low speeds makes it a good alternative to geared motors in many applications.

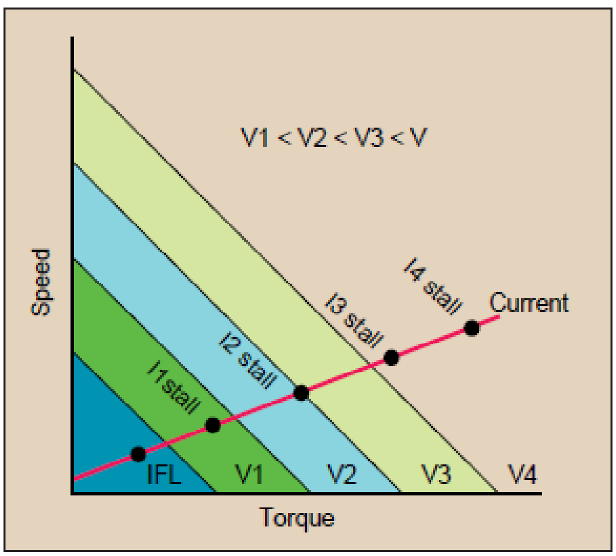

FIG 4. Speed is proportional

V. CONCULSION

This mission is made with pre planning, that it offers flexibility in operation. This innovation has made the extra applicable and in your price range. This mission “HYBRID CAR” is designed with the wish that it's far very a lot in your price range and assist complete to car field. This mission helped us to recognize the periodic steps in finishing a mission work. Thus we've got finished the mission successfully. A novel idea of disbursed power garage tool with modularized battery % and excessive frequency DC-DC converter turned into proposed. The benefits of the parallel related DESD modules have been analyzed. A 200kHz 256W 400V to 12.8V bi-directional DC-DC converter with twin energetic 1/2 of bridges turned into proposed. An preliminary hardware prototype turned into constructed and proven for this application. In the destiny work, the performance and energy density of the DCDC converter ought to be in addition progressed and optimized.

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