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DRIVE CAR BY BATTERY TO SAVE THE ENVIRONMENT

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Abstract— Drives running on petrol and diesel produce large amount of chemicals to pollute the air. Thus, a healthy environment is becoming unhealthy for human beings. Battery driven drives are free from exhaust of pollutants. In this paper, efforts are made to model battery operated drives. The model is simulated in the environment of MATLAB. Energy from Sun is gift of God to mankind. When the batteries are charged from the energy from Sun, then a lot of gasoline can be conserved. The energy saved from fuel can generate useful money to be used for the welfare of citizens of India. The optimal use of solar energy will save the pollution of environment.

Keywords— Power Electronics/ Mechatronics , Photovoltaic power systems, Power generation, Solar drives, MATLAB/SIMULINK/GUI Modeling, MPPT tracking

I. ENERGY CONSERVATION

Home Energy Conservation program helps to save thousands of rupees per year in our homes.

E-manual and E-Class Notes developed by teachers help in saving time of students. Students save time in performing experiments and writing notes in the class. It helps students to utilize saved time in learning emerging technologies to prepare them for better placement.

II. ENERGY CONSERVATION PROGRAM

A Centre of Excellence in Energy and Systems has been established in our engineering college to provide following services;

(i) Energy Audit,

(ii) E-Governance,

(iii) Tips for energy conservation in homes,

(iv) Energy conservation in industries,

(v) Logo of energy conservation is shown in Fig. 1

(vi) Spread awareness of Energy Conservation in rural areas,

(vii) Celebration of Akshya Urja Divas on 20th August. Date of birth of our Ex Prime Minister Shri Rajiv Gandhi is 20th August, 1944,

(viii) Develop eco friendly drives to save environment.

(ix) Energy Park,

(x) Energy laboratory,

(xi) Optimal use of energy from Sun,

(xii) Green house for development of Herbs and Medicinal plants,

(xiii) Develop Solar Car to save environment on roads,

(xiv) To organize Seminars/ Conferences/ Lectures on Energy Conservation,

(xv) Spread the message of REDA,

(xvi) Work with similar NGOs to develop new sources of renewable energy,

(xvii) Consultancy in Energy and Systems,

(xviii) Publish an International Journal of Energy and Systems,

(xix) Development of learning materials in energy and systems,

(xx) E-Books, To prepare road map for the development of Engineering college and Any other related area.

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Fig. 1 Logo

AIM

Aim of the program is, *"To bring MEC on the global map"*.

The salient features are illustrated in Fig. 2.

Fig. 2 Salient features

III. PV TECHNOLOGY

The use of new efficient Photo Voltaic Solar Cells (PVSCs) has emerged as an important solution in energy conservation and demand side management during the last decades. Due to high installation costs, PVSCs have not yet been an attractive alternative for electrical energy users. Users are able to buy cheaper electrical energy from the utility grid. However, they have been used extensively for water pumping and air conditioning in remote and isolated areas where utility power is not available or is too expensive to transport.

Due to new developments in the film technology and manufacturing process the prices of Solar Cell (SC) have decreased considerably during the last decade. [1-5]. PV arrays are still considered rather expensive compared with the utility fossil fuel generated electricity prices. After building such an expensive renewable energy system, the user naturally wants to operate the PV array at its highest conversion efficiency by continuously utilizing the maximum available output power of the array. The electrical system powered by solar cells requires special design considerations because of the varying nature of the solar power generated resulting from unpredictable changes in weather conditions which affect the solar radiation level as well as the cell operating temperature. Shah and Rai [6-7] have presented a model.

It considers the effect of shadowing on solar panels. Walia and Rai [8] have presented efficient use of solar energy for electrical drives. Sharma and Rai [9-11] have made use of MPPT to make maximum use of solar energy. All these measures have lead to energy conservation. It has been presented by Rai [12-14]. Due to changes in the solar radiation energy and the operating temperature of solar cell, the output power of a solar array is not constant at all times. Consequently, a maximum solar power tracking controller is always needed in any scheme with solar cell arrays to ensure maximum utilization. Therefore, works to solve the problems on MPPT have always been a hot topic for PVA utilization systems.

PVA operating schemes consist of mainly four different controlled parts as MPP tracking controller, backup battery charge regulator and controller, load bus voltage controller, and special load controllers. A PVA scheme must be considered as a whole unit. In this all these parts are tied up together. They need to be controlled together. Separate consideration usually results in the failure of required operation. They affect the efficiency of the solar car.

IV. SOLAR PHOTOVOLTAIC

"Milestones of Solar Photo Voltaic" journey are presented by Rai *et al*. [15]

SPVs are a proven solution for distributed energy right on tops of our roofs.

V. MODEL OF BATTERY DRIVE

Survey of literature shows that to develop eco friendly drives a suitable model for battery drive be developed. The development has been made in the environment of MATLAB. The developed model is shown in Fig. 3.

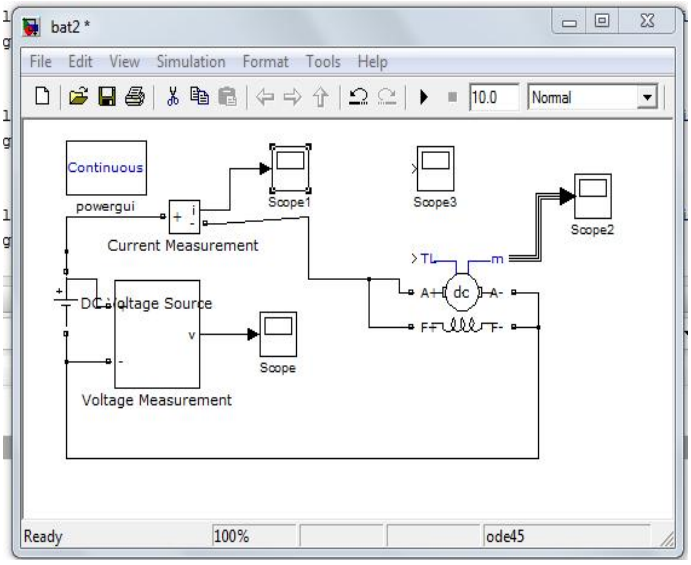

Fig. 3 Model of battery drive

The performance obtained from this model are shown in Figs. (4 to 6).

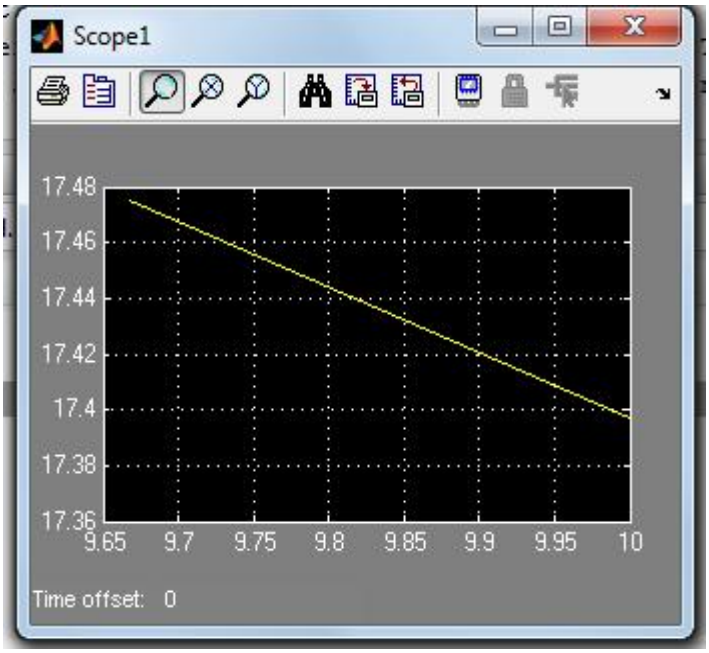

Fig. 4 Current

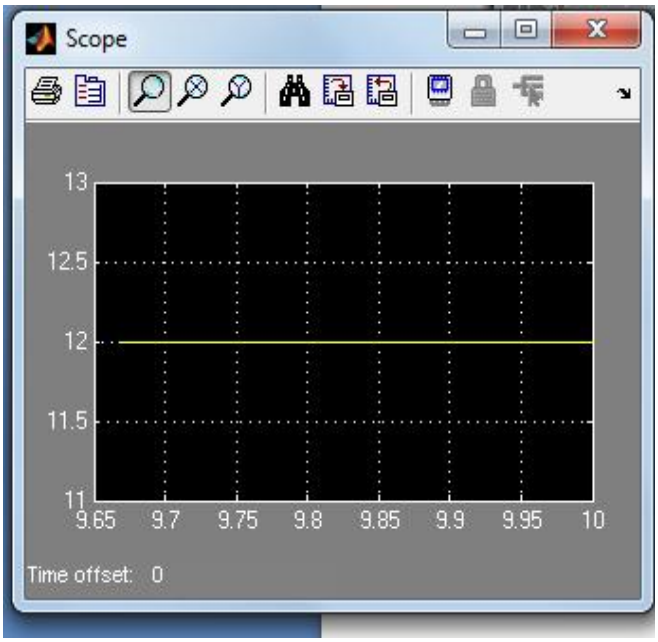

Fig. 5 Voltage

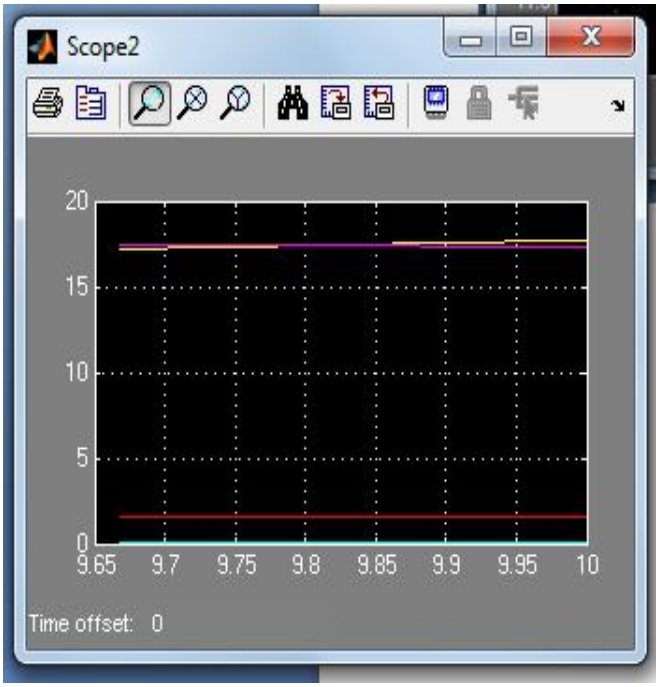

Fig. 6 Speed

VI. PERMANENT MAGNET MOTOR

In homes a large number of low power drives are used. The field winding is replaced by pairs of permanent magnets. The model of PMDC drive is developed in MATLAB. The developed model is shown in Fig. 7.

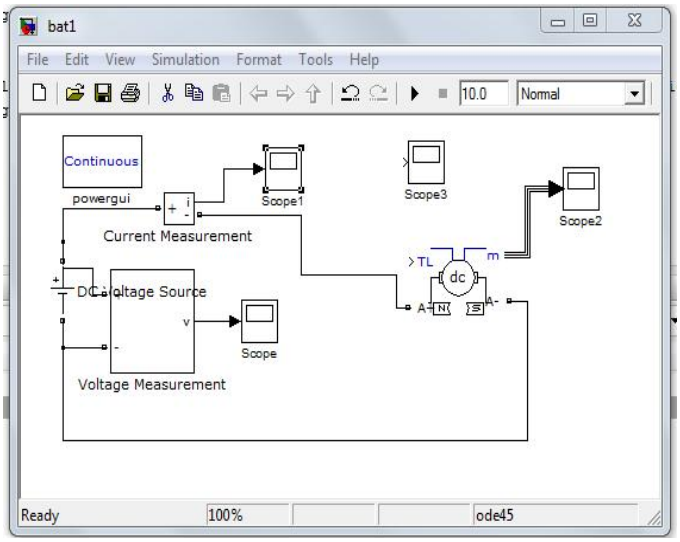

Fig. 7 Model of PMDC Drive

The performance obtained from this model are shown in Figs. (8 to 10).

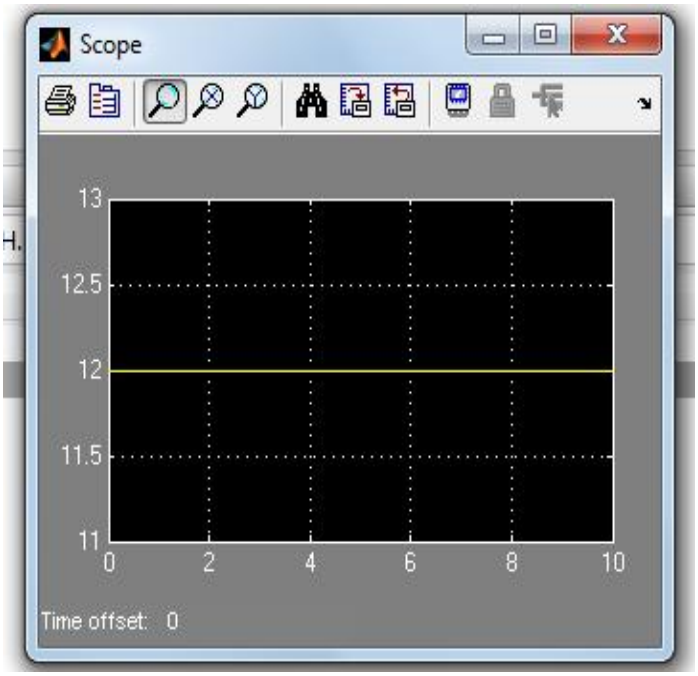

Fig. 8 Voltage

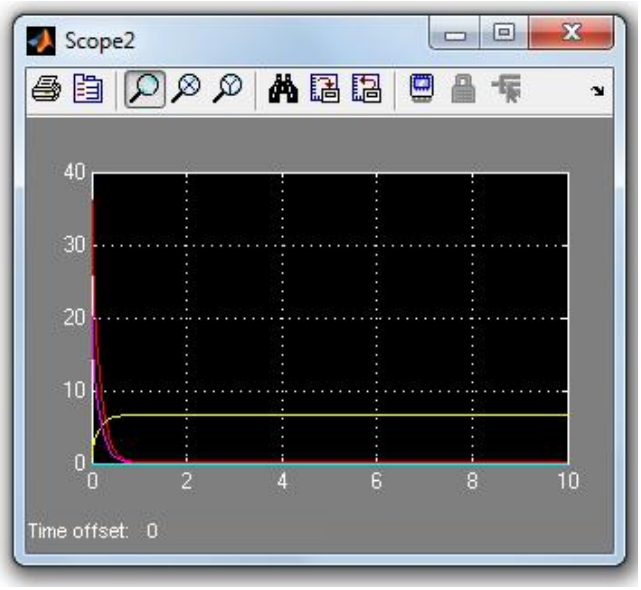

Fig. 9 Speed

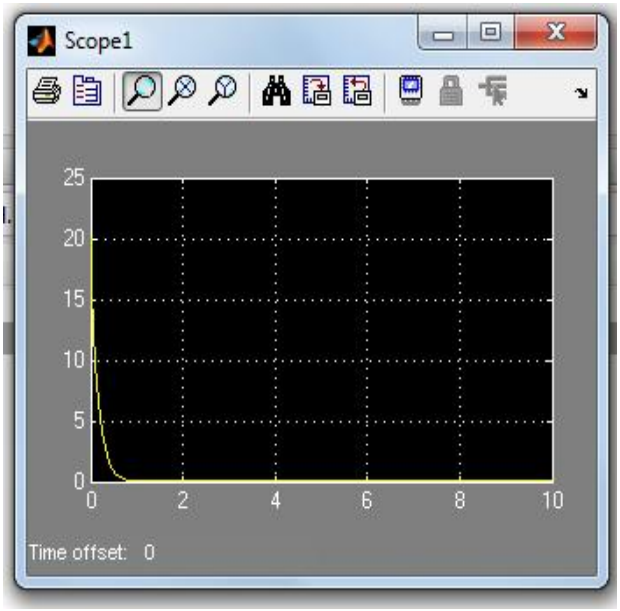

Fig. 10 Current

VII. SOLAR CAR

Solar car runs on energy converted from SUN. Solar Powered Cars are defined as cars which run on energy from Sun. They got their first recognition as a possible transportation method through the series of annual races across Australia.

However, this definition is changing. In recent years of the green movement, solar power explosion now allows people to charge Plug in Electric Vehicles (PEVs) through solar panels

installed on their homes. In recent history solar panels are installed on the roof of the car itself. The future for solar energy to power our transportation needs is very bright.

VIII. MODELING OF SOLAR CAR

The proposed model is implemented in MATLAB 7.6. The test model is shown in Fig. 11.

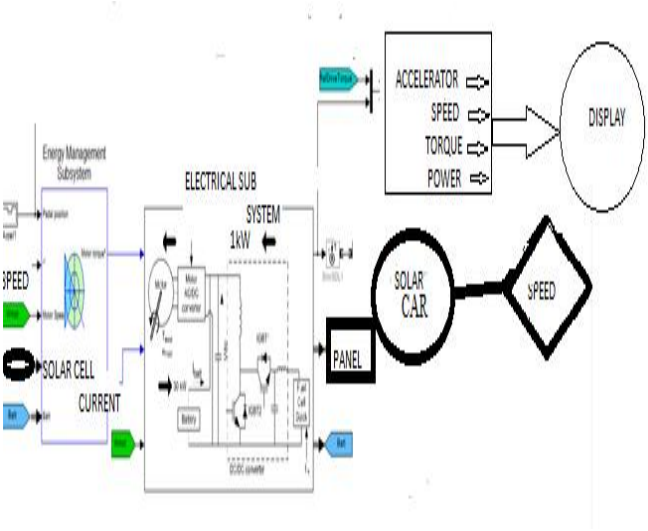

Fig. 11 Test model

IX. CONCLUSIONS

Case studies done at Margreat Engineering College Neemrana indicates that there is a great need to conserve energy. To save the environment from pollution, there is the necessity of running low power domestic drives by battery. The models of low power battery drives are developed in the environment of MATLAB. The developed models are developed and simulated in MATLAB.

India lies in the sunny regions of the world. Most parts of India receive 4-7 kWh of solar radiation per square metre per day. With 250-300 sunny days in a year, SPVs holds huge promise for India. Electrical energy from Sun and social development go hand in hand. There are large numbers of cars running on our national highways. Each car consumes 15 *km/ℓ* on highways. Each car pullulate the environment with 3 *g* of CO_2 in 1 *km* of its drive run. SPVs are a proven solution to run Solar Car. The car will have solar panel on top of its roof. The model of solar car is developed in the environment of MATLAB.

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BIOGRAPHIES

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