Journal of The Gujarat Research Society
ISSN: 0374-8588
Volume 21 Issue 8, August 2019

IOT BASED ELECTRIC VEHICLES CHARGING SYSTEM

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Abstract

As more countries are moving towards pollution free traffic, EVs are gaining more popularity across the globe. As the number of EVs increases, EV charging infrastructure will also be a basic need. EV charging infrastructure would also be a basic need as the number of EVs grows. An IoT scheme will certainly streamline EV charging efficiency and look at the consequences. For transportation systems and V2G systems, this approach is useful. This proposed system would enhance community planning and make life easier for the city. We can easily handle the whole V2G framework via IoT, which will certainly save time and money. This task is to create a smart application to link to the grid and to understand the grid's various tariff rates. The tariff rates would have both the power supply rate to the grid and the tariff rate to take power from the grid. If the user is having the car battery fully charged, he can deliver some power to the grid and can earn some money. SoC is measured using the ARM Mbed controller and transmitted to the cloud. The application will also display the battery status (SoC) of the user when he comes to the grid.

Keywords: *Air pollution, Battery, Charging, Environment, Electric Vehicles, IoT, Tariff rates.*

I. INTRODUCTION

Present days batteries have become popular for storing electrical energy. The changing transportation of cities has improved over the past few decades which increased the development of various industries & societies. Since batteries are a widely used device for energy storage, Status of Charge calculation plays an important role in the future. Nowadays, for industrial use vehicles are essential as well for transportation in the day to day life. Various efforts are being done to overcome the fuel engines by electric motors. Present day electrical vehicles are a hot topic & it is an important part of the present smart world [1]. Drawback of electric vehicles which have a cruising range is sometimes limited because it requires frequent recharging. Not only for electric vehicles but population of the world is also increasing

exponentially & the problem is due to this is, increase in traffic density. All know that there is limited stock of the fuel on the earth that's why it is a need of time to switch to another way & electricity is the best option for it & electric vehicles are one of the examples of it.

For charging electric vehicles, the present day widely used charging method is plug in charging, this charging method discloses a plug which needs to be connected to the vehicle to charge the battery of electric vehicles [2]. To charge electric vehicles wirelessly there is no need to ON/OFF the power plug, it decreases human interaction; it also reduces the risk of electric shock due to wired connections. Plug-in electric vehicles travel range is limited & need heavy and large batteries. The wireless charging technology has various advantages such as traveling range increase, battery size reduced & the waiting time for charging the electric vehicle will minimize. These advantages will increase the environmental benefits & economic as well as the adoption rates of Electric Vehicles [3].

Due to the increase in carbon dioxide (CO_2) produced by the transportation & various industries, the Kyoto treaty was signed. The main purpose of the kyoto treaty was to decrease carbon dioxide levels from the environment & has upgraded the findings for a solution of new cleaner energy. As a finding, Electrical Vehicles appeared as a solution to decrease CO2 emissions. Electric Vehicles are increasing day by day all over the world. When the number of Electric vehicles is increasing, there is a need to develop Electric Vehicles Charging systems in grid as well as in parking systems [4].

The condition of the environment is going worse every year because of the development of civilization and increasing pollutant emissions from vehicles and industries. Air pollution is one of the major problems which lead to global warming, leading to global climate change which has caused an increase of the surface temperature of earth and also leads to many health problems. Air pollution is one of the biggest problems nowadays, the whole world is facing the problem of air pollution due to increase of harmful gas in the environment which leads to many health problems, due to increase of harmful gas in the environment and increase in the surface temperature of the atmosphere which leads to global warming. Every person spends his 80- 90% time indoors like school, office, home so it is important to get good quality air in indoor premises because indoor air pollution causes severe health related problems like illness, cancer and many more health related problems. Indoor air quality depends on concentration of different gases and particulate pollutants in indoor air. There are many factors which increase the air pollutant. Humidity and high temperature can also increase the level of some pollutants in indoor fresh air. Indoor air pollutant sources can be controlled by using ventilation, air filtration. Ventilation, air filtration is the important methods of getting good quality air in buildings, offices and all other indoor premises [5].

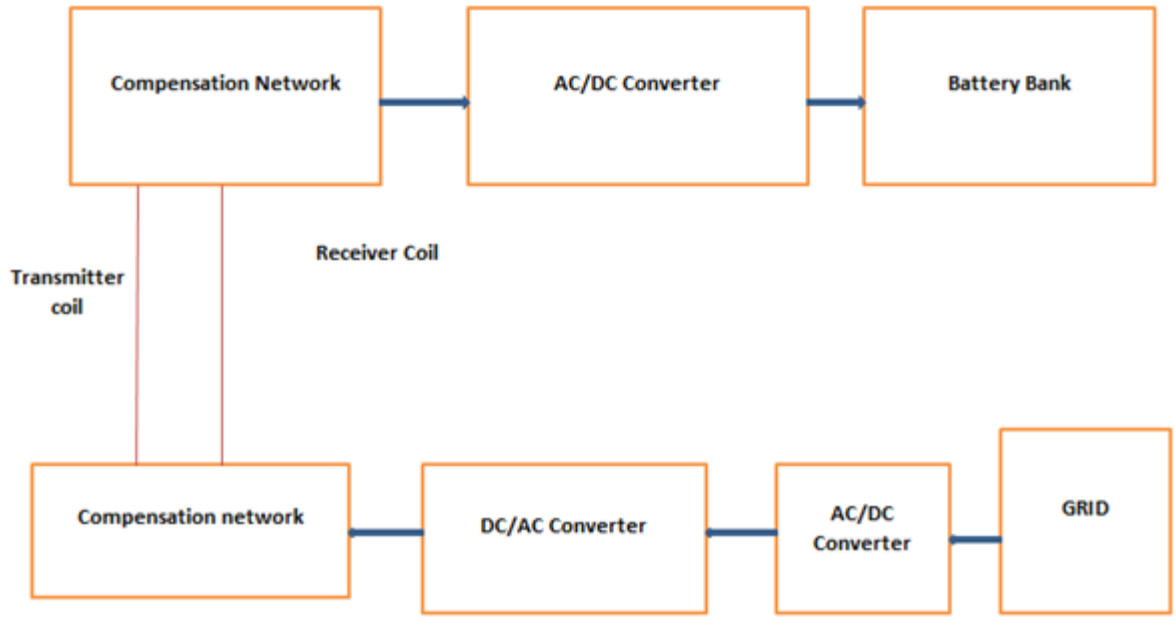

Fig. 1 Block diagram of charging system

Figure 1 shows the block diagram of the charging system. The development trend of the automobile industry worldwide is energy-saving, green & intelligent when it is undertaking great energy challenges & environmental crises. A battery of electric vehicles will get rid of emissions inside the smart cities as well as reduce dependency on oil. Which improved the performance of electric vehicles & made it suitable for domestic as well as for commercial use during the last decades? Electric vehicles will automatically be the main transport system in the future. Nowadays, electric vehicles are acutely regarded as an emerging type of mobile intelligent power consumption device & energy storage terminal in Smart Grid. Therefore, the construction of a unified, wide-area and large-scale charging-swap network is the basic premise to ensure wide electric vehicle propulsion [6].

Electric vehicle charging-swap network management businesses mainly consist of battery distribution, charging, swap, metering, discharging & billing of financial settlement, scheduling and many more. Generally, electric vehicles charge-swap services, which need highly automated, intelligent and interactive characters and high-level reliable information communication technology support for perception of information, aggregation, visualization & interaction. Yet, the domain of electric vehicles is complex and not only affects the driver, but also opens new business opportunities & perspectives. The Internet of Things technology can provide pervasive perception abilities & a real-time, interactive view of the physical world by different sensors & various radio devices. Hence physical antiquity becomes interconnected and accessible through existing networks and IT systems.

The Internet of Things will be readily accessible to a wide range of applications, for smart home, smart community, but its application level is considerably lagging behind. In this paper

we focus on the objectives of providing efficient and interactive electric vehicles smart charging-swap service to carry out applications study in critical intelligence charging-swap network operations management with the Internet of Things technology. The sustainable growth of human society has been affected by both the energy crisis and environmental issues. Because of this, trillions of dollars were pledged to support the research and development (R&D) activities of EV years. Technology is promising to increase the efficiency of energy conversion and reduce greenhouse gas emissions by moving energy requirements from crude oil to electricity. The large-scale penetration of EV, as an emerging load, creates new energy demands and this contributes to the emergence of new peak loads to the current power grid system [7].

Electrical Vehicles are easy to use and therefore accepted by customers. One important need of it is that it requires comfortable charging and parking space. Proposed model designed to give an efficient solution to this by combining these two systems. In this paper the design of a system which is able to handle free parking slots and scheduling of the charging. Current parking systems are unable to deal with all types of vehicles. For Electrical Vehicles there is a need for a charging facility along with parking [10]. The proposed model provides a facility to book the charging space via smartphone. Then the system manages all activities related to it on the basis of information like arrival time of vehicle, battery status etc. The main components are customer manager, vehicle manager, map manager and lot manager. The software used is Java Platform and Enterprise Edition.

II. CONCLUSION

Overall, this paper compares various smart parking, charging and combined charging-parking systems, which can help to solve various issues related to it. Also, it contains a table of comparison of various research papers. There are various types of methods and techniques used for parking and charging is discussed. There are various sensors, controllers, and software and cloud servers available at market which will help to make the system automatic, reliable and user friendly along with development of efficient IoT platforms. This proposed Smart electric vehicles charging System uses Vehicle-to-Grid (V2G) technology, to connect not only Electric Vehicles, but also renewable energy sources, to Smart Grids (SG). The new model of Electrical Markets (EM), with denationalized electricity production & their use is also explained in this proposed system, in order to gain the prices of buying & selling electrical energy, to or from the electrical network. In the proposed Smart EV Charging System, the introduction of mobile applications will facilitate connectivity user's interaction.

III. REFERENCES

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