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ELECTRIC VEHICLE CHARGING STATION DESIGN BY USING NI-LAB VIEW

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Abstract:- Global environmental concerns and the escalating demand for energy, coupled with steady progress in renewable energy technologies, are opening up new opportunities for utilization of renewable energy resources. Solar energy is the most abundant, inexhaustible and clean of all the renewable energy resources till date. Global warming has led to the large adoption of Electric Vehicles (EVs) which appear to be the best replacement to IC engines. Due to increased number of EVs on road, charging of the vehicles with conventional fossil fuel based grid is not economical and efficient. Thus, a renewable energy based charging station finds immense potential and control for electric vehicle charging. An electric vehicle charging station integrating solar power and a battery energy storage system (BEES) is designed for current scenario. For uninterrupted power in the charging station an additional grid support is also considered without becoming an extra burden to the grid. By taking dynamic charging needs of EVs, the design of charging station is formulated and validated in LAB VIEW software.

Keywords: *Charging Station, Electric Vehicles, Solar, State Of Charge, Battery energy storage system and IOT*

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I INTRODUCTION

In the last decade two fundamental issues emerged in terms of energy throughout the world. The first one is running out of limited petroleum in the near future and the other one is carbon emission result in global warming. many countries currently rely heavily on coal, oil, and natural gas for its energy. fossil fuels are non-renewable, that is, they draw on finite resources that will eventually dwindle, becoming too expensive or too environmentally damaging to retrieve. in contrast, the many types of renewable energy resources-such as wind, and solar energy-are constantly replenished and will never run out. renewable energy [1] is mostly called “clean energy” or “green power” because it doesn’t pollute the air or the water and does not result carbon emission. most renewable energy comes either directly or indirectly from the wind or sun. sunlight, or solar energy can be used directly for heating and lighting homes and other buildings, for generating electricity, and for hot water heating, solar cooling, or charging vehicles in any charging station and a variety of commercial and industrial uses. so pv based system

is a very effective system for using in ev based charging station by utilizing solar energy. there can be seen so many scientific researches on this subject covering analyze, find solution, apply technical methods for overcoming this problems as one looks up literature. speaking generally renewable energy is proposed dominantly all around the world due to its benefits and less harm for the natural beings. as it is well known these resources are wind, solar energy, etc. in this application as replacement of conventional energy types like fuel, diesel and natural gas. a detailed literature research has been done and under this enlightenment of research a pv based ev/phev charging station characteristics, specifications and requirements are revealed by using real data for specific area. the paper consists of a system description, system model, computer-aided simulations and conclusion with suggestions for the future works.

II LITERATURE SURVEY

An electrical vehicle charging station is a charging power supply for electrical vehicles. This paper proposes design of a model for a pv based electrical vehicle that forecasts total power output under particular conditions of ankara city. First pv cell parameters are determined and then pv array formed including cells designed in order to calculate cumulative effect. Using actual irradiation and temperature we try to catch an approximation of output power for the future needs.

Fig.1gives the block diagram of the proposed EV charging station. In this paper we have considered the EVs of 6V DC. The whole system is design with the help of NI-LAB VIEW software.

A. Lab VIEW : It is a laboratory virtual instrument engineering workbench, created by National Instruments (www.ni.com) is a graphical programming language that uses icons instead of lines of text to create applications. LabVIEW is used for Data acquisition, signal processing and hardware control and image processing.

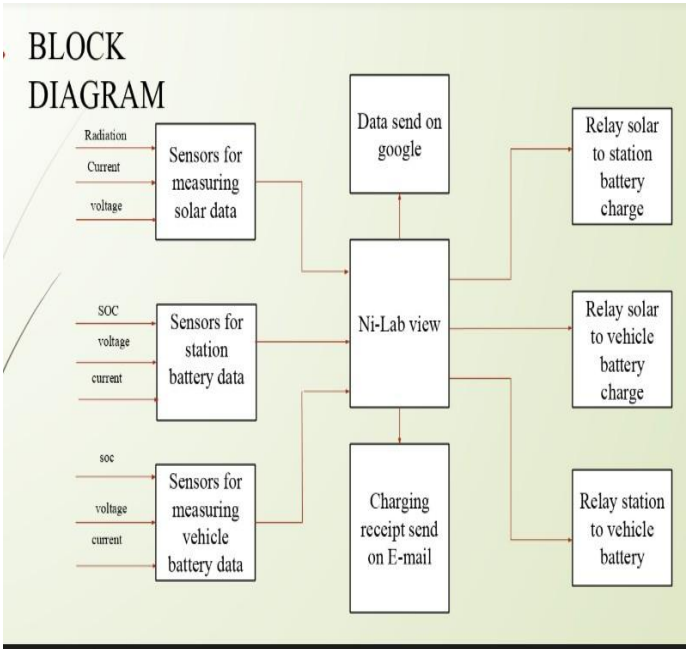

Fig 1.Block diagram

LabVIEW consisted of

a. Front panel window

b. Block diagram window

a. Front panel window of proposed work:

It consists of controls and indicators. In this front panel the graphical representation is shown of power , voltage, current, temperature , state of charge and radiations. The green buttons are provided to ON-OFF the graphical response. Below the switch display is provided to indicate the change in readings took from sensors.

The fig. a has three waveform charts for solar data, station battery data and vehicle battery data. On this chart we can see the variations of different quantities like voltage, radiations, current and temperature , etc.

Terminals corresponding to front panel controls and indicators, as well as constants, function, SubVIs , structure, and wires that connect data from one object to another.

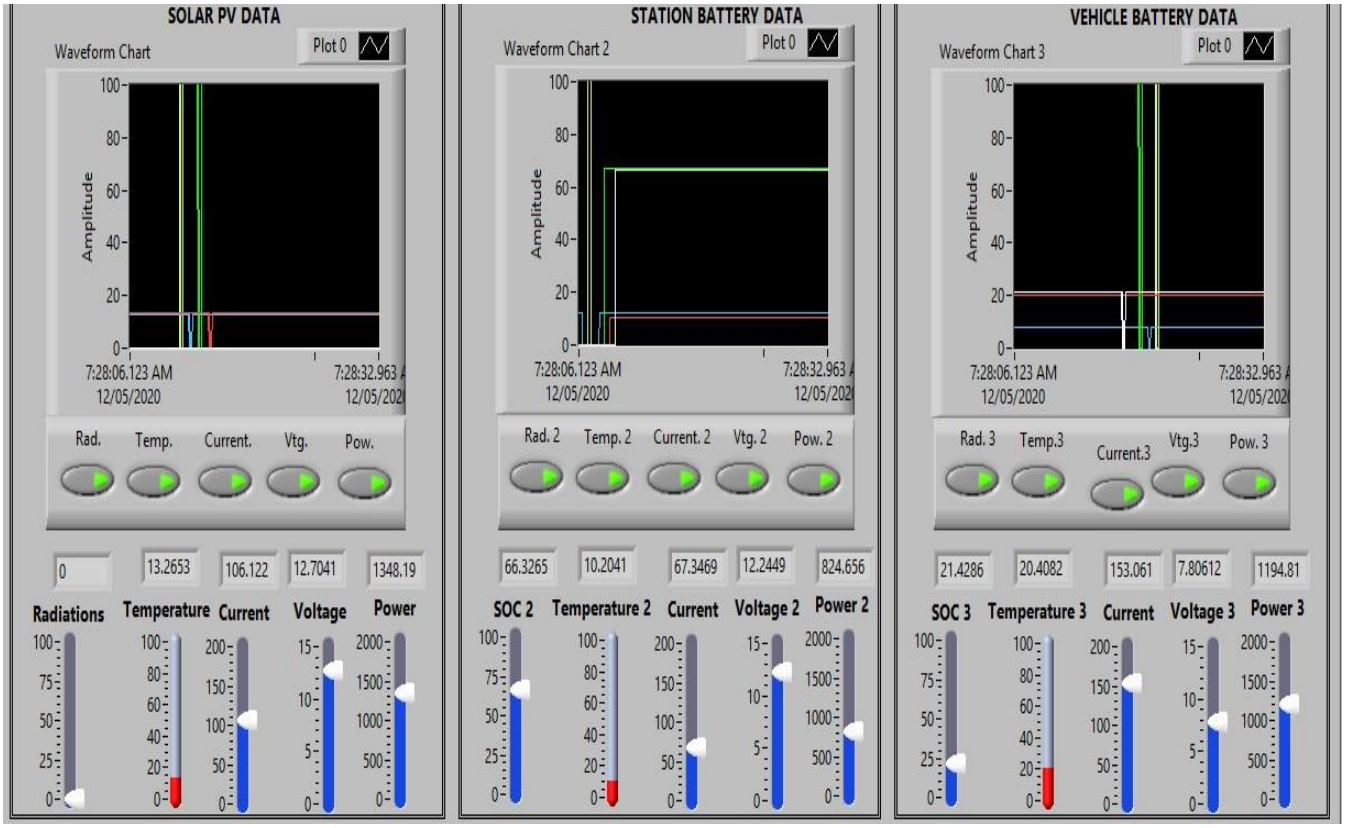

Fig 2.simulation window

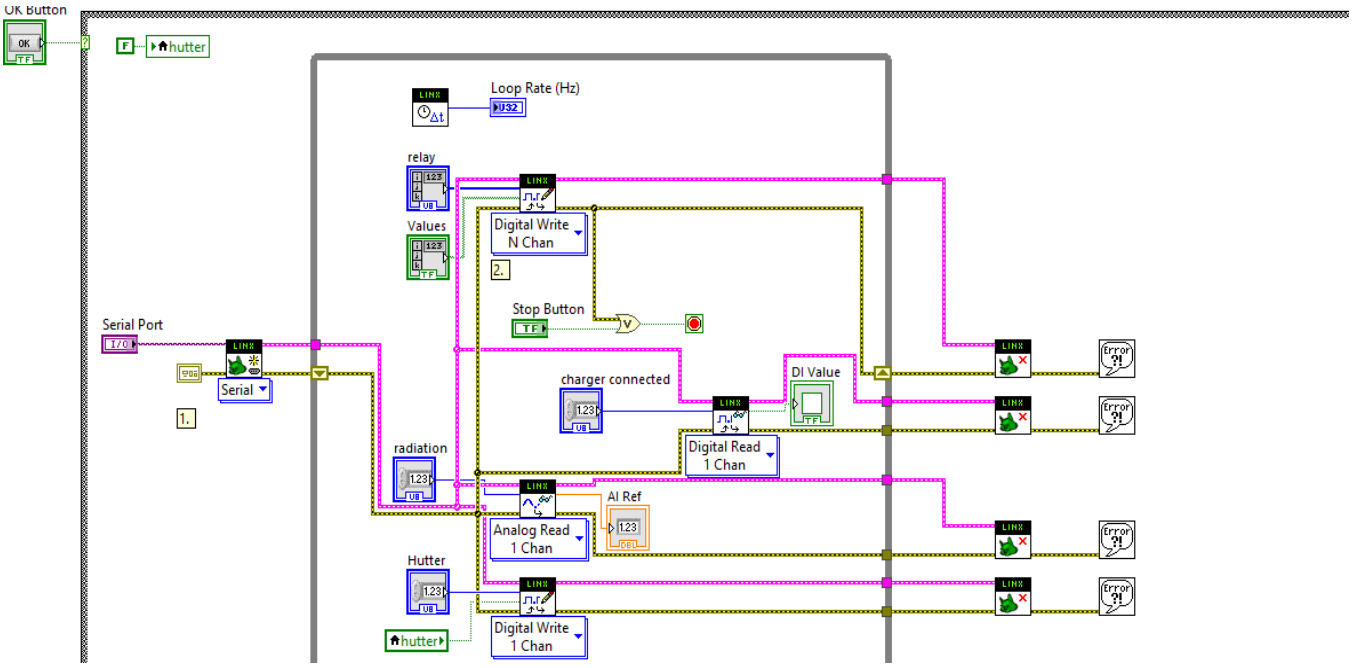

Fig.3 Circuit diagram

The components of a block diagram belong to one of the three classes:

 Nodes: program execution elements.

 Terminals: ports through which data passes between the block diagram and the front panel, and between nodes. Terminal is any point to which you can attached a wire to pass data.

 Wires: data paths between terminals

III. METHODOLOGY

The progress in the research work can be observed as,

- Literature review
- Data analysis
- Identification problem
- Developing the aim and objective
- Experimental setup
- Testing
- Performance analysis
- Experimental condition
- Data collection
- Data analysis
- Validation of testing

IV RESULT

In this project work we have done the design of EVs

Charging station with the help of lab view software. here are four steps take place:

a. **Solar to Station battery:** in this mode of operation the station battery get charge when the sun radiations are available.

b**. Solar to vehicle Battery:** when sun radiations are also available and vehicle also connected to charger with the help of charger then solar to station battery get tripped and then solar to vehicle battery charging get start.

C.**Station Battery to Vehicle Battery:** in this mode when vehicle is connected to charger but sun radiations are not available then vehicle battery charged by station battery.

V CONCLUSION

With increase EVs on the road, charging of EVs posses as a critical issue. A charging station with solar, battery storage system with additional IOT support gives a promising solution for satisfying charging requirements of all EVs throughout the day. The design and its power management of the proposed station is explained and validated in NI-Lab View.

VI FUTURE SCOPE

- Battery Costs Are Dropping Fast.
- Longer Range, affordable Electric Cars are Coming
- Building More Charging Stations are Easy
- Auto Industries Are Embarrassing EV's
- The Global Imperative To Cut Carbon Pollution And Oil Dependency.

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