

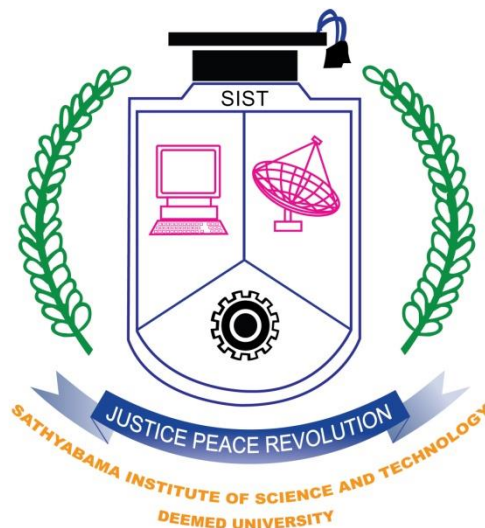
HYBRID SATHYABAMA DC CHARGING STATION FOR ELECTRIC VEHICLE USING IOT

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering Degree in
Electrical and Electronics Engineering

By

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**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **G. V BHUVANSAI (RegisterNo.38140012)** and **Y. SATYANARAYANAREDDY (Register No.38140064)** who carried out the project entitled **"HYBRID SATHYABAMA DC CHARGING STATION FOR ELECTRIC VEHICLE USING IOT"** under our supervision from November 2021 to May 2022.

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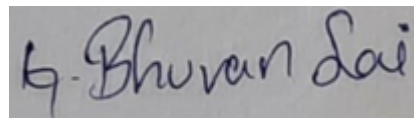
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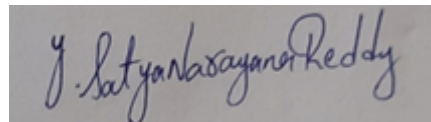
We **G. V BHUVANSAI** (Reg. No. 38140012) and **Y. SATYANARAYANAREDDY** (Reg. No. 38140064) hereby declare that the Project Report entitled “**HYBRID SATHYABAMA DC CHARGING STATION FOR ELECTRIC VEHICLE USING IOT**” done by us under the guidance of **Dr.S.D SUNDARSINGH JEBASEELAN** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Electrical and Electronics Engineering.

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ABSTRACT

Hybrid Grid Charging Stations (HGCS) play a significant role in the adoption of electric vehicles (EV) at remote locations and reduce grid burden in urban areas. The HGCS seeks energy from both renewable and non-renewable sources (RES). Of all the RES, photovoltaic (PV) is the best choice for clean energy due to its abundance and ease of installation. Nevertheless, PV energy fluctuates due to changes in irradiance, and it cannot generate constant energy. To meet the energy demand, an energy storage device and non-renewable source are needed. The proposed system includes a PV array coupled with a boost converter, a non-renewable AC source, and an EV charger. PV energy generated in the absence of or with reduced sunlight is not adequate to meet the demand. EV can therefore meet the demand. As generation exceeds demand, EV utilizes the excess clean energy to stabilize the system. With IoT, EV charging will be improved and the impact will be seen. Transportation systems can benefit from this method. This work is to create an application that connects to the system, displays the available power sources, and displays the power delivered from those sources. This method yielded an off-grid, pollution-free, efficient and reliable EV charging station.

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LIST OF SYMBOLS AND ABBREVIATIONS

HGCS	-	Hybrid Grid Charging Station
EV	-	Electric Vehicle
V2G	-	Vehicle to Grid
G2V	-	Grid to Vehicle
OGCS	-	Off-Grid Charging Station
PV	-	Photovoltaics
RES	-	Renewable Energy Source
CS	-	Charging Station
PHEV	-	Plug-In Hybrid Vehicles
HEV	-	Hybrid Electric Vehicles
SOC	-	State of Charge
PCC	-	Point of Common Coupling
DC	-	Direct Current
AC	-	Alternating Current
SEPIC	-	Single-Ended Primary-Inductor Converter
MPPT	-	Maximum Power Point Tracking
IOT	-	Internet Of Things
LED	-	Light Emitting Diode
LCD	-	Liquid Crystal Display
IC	-	Integrated Circuit
MOSFET	-	Metal Oxide Semiconductor Field Effect Transistor

IGBT	-	Insulated Gate Bipolar Transistor
PWM	-	Pulse Width Modulation
PFM	-	Pulse Frequency Modulation
CMM	-	Continuous Conduction Mode
DCM	-	DisContinuous Conduction Mode
P&O	-	Perturbation & Observation
CPU	-	Central Processing Unit
RAM	-	Random Access Memory
EEPROM	-	Electrically Erasable Programmable Read Only Memory
MAC	-	Multiply Accumulate
DC	-	Digital Carry
ACC	-	Accumulator
V	-	Voltage
A	-	Ampere
W	-	Watts
AH	-	Ampere Hour
A/H	-	Ampere per Hour