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"SMART ELECTRIC VEHICLE CHARGINGSTATION"

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ABSTRACT

Recently, Electric Vehicles are attracting significant attention as anenvironmental friendly, sustainable andeconomical substitute for vehicles with a conventional engine. It addresses the concerns associated with petroleum fuels, global climate change, and pollution control. In this paper, the design and development of a Photovoltaic (PV) and grid fed Hybrid charging station for electric vehicles is discussed, and the new control strategy is proposed for energy management underdifferent operating conditions. The proposedcontrol ensures the system working in an integrated manner to optimize the energy use from the grid. The system shares power between PV and grid, and directly charge theEV when solar energy is available using Maximum Power Point Tracking (MPPT) and automaticallychanges modes of operation when solar energy is not available. Reverse power feeding provision is also adapted for the futuristic smart-E-gridconcept where EV shares the grid load. The proposed control strategy can be easily adapted to evenfor the conventional EV charging stations.

Key Words :

Auto change over unit, Battery MPPT, Solar

INTRODUCTION

Electric vehicles are a relatively recent technology that is seeking for its place in the market. It has several advantages, such as the reduced greenhouse emissions, fuel savings and its ease of use. The increase of the electric vehicles in the roads raises issues about their impact on the grid, in terms of power quality. In this the main considerations about power balance and the impact of an electric vehicle charge in the voltage, current, and total harmonic distortion. An experimental charging station prototypefor Modes 2 and 3 is used to acquire data of voltage, current and active and reactive power for different charging profiles and battery state of charging.

Two major trends in energy usage that are expected for future smart grids are: -

1. Large scale decentralized renewable energy production through photovoltaic (PV) system.
2.Emergence of battery electric vehicles (EV) as the future mode of transport

Firstly, the use of renewable energy sources such as solar energy is accessible to a wider audience because of the falling cost of PV panels [1].

The new contributions of the work comparedto earlier works are as follows: 1.Determination of smart grid of PV cell andthe commercial supply.

2. Battery monitoring using time required for charging.

LITERATURE SURVEY

Reference [1]

It Present, Electric vehicles are a relatively recent technology seeking for its place in the market. It hasseveral advantages, such as the reduced greenhouse emissions, fuel savingsand its ease of use. The increase of the electric vehicles in the roads raises issues about their impact on the grid, in terms of power quality. This paper presents the main considerations about power balance and the impact of an electric vehicle charge in thevoltage, current, and total harmonic distortion. An experimental charging station prototype for Modes 2 and 3 is used to acquiredata of voltage, current and active andreactive power for different charging profiles and battery state of charge. The possibility of charging the battery ofelectric vehicles at a various working place like offices, colleges, hospitals, universities in Delhi, India using solar energy.

Reference [2]

It Present, The issue of climate change is no longer a matter of urgency but is a crisis. Unarguably, the indispensable transition towards decarburization must come from the top-down and the bottom up. In the U.K., researchers and policy makers across the sectors have therefore been actively engaged in meeting the Paris agreement of net zero emissions through means of sustainable development.

As the U.K.'s largest emission contributor, the transport sector is yet to have a key role in the transition. Today, advances in Electric Vehicles (EV) technologies have made it possible to tackle carbon emissions, the carbon emissions involved with the life cycle of EV's remains to be questioned. Irrespective of the emissions associated with the manufacturing process of the battery, EVs have shown to reduce the road transport carbon footprint, The U.K. has introduced incentives and funding to stimulate interest inEVs and ambitiously aims for complete transition to zero emission vehicles by 2050.

The advances of such a technological shift are still challenged by many factors. Among those is the concentrated large load EV introduces into a main grid during the charging process, not to mention, the sustainability of charging EVs by carbon-emitting sources. In fact, studies suggest that emissions of the current charginginfrastructure are worse than that of internal combustion engine vehicles.

Reference [3]

It Present Currently, electric vehicles (EVs) are recognized as one of the most efficient modes of transportation with zero trailing emission. Considering the advantage of EVs, 3 million vehicles are already deployed on theroad, and it is expected to cross 100 million by 2030 [1]. However, the execution of proposed plan demand for huge charging infrastructure and enormous electrical energy. Moreover, EVs can only be sustainable when the electrical energy required for charging is generated from renewable and sustainable energy sources. However, the use of fossil fuels for electricity generation, does not reduce the emission but merely shift it from vehicles to the powerplant. Therefore, the use of renewable energy sources for electricitygeneration can completely eliminate the emission and provides an environmental benefit. Among various available renewable energy sources, solar PV array, wind energy, hydro energy andfuel cell based energy, solar PV based generation is a most feasible solution for EV charging because it is available almost everywhere irrespective of the rural or urban.

Reference [4]

This Paper Presnt, Transportation is trending towards electrification nowadays. EVs are gaining prominence due to technological advance- ments especially in renewable energy sector. Similar to land transportation, marine sectors are also reflecting the alterations to be all electric. Thus the impact on atmospheric pollution by using fossil fuel can be reduced to have abetter future society. Unlike the electric cars or buses, the marine vehicles travels dawn to dusk. The stored energy may not be enough fortheir voyage.

points on the way in sea routes is inevitable as diverting to shore for charging is impractical. Normally the existing on- shore charging stations will be far from the sea route.

The shore power can be grid supported and/or renewable energy based and can ensure sufficient power all the time. Ships in voyage cant access the shore power most of the time. So the construction of an FCS is a reliable option for electric marine vehicles.Thus the capacity of on-shore charging station can be considerably reduced and the land used for the renewable energy based charging station on shore can be used for some other applicationsor preserved. as

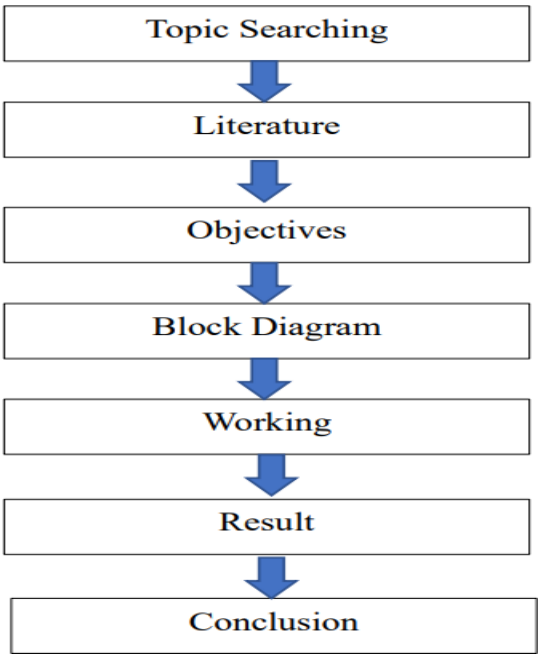
Reference [5]

This Present, We have collected information from the Indian Meteorological Department and it is used to determine the optimal orientation of solar panels for maximum energy production in Delhi. Theseasonal variation in solar insolation is analyzed to determine the energy availableforEV charging. Due to low range per charge people prefer to conventional vehicle, so by increasing the number of charging station in between every 25 km. India's per capital energy consumption is 23.35(GJ) cagoules. India ranks 3rd in oil consumption with 211.5million tons in 2016, after China and USA.

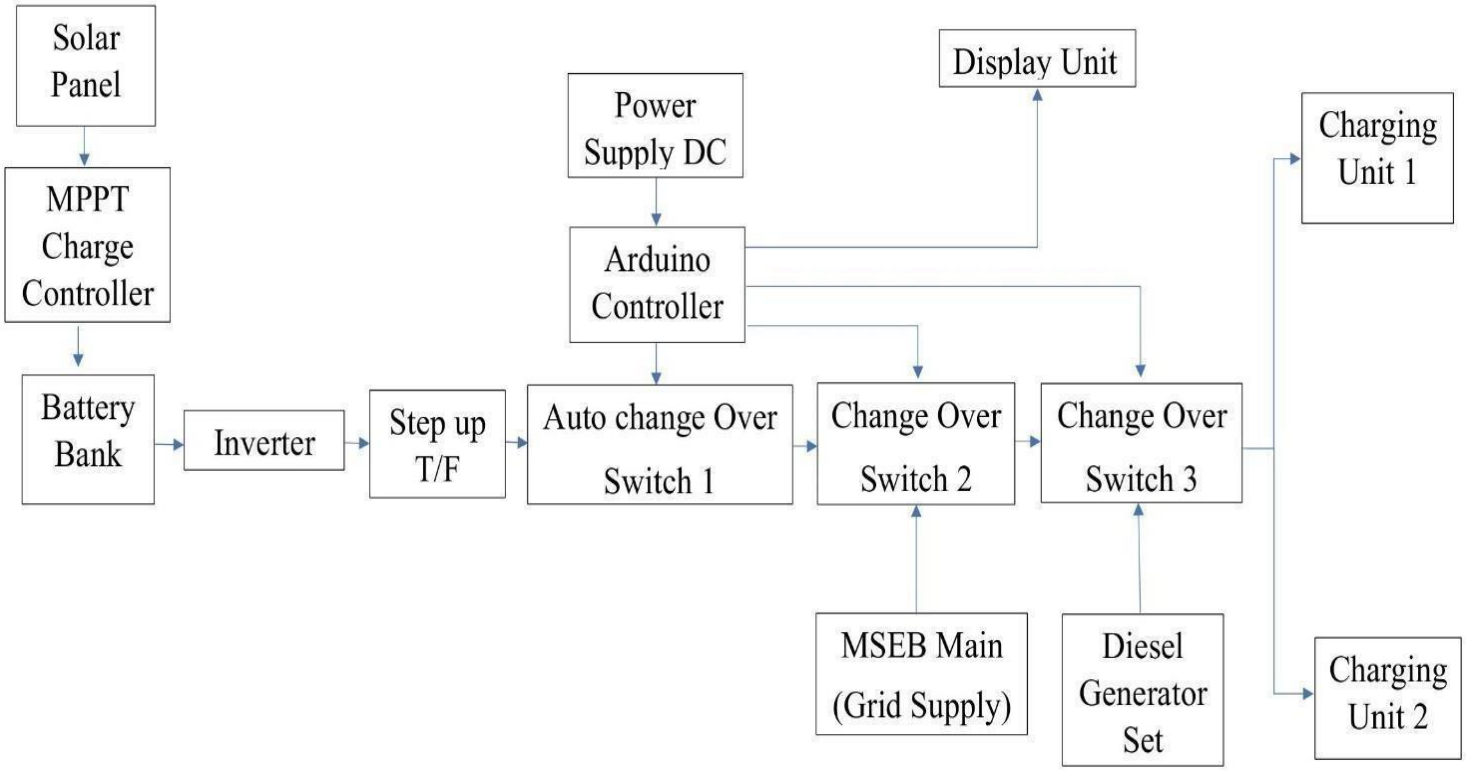
METHODOLOGY

In "Smart Hybrid Electrical Vehicle Charging Station" project we are going to make the charging station for electrical vehicles which are coming in the market.in this system we are using two supply such as renewable and non-renewable, renewable supply is solar supply and non-renewable which is take from state electricity board. Onesupply taking supply from solar (photo voltaic cell) and this DC supply is given to the Maximum power point tracker (MPPT) it is basically DC to DC converter it's mainfunction to maximize the energy available from the connected solar module arrays atany time during its operation.

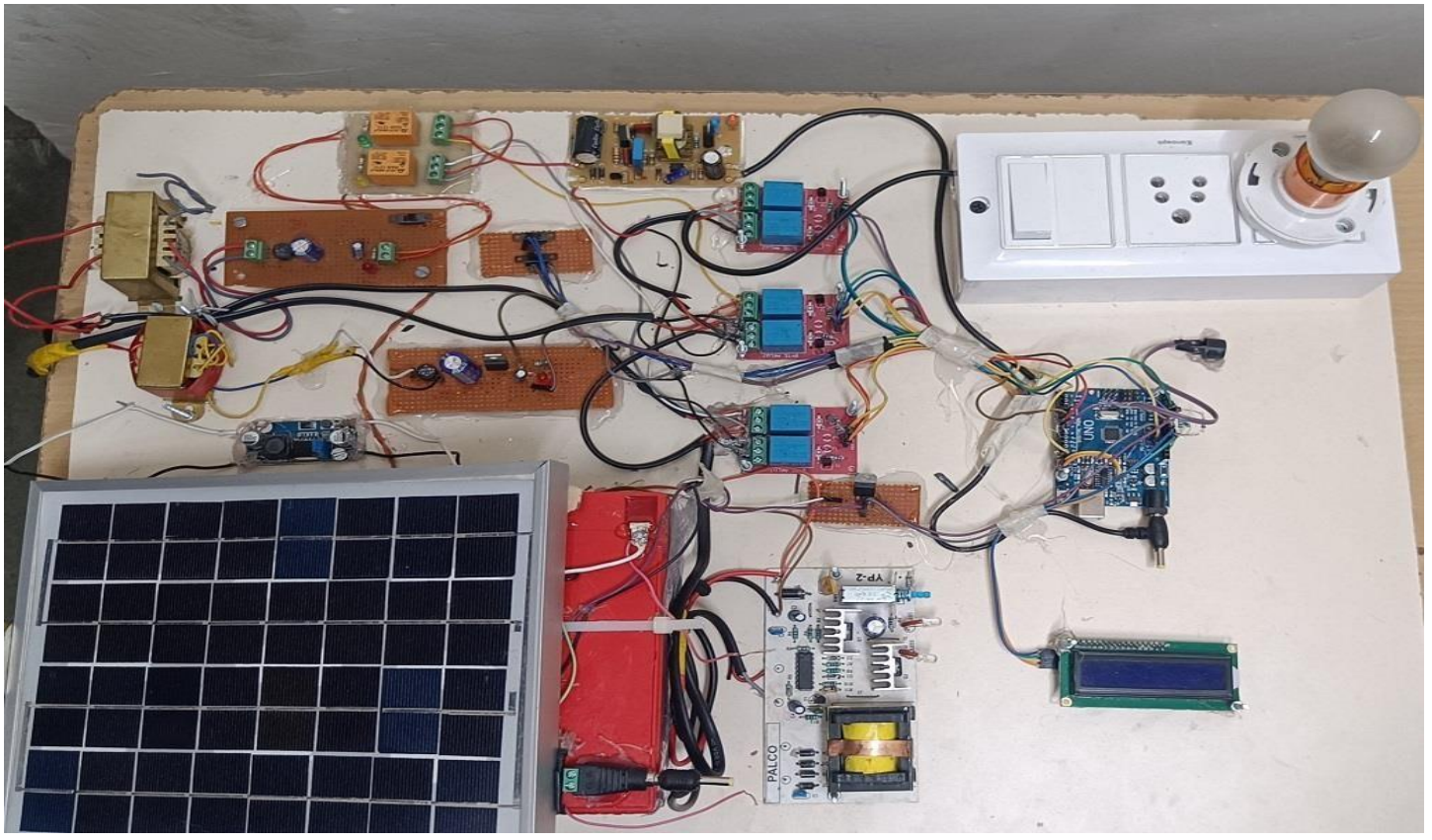
Then apply to change over unit, and source to from state electricity board taken and change the solar power to the grid supply through a change over switch. The Output of change over switch is given to the directly connected to the charging unit output , the change over switch controlling by the Arduinoand display the actually which source run in charging station. The Grid supply is connectedto transformer 230V/12V and this transformer output is connected rectified supply is given tothe Arduino uno to run in 5V dc. After the disturbances of two sources such as state electricity board and solar power, it identify the condition and changing the supply source on Diesel generator set ,and output is given to charging unit. Output supply of the solar power up to the 230V 8A.



BLOCK DIAGRAM



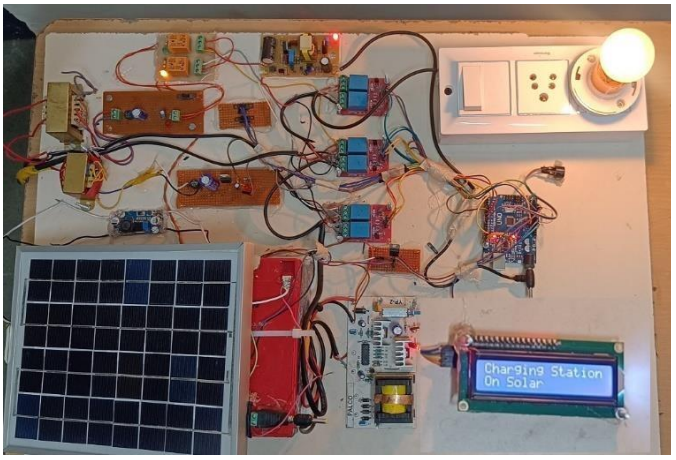
HARDWARE MODEL



RESULT

The paper presents design, Smart electric vehicle charging station. The charging station mainly works on three sources,1) Solar Energy
2) Grid Supply 3) Diesel Generator.

The charging system works on solar power during the day period, at good climate or properly sun ray falling in solar panel the charging station continuously run in Solar Power.



When the climate changes or at night time solar power not present, the charging stationautomatically switch to MSEB (grid power).

In case of disturbance both the supply Solarand MSEB, then it switches to DG SET.

CONCLUSION

The Charging Station set up worked effectivelyand effortless with no errors or unwanted functions. The capability of fast charging with three sources,Solar, Grid Supply and DG Set, must be adaptedShorten the time required for charging. The entiresystem is a scaled-down model as all the test carriedout were for a small Li-Ion battery of 12V and 8Ah.Solar charging time was approximately 1 hours 30min.

FUTURE SCOPE

We currently use three source solar Energy Grid Energy and DG Source considering the futurewe can use wind energy.

We also use the inductive coil for the wireless charging system.

By using smart charging station we can easilyfind available changing point also get fast charging, charging safer, save money and the environment.

APPLICATIONS

1. It can be used at parking.
2. It can be used at petrol pumps.
3. It can be used at gas station,

LIMITATIONS

1. As three sources are used so High initial cost.
2. Battery bank capacity required is high.
3. Frequent maintenance is required.

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