

**Regent Education and Research Foundation
Group of Institutions**

Bara kanthalia, Barrackpore, Telini Para, Kolkata – 700121



A FINAL PROJECT REPORT

ON

"Three-Phase Fault Analysis with Auto Reset on Temporary Fault and Permanent Trip"
submitted in partial fulfilment of the requirements for the award of the Degree of

BACHELOR OF TECHNOLOGY

IN

ELECTRICAL ENGINEERING

Submitted By The Member Of

Group 1

BISWAJIT SARKAR

Roll No. 26301620017

SOURAV BISWAS

Roll No. 26301620009

AKASH DAS

Roll No. 26301620011

BISWARUP GHOSH

Roll No. 26301621035

SANDIPAN MUKHERJEE

Roll No. 26301621023

YEAR:4TH

SEM:8TH

SUBJECT CODE :PW-EE 881

UNDER THE ESTEEMED GUIDANCE OF

Mrs. Shreyasi Sengupta

Department of Electrical Engineering (EE)



Regent Education and Research Foundation

Group of Institutions

FINAL YEAR PROJECT ABOUT

**“THREE-PHASE FAULT ANALYSIS WITH AUTO RESET ON
TEMPORARY FAULT AND PERMANENT TRIP”**

DEPARTMENT: ELECTRICAL ENGINEERING

YEAR: 4th Year

PROJECT GUIDE: Mrs. Shreyasi Sengupta

SUBMITTED BY:

- | | |
|----------------------|----------------------|
| ❖ BISWAJIT SARKAR | Roll No. 26301620017 |
| ❖ SOURAV BISWAS | Roll No. 26301620009 |
| ❖ AKASH DAS | Roll No. 26301620011 |
| ❖ BISWARUP GHOSH | Roll No. 26301621035 |
| ❖ SANDIPAN MUKHERJEE | Roll No. 26301621023 |



CERTIFICATE OF APPROVAL

TO WHOM IT MAY CONCERN

The Project entitled 'THREE-PHASE FAULT ANALYSIS WITH AUTO RESET ON TEMPORARY FAULT AND PERMANENT TRIP' assigned to the under named, student of Regent Education Research Foundation. **BISWAJIT SARKAR, SANDIPAN MUKHERJEE, SOURAV BISWAS, AKASH DAS, BISWARUP GHOSH** is hereby approved & certified as a creditable of a technological subject carried out and presented in a manner satisfactory to warrant its acceptance as a pre-requisite to the B. Tech on EEE from our college for which it is submitted. It is so be approved by the following peoples.

Sanjib Pal
07/06/2022

(Head of the Dept.)

Prof. Sanjib Pal

Department OF Electrical Engineering

Regent Education and Research Foundation

S. Sengupta 7/6/2022

(Project Guide)

Mrs. Shreyasi Sengupta

ELECTRICAL AND ELECTRONICS ENGINEERING

Regent Education and Research

Foundation

ACKNOWLEDGMENT

The analysis of the project work wishes to express our guide to Asst. Prof. Shreyasi Sengupta for allowing the degree attitude and providing effective guidance in department of this project work. His conscription of the topic and all the helpful hints, he provided, contributed greatly to successful development of this work, without being pedagogic and overbearing influence.

We also express my sincere guidance to Asst. Prof. Sanjib Pal, Head of Department of Electrical Engineering of Regent Education and Research Foundation Group of Institutions for giving the scope of successfully carrying out the project work.

Finally, we take this opportunity to thank to Dr. Samik Chakraborty Principal of Regent Education and Research Foundation Group of Institutions for giving me the scope of carrying out the project work.

DATE: 07-06-2024

Biswajit Sarkar

BISWAJIT SARKAR

Roll No. 26301620017

Akash Das

AKASH DAS

Roll No. 26301620011

Sourav Biswas

SOURAV BISWAS

Roll No. 26301620009

Biswarup Ghosh

BISWARUP GHOSH

Roll No. 26301621035

Sandipan Mukherjee
SANDIPAN MUKHERJEE

Roll No. 26301621023

DECLARATION

BISWAJIT SARKAR, SANDIPAN MUKHERJEE, BISWARUP GHOSH, SOURAV BISWAS, AKASH DAS here declared that the work which is been presented in this report entitled "THREE-PHASE FAULT ANALYSIS WITH AUTO RESET ON TEMPORARY FAULT AND PERMANENT TRIP" in partial fulfilment of the requirements for award of degree of B.Tech in Electrical & Electronics Engineering at Regent Education & Research Foundation Group of Institutions, Barrackpore is an authentic record of my own work carried out under the supervision of Asst. Prof. Shreyasi Sengupta and refers other researcher's work which are duly listed in the reference section.

The matter embodied in this report as not be submitted for the award of any other degree to any other university.

Date: 07-06-2024

Biswajit Sarkar

BISWAJIT SARKAR

Roll No. 26301620017

Akash Das
AKASH DAS

Roll No. 26301620011

Sourav Biswas.

SOURAV BISWAS

Roll No. 26301620009

Biswarup Ghosh

BISWARUP GHOSH

Roll No. 26301621035

Sandipan Mukherjee
SANDIPAN MUKHERJEE

Roll No. 26301621023



REGENT EDUCATION & RESEARCH FOUNDATION

Group of institutions

RECOMMENDATION

I hereby recommend that the project entitled "THREE-PHASE FAULT ANALYSIS WITH AUTO RESET ON TEMPORARY FAULT AND PERMANENT TRIP " being submitted by Mr. Biswajit Sarkar, Mr. Sourav Das, Mr. Akash Das, Mr. Biswarup Ghosh, & Mr. Sandipan Mukherjee are eligible for the award of the degree of Bachelor of Technology in Electrical Engineering is the record of his Bonafide research work carried out under my vision and guidance. The result presented in this thesis have not been published elsewhere for the award of any other degree or diploma. This work in my opinion, has reached the standard of fulfilling the requirement for the award of the degree of Bachelor of Electrical Engineering. It is notified to be understood that by my approval, the undersigned do not necessarily endorse or approved any statement of opinion expressed and conclusion drawn therein but approve the PROJECT for the purpose for which it has been submitted.

S. Sengupta. 7/6/2024.

Mrs. Shreyasi Sengupta

Assistant Professor

Department of Electrical & Electronics Engineering
Regent Education & Research Foundation

Group of Institution
Barrackpore, 24pgs (North)

A PROJECT REPORT ON

FABRICATION OF INDUCTION WATER HEATER

Submitted in partial fulfilment of the requirements for the award of the degree

BACHELOR OF TECHNOLOGY

IN

ELECTRICAL ENGINEERING

SUBMITTED BY

MANOJ KUMAR GUPTA (26301620016)

PRANESH BISAWAS (26301620003)

ABHIJIT MISRA (26301621014)

KOUSHIK PATRA (26301621015)

SOUVIK SARKAR (26301621049)

Under the Guidance of

Ms. RAJALAKSHMI CHANDRASEKHAR



DEPARTMENT OF ELECTRICAL ENGINEERING

REGENT EDUCATION AND RESEARCH FOUNDATION GROUP OF INSTITUTIONS

BARRACKPORE, NORTH 24 PARGANAS

AFFILIATED TO

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

MAY, 2024

ACKNOWLEDGEMENT

I take this opportunity to place on record my deep sense of gratitude to Ms. RAJALAKSHMI CHANDRASEKHAR for her valuable guidance, encouragement and helpful criticism during the course of this project work. My thanks are also to Mr. SANJIB PAL, Head of Electrical Engineering Department for his constant encouragement during my work and for providing necessary facilities to carry out the project. I also grateful to Dr. Samik Chakraborty, Principal, RERFGI for giving me this opportunity to be a part of this esteemed institution and facilitate me for carrying out the project work. Last, but not the least, I thank all the staff members of Electrical Engineering Department, RERFGI for helping me to carry out the thesis. Finally, I am grateful to my all-family member for giving their continuous support and encouragement throughout the process from beginning.



REGENT EDUCATION & RESEARCH FOUNDATION

GROUP OF INSTITUTIONS

CERTIFICATE

We hereby certify that the project report prepared by *Mr. Manoj Kumar Gupta, Mr. Pranesh Biswas, Mr. Abijit Misra, Mr. Kaushik Patra and Mr. Souvik Sarker* entitled "**Fabrication of Induction Water Heater**" be accepted in partial fulfilment of the requirements for awarding the degree of "**Bachelor of Technology in Electrical Engineering**" Session [2023-2024] in the Department of Electrical Engineering, RERFGI, Barrackpore. The forgoing PROJECT is hereby approved as a creditable study of an Engineering Subject carried out and presented in a manner of satisfactory to warrant its acceptance as a pre- requisite to the DEGREE for which it has been submitted.

It is notified to be understood that by this approval, the undersigned do not necessarily endorse or approve any statement made, opinion expressed and conclusion drawn therein but approve the PROJECT only for the purpose for which it has been submitted.

L. Rajalakshmi
2/6/24

Ms. RAJALAKSHMI CHANDRASEKHAR
(Project Guide)
Assistant Professor
Department of Electrical Engineering

Sanjib P. A.
01/06/2024

Mr. SANJIB PAUL
(Head of the Department)
Assistant Professor
Department of Electrical Engineering
Regent Education & Research Foundation
Barrackpore, North 24 Parganas



Campus: Regent Education & Research Foundation Group of Institutions

E-mail : rerfolkata@gmail.com, Website : www.rerf.in

Campus Address:

Bara Kanthalia, Barrackpore
P.O: Sewli Telinpara, P.S.: Titagarh
Kolkata - 700 121
Tel.: 033-3008-5442/432/431, Fax: 033-3008-5442

Head Office Address:

11/3, Biresw Guha Street 7th Floor,
Kolkata - 700 017
Tel.: 033-3221-3013

ABSTRACT

During the winter season, the demand for hot water in our daily routines is undeniable. However, the conventional method of heating water, often employed by geysers in domestic settings, can be a time-consuming process. Not only are high-quality geysers expensive, but their installation requires special arrangements. Furthermore, traditional resistive heating methods present various drawbacks, such as potential element faults, ballast issues, and the risk of electrocution in plumbing fittings. The accumulation of mineral deposits in water heaters, known as scaling, gradually diminishes their efficiency over time.

This project aims to address these challenges by developing a water heater or geyser that utilizes induction heating instead of the conventional resistive heating method. Induction heating involves the use of electromagnetic induction to heat an electrically conductive material. This innovative heating approach is based on the electromagnetic induction principle discovered by Michael Faraday in the 19th century. The fundamental concept is to generate heat within a conductor by inducing electrical currents, eliminating the need for traditional heating elements.

In contrast to traditional methods where water comes into direct contact with electricity, our induction heating approach ensures safety by operating without direct contact. Drawing parallels with the familiar induction cooktops used in domestic cooking, this project optimizes the efficiency of the induction heater while maintaining safety. Unlike the flat and round design of induction ovens in kitchens, our project incorporates a carefully designed induction coil to cater to specific needs. Notably, the induction heating in this project is applied in a 360-degree manner, distinguishing it from the one-directional induction frequency used in typical induction cooktops.

**A PROJECT REPORT
ON
eFLOATER RIVER CARE**

Submitted in partial fulfilment of the requirements for the award of the degree.

**BACHELOR OF TECHNOLOGY
IN
ELECTRICAL ENGINEERING**

Submitted by

ARKA BANIK: 26301621041

AVISHEK MAJUMDER: 26301621057

YOGESH KUMAR SHARMA: 26301621055

DEBANJAN KARMAKAR: 26301621045

SURYA PRATAP SINGH: 26301621043

Under the guidance of

PROF. ASHMITA GUHA CHOWDHURY



DEPARTMENT OF ELECTRICAL ENGINEERING

**REGENT EDUCATION AND RESEARCH FOUNDATION GROUP OF INSTITUTIONS
BARRACKPORE, NORTH 24 PARGANAS**

AFFILITED TO

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

ABSTRACT

Water bodies, especially rivers, are pivotal natural resources. They play indispensable roles in ecosystems, human livelihoods, and economic activities. Nevertheless, with the increasing demands for energy and the intensifying environmental challenges, particularly riverine waste, there's a growing imperative for inventive solutions that tackle both issues concurrently. This project work provides a solution for the river waste without obstructing the flow of the river and the ecology of the river, as well it provide the solution for energy demands by using the roof or the top portion of the project.

This project is mainly focus on the waste collection from the river, with self-integrated gear system, which is totally bidirectional by adjusting with the flows of the river. As the device aligns with the river's flow direction, it proficiently traps and transports floating waste using gates which are similar to fishing nets. Sequentially, the waste is collected, retained, and eventually released in the waste collection, gate closing, and dumping zones, respectively. The moving gates, interlinked with a belt, collaborate with a specialized mechanical pathway, facilitating the automatic opening and closing of gates at predetermined zones.

Enhancing its eco-efficiency, the device's upper surface is adorned with solar panels. These panels harness sunlight, adding to the system's energy production and further underscoring its emphasis on renewable energy.



REGENT EDUCATION & RESEARCH FOUNDATION

Group of institutions

CERTIFICATE OF APPROVAL

We hereby certify that the project report prepared by ARKA BANIK, SURYA PRATAP SINGH, DEBANJAN KARMAKAR, YOGESH KUMAR SHARMA, AVISHEK MAJUMDER, "eFLOATER RIVER CARE" be accepted in partial fulfillment of the requirements for awarding the degree of the "Bachelor of Technology in Electrical Engineering" session (2021-2024) in the Department of Electrical Engineering (RERFGOI), Barrackpore. The going project is hereby approved as a creditable study of an engineering subject and presented in a manner of satisfactory to warrant its acceptance as a prerequisite to the degree for which it had been submitted.

Notified to be understood that by this approval, the undersigned do not necessarily endorse or approve any statement made, opinion expressed and conclusion drawn therein but approve the project only for the purpose for which it has been submitted.

AKK 07/06/24

(Project Guide)

Ashmita Guha Chowdhury

Department of Electrical & Electronics Engineering
Regent Education & Research Foundation
Group of Institutions
Barrackpore, 24pgs (North)

Sanjib Pal 07/06/24
HOD
EE
REGENT EDUCATION & RESEARCH FOUNDATION

(Head of the Department)

Prof. Sanjib Pal

Department of Electrical Engineering
Regent Education & Research Foundation
Group of Institution
Barrackpore, 24pgs (North)

Campus: Regent education & Research Foundation Group of Institution
E-mail: rerfkolkata@gmail.com, Website: www.rerf.in

Campus Address:

Bara Kanthaliya, Barrackpore
P.O.: Sewli Telinipara, P.S.: Mohanpur
Kolkata - 700121
Tel: 033-3008-5442/432/431, Fax: 033-3008-5442

Regd. Office Address:

11/3, Bireswari Guha Street
7th Floor, Kolkata - 700017
Tel: 033-3221-3013



REGENT EDUCATION & RESEARCH FOUNDATION

Group of institutions

RECOMMENDATION

I hereby recommend that the project entitled "eFLOATER RIVER CARE" being submitted by ARKA BANIK, SURYA PRATAP SINGH, DEBANJAN KARMAKAR, YOGESH KUMAR SHARMA, AVISHEK MAJUMDER, to MAKAUT for the award of the degree of Bachelor of Technology in Electrical Engineering is the record of his Bonafide research work carried out under my supervision and guidance. The result presented in this thesis have not been submitted elsewhere for the award of any other degree or diploma. This work in my opinion, has reached the standard of fulfilling the requirement for the award of Degree of Bachelor of Electrical Engineering. It is notified to be understood that by this approval, the undersigned do not necessarily endorse or approved any statement made, opinion expressed and conclusion drawn therein but approve the PROJECT only for the purpose for which it has been submitted.

Agd 07/06/24

Ashmita Guha Chowdhury
Assistant Professor
Department of Electrical & Electronics
Engineering
Regent Education & Research Foundation Group of
Institution
Barrackpore, 24pgs (North)

Campus: Regent education & Research Foundation Group of Institution
E-mail: rrf.kolkata@gmail.com, Website: www.rrf.in

Campus Address:

Bara Kanthaliya, Barrackpore
P.O.: Sewti Tefinipara, P.S.: Mahanpur
Kolkata - 700121
Tel: 033-3008-5442/432/431, Fax: 033-3008-5442

Regd. Office Address:

11/3, Biresw Guha Street
7th Floor, Kolkata - 700017
Tel: 033-3221-3013

ACKNOWLEDGEMENT

We take this opportunity to place on record my deep sense of gratitude to Prof. Ashmita Guha Chowdhury, for her valuable guidance, encouragement and helpful criticism throughout. Sincere thanks to Prof. Sanjib Pal head of Electrical Engineering department, Regent Education & Research Foundation Group of Institutions, for his constant encouragement during our work and for providing necessary facilities to carry out the project. We also grateful to Prof. for his endless guidance and support. We also thankful to the Principal of Regent Education & Research Foundation Group of Institutions for giving us the opportunity to be a part of this esteemed institution and facilitate us for carrying out the project work. Lastly, we would like to thank all the staff members of Electrical Engineering department (RERFGOI) for helping us to carry out thesis and we also grateful to our family for giving their continuous support and encouragement throughout the process from beginning.

A Project Report on
"SOLAR POWERED STREET LIGHTING SYSTEM WITH OPTIMUM USE
OF BATTERY CAPACITY AND MONITORING SYSTEM"

Submitted in the partial fulfilment of the requirements for award of the degree

Bachelor of Technology

in

Electrical Engineering

from

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY

By,

AVIK MAJHI [26301621028]
SUBHAJIT DAS [26301621054]
PALASH KUMAR GHARA [26301621020]
PRITAM BANERJEE [26301621030]
SHATADRU MAJUMDAR [26301621031]

Under the guidance of

MR. SREEDIP GHOSH.
ASSISTANT PROFESSOR,
DEPARTMENT OF ELECTRICAL ENGINEERING,



Regent Education & Research Foundation.

(Affiliated to Maulana Abul Kalam Azad University of Technology, West Bengal)

Campus: Sewli Telini Para, SH 1, Malir Math, Barrackpore,
North Twenty Four (24) Parganas District, Pin-700121, West Bengal, India.

2024

REGENT EDUCATION & RESEARCH FOUNDATION

SEWLI TELINI PARA, SH 1, MALIR MATH, BARRACKPORE,
NORTH TWENTY FOUR PARGANAS, 700121, WEST BENGAL.
DEPARTMENT OF ELECTRICAL ENGINEERING



CERTIFICATE OF RECOMENDATION

This is to Certify that AVIK MAJHI [26301621028], SUBHAJIT DAS [26301621054], PALASH KUMAR GHARA [26301621020], PRITAM BANERJEE [26301621030], SHATADRU MAJUMDAR [26301621031] are the student of Bachelor of Technology (B.Tech), Final Year, Even Semester, 8th Semester (4th Year, 2nd Semester, Sem-08), Electrical Engineering Department in Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal under Maulana Abul Kaam Azad University of Technology, West Bengal is continuing their Project Entitled As "SOLAR POWERED STREET LIGHTING SYSTEM WITH OPTIMUM USE OF BATTERY CAPACITY AND MONITORING SYSTEM " under our guidance and supervision. This Project was authentically created under our direction and supervision and meets the requirements for the award of Bachelor of Technology in Electrical Engineering during the academic year 2021-2024 at Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal (Affiliated to Maulana Abul Kalam Azad University of Technology, West Bengal, Approved By-AICTE). To the best of our knowledge other university or institute has received a request for the matted contained in the report in order to issue a Degree or Diploma in Engineering or Technology.

Sanjib Pal
07/07/2024
Mr. Sanjib Pal.

Professor And Head of the Department,
Department of Electrical Engineering,
Regent Education & Research Foundation,
Barrackpore, North 24 Parganas, West Bengal.



S. Ghosh
Mr. Sreedip Ghosh.

Project Supervisor And Assistant Professor,
Department of Electrical Engineering,
Regent Education & Research Foundation,
Barrackpore, North 24 Parganas, West Bengal.

**REGENT EDUCATION & RESEARCH
FOUNDATION**

SEWLI TELINI PARA, SH 1, MALIR MATH, BARRACKPORE,
NORTH TWENTY FOUR PARGANAS, 700121, WEST BENGAL.
DEPARTMENT OF ELECTRICAL ENGINEERING



CERTIFICATE OF APPROVAL

This is to Certify that the Project Work entitled as "SOLAR POWERED STREET LIGHTING SYSTEM WITH OPTIMUM USE OF BATTERY CAPACITY AND MONITORING SYSTEM" submitted by AVIK MAJHI [26301621028], SUBHAJIT DAS [26301621054], PALASH KUMAR GHARA [26301621020], PRITAM BANERJEE [26301621030], SHATADRU MAJUMDAR [26301621031] under the guidance and supervision of MR. SREEDIP GHOSH, Assistant Professor, Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal to the Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal has been Examined and Evaluated.

This Project Work has been prepared as per the regulation of Maulana Abul Kaam Azad University of Technology, West Bengal and qualities to be accepted in fulfillment of the requirement for the degree of Bachelor of Technology in Electrical Engineering.

Date:-

Place:- Barrackpore, North 24 Parganas, West Bengal.

Sanjib Pal
07/06/2024

Mr. Sanjib Pal.
Professor And Head of the
Department,
Department of Electrical
Engineering,
Regent Education & Research
Foundation, Barrackpore,
North 24 Parganas, West Bengal.



S. Ghosh
Mr. Sreedip Ghosh.
Project Supervisor,
And Assistant Professor,
Department of Electrical
Engineering,
Regent Education & Research
Foundation, Barrackpore,
North 24 Parganas, West Bengal.

Board of External Examiners

1. *[Signature]*
2. *[Signature]*
3. *[Signature]*

ABSTRACT

The emphasis for solar energy has been increasing every day in the context of Nepal with the installment of solar street lights in major cities and addition of solar technologies in buildings, institutions, etc. With a survey around the Barrackpore City, Barrackpore Subdivision, North Twenty Four Parganas District, West Bengal was found that the efficiency of the solar street lights decrease greatly with time as the maximum power from the solar panel can't be extracted properly and improper charging and haphazard discharging of the battery completely undermines the battery life cycle. Most of the solar lights in major city areas were abandoned and non-functioning. This project utilizes MPPT technique incorporated into a battery charging algorithm to solve the problem revolving with the power deliverance and battery charging.

ACKNOWLEDGEMENT

In the current competitive environment, there is a race for existence in which those with willpower will advance and prevail. Project functions as a link between theory and practice. We all agreed to participate in this particular initiative.

First and foremost, we would like to express our gratitude to the Almighty God, who is without a doubt the one who has always led us in the correct direction. Without his kindness, this endeavor would not have been possible.

We feel compelled to take this opportunity to express our sincere gratitude to our mentor, advisor and our project supervisor and guide, **MR. SREEDIP GHOSH**, Assistant Professor, Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal for her noble involvement, unweaving support, director and valuable guidance during the project work. We are indebted to her for her kind help and timely encouragement in making this project work professionally stimulating and professionally satisfying.

Next to her are our parents, to whom we owe a big debt of gratitude for raising us and educating and preparing us for this point in time as well as the future.

We would also like to thank all the other faculty members and teachers of Electrical Engineering Department and our Head of the Department (H.O.D), who is also Professor And Head, Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal, **MR. SANJIB PAL** for his continuous support and encouragement during the work in all year long.

Last but not least, we want to express our gratitude to the management representatives of Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal and our friends for supporting us all year long.

We lack the appropriate words to express our gratitude, but our hearts are still overflowing with the kindness we have all received from everyone.

Date:- 07/05/24

Avik Majhi

AVIK MAJHI
ROLL No.: 26301621028.

Subhajit Das

SUBHAJIT DAS
ROLL No.: 26301621054.

Palash Kumar Ghara

PALASH KUMAR GHARA
ROLL No.: 26301621020.

Pritam Banerjee

PRITAM BANERJEE
ROLL No.: 26301621030.

Shatadru Majumdar

SHATADRU MAJUMDAR
ROLL No.: 26301621031.

**A PROJECT REPORT
ON
DRY AND WET WASTE SEGREGATOR USING
ARDUINO**

Submitted in partial fulfillment of the requirement for the award of the degree of

**BACHELOR OF TECHNOLOGY
IN
ELECTRICAL ENGINEERING**

Submitted by

**SOUMYADIP SAHU: 26301621040
RAKESH PURKAIT: 26301621056
SOUMEN SAHOO: 26301621050
BIPLAB MISTRY: 26301621052
GOBINDA PAUL: 26301621051
ANUP KUMAR JANA: 26301621012**

Under the guidance of
Dr. SUMAN JANA



**DEPARTMENT OF ELECTRICAL ENGINEERING
REGENT EDUCATION & RESEARCH FOUNDATION GROUP OF INSTITUTIONS
BARRACKPORE, NORTH 24 PARGANAS, WEST BENGAL**

**AFFILIATED TO
MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY
WEST BENGAL**

ACKNOWLEDGEMENT

We should like to take this opportunity to extend our gratitude and appreciation to all the individuals without whose immense support, completion of this project would not have been possible. We are sincerely grateful to our advisor & mentor Prof. Suman Jana of the Electrical Engineering Department of Regent Education and Research Foundation group of institution, for generating interest for this project and his valuable guidance & constant support, encouragement and helpful criticism throughout. Sincere thanks to Prof. Sanjib Pal, Head of the Department of the Electrical Engineering department of Regent Education and Research Foundation group of institution, for giving us the golden opportunity for working in this project. We are also thankful to the Principal of Regent Education & Research Foundation Group of Institutions for giving us the opportunity to be a part of this esteemed institution and facilitate us for carrying out the project work. Last but not the least, we would like to express our deep appreciation to our families and friends for their understanding, encouragement, and patience throughout this project journey. Their unwavering support has been a constant source of our motivation.

Soumyadip Sahu
SOUMYADIP SAHU
26301621040

Soumen Sahoo
SOUMEN SAHOO
26301621050

Biplab Mishra
Biplab Mishra
26301621052

Gobinda Paul
GOBINDA PAUL
26301621051

Anup Kumar Jana
ANUP KUMAR JANA
26301621072

Rakesh Purkait
RAKESH PURKAIT
26301621056



REGENT EDUCATION AND RESEARCH FOUNDATION

Group of Institutions

RECOMMENDATION

I hereby recommend that the project entitled " DRY AND WET WASTE SEGREGATOR USING ARDUINO " being submitted by SOUMYADIP SAHU, RAKESH PURKAIT, SOUMEN SAHOO, BIPLAB MISTRY, GOBINDA PAUL, ANUP KUMAR JANA to MAKAUT for the award of the degree of Bachelor of Technology in Electrical Engineering is the record of their bonafide research work carried out under my supervision and guidance. The result presented in this thesis have not been submitted elsewhere for the award of any other degree or diploma. This work in my opinion, has reached the standard of fulfilling the requirement for the award of Degree of Bachelor of Electrical Engineering. It is notified to be understood that by this approval, the undersigned do not necessarily endorse or approved any statement made, opinion expressed and conclusion drawn therein but approve the PROJECT only for the purpose for which it has been submitted.

Dr. Suman Jana
Assistant Professor
Department of Electrical Engineering
Regent Education & Research Foundation
Group of Institutions
Barrackpore, 24pgs (North)

Campus: Regent Education & Research Foundation Group of Institution
Email: regedufoundation@gmail.com, Website: www.regeduf.in

Campus Address:

Bana Kanthalia, Barrackpore
P.O: Seshi Telinijara, P.S.: Mohanpur
Kolkata - 700121
Tel: 033-3001-5442/432/411, Fax: 033-3006-5442

Regd. Office Address:

11/3, Hresh Guha Street
7th Floor, Kolkata - 700017
Tel: 033-3221-3013



REGENT EDUCATION AND RESEARCH FOUNDATION

Group of Institutions

CERTIFICATE OF APPROVAL

We hereby certify that Project prepared by SOUMYADIP SAHU, RAKESH PURKAIT, SOUMEN SAHOO, BIPLAB MISTRY, GOBINDA PAUL, ANUP KUMAR JANA entitled "DRY AND WET WASTE SEGREGATOR USING ARDUINO" be accepted in partial fulfillment of the requirements for awarding the degree of "Bachelor of Technology in Electrical Engineering" session [2021-2024] in the Department of Electrical Engineering at Regent Education & Research Foundation Group of Institutions, Barrackpore. The forgoing project is hereby approved as a credible study of an engineering subject carried out & presented in a manner of satisfactory to warrant its acceptance as a pre-requisite to the degree for which it has been submitted.

It is notified to be understood that by this approval, the undersigned do not necessarily endorse or approve any statement made, opinion expressed & conclusion draw therein but approve the project only for the purpose for which it has been submitted.

(Project Guide)
Dr. Soumen Jana
Department of Electrical Engineering
Regent Education & Research Foundation
Group of Institutions
Barrackpore, 24pgs (North)

Sanjib Pal
07/08/2024

(Head of the Department)
Mr. Sanjib Pal
Department of Electrical Engineering
Regent Education & Research Foundation
Group of Institutions
Barrackpore, 24pgs (North)



Campus: Regent Education & Research Foundation Group of Institution
Email: regeduf@gmail.com • Website: www.regeduf.in

Campus Address:

Bata Kumbalia, Barrackpore
P.O.: Sewil, Telhara, P.S.: Motasur
Kolkata - 700121
Tel: 033-3006-5442/412431, Fax: 033-3006-5442

Regd. Office Address:

11/3, Biresh Guha Street
7th Floor, Kolkata - 700012
Tel: 033-3224-3013

ABSTRACT

Effective waste management is critical for sustainable urban development, necessitating the efficient segregation of waste into dry and wet categories. This report presents the development and implementation of an automated waste segregation system utilizing Arduino microcontrollers, aimed at addressing these challenges. The system employs a combination of moisture sensors and ultrasonic sensor to accurately classify waste based on its properties. Once classified, the waste is sorted into respective bins using actuators such as servo motors controlled by the Arduino microcontroller.

The objective of this project is to streamline the waste segregation process, reduce manual effort, and enhance accuracy and efficiency. The methodology includes the integration of various sensors for data acquisition, processing of this data using the Arduino platform, and mechanical actuation for the physical sorting of waste. The hardware setup comprises an Arduino microcontroller, moisture sensors to detect wet waste, ultrasonic sensor to identify the presence and type of waste, and actuators to divert waste into the appropriate bins.

This project represents a significant step forward in the field of waste management, leveraging affordable and accessible technology to automate and improve the waste segregation process. By reducing the reliance on manual sorting, the system not only minimizes human error but also promotes more effective recycling and disposal practices, contributing to a cleaner and more sustainable environment.

A Project Report on
"SOLAR POWERED STREET LIGHTING SYSTEM WITH OPTIMUM USE
OF BATTERY CAPACITY AND MONITORING SYSTEM"

Submitted in the partial fulfilment of the requirements for award of the degree

Bachelor of Technology

in

Electrical Engineering

from

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY

By,

AVIK MAJHI [26301621028]
SUBHAJIT DAS [26301621054]
PALASH KUMAR GHARA [26301621020]
PRITAM BANERJEE [26301621030]
SHATADRU MAJUMDAR [26301621031]

Under the guidance of

MR. SREEDIP GHOSH.
ASSISTANT PROFESSOR,
DEPARTMENT OF ELECTRICAL ENGINEERING,



Regent Education & Research Foundation.

(Affiliated to Maulana Abul Kalam Azad University of Technology, West Bengal)

Campus: Sewli Telini Para, SH 1, Malir Math, Barrackpore,
North Twenty Four (24) Parganas District, Pin-700121, West Bengal, India.

2024

REGENT EDUCATION & RESEARCH FOUNDATION

SEWLI TELINI PARA, SH 1, MALIR MATH, BARRACKPORE,
NORTH TWENTY FOUR PARGANAS, 700121, WEST BENGAL.
DEPARTMENT OF ELECTRICAL ENGINEERING



CERTIFICATE OF RECOMENDATION

This is to Certify that AVIK MAJHI [26301621028], SUBHAJIT DAS [26301621054], PALASH KUMAR GHARA [26301621020], PRITAM BANERJEE [26301621030], SHATADRU MAJUMDAR [26301621031] are the student of Bachelor of Technology (B.Tech), Final Year, Even Semester, 8th Semester (4th Year, 2nd Semester, Sem-08), Electrical Engineering Department in Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal under Maulana Abul Kaam Azad University of Technology, West Bengal is continuing their Project Entitled As "SOLAR POWERED STREET LIGHTING SYSTEM WITH OPTIMUM USE OF BATTERY CAPACITY AND MONITORING SYSTEM " under our guidance and supervision. This Project was authentically created under our direction and supervision and meets the requirements for the award of Bachelor of Technology in Electrical Engineering during the academic year 2021-2024 at Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal (Affiliated to Maulana Abul Kalam Azad University of Technology, West Bengal, Approved By-AICTE). To the best of our knowledge other university or institute has received a request for the matted contained in the report in order to issue a Degree or Diploma in Engineering or Technology.

Mr. Sanjib Pal.

Professor And Head of the Department,
Department of Electrical Engineering,
Regent Education & Research Foundation,
Barrackpore, North 24 Parganas, West Bengal.



Mr. Sreedip Ghosh.

Project Supervisor And Assistant Professor,
Department of Electrical Engineering,
Regent Education & Research Foundation,
Barrackpore, North 24 Parganas, West Bengal.

**REGENT EDUCATION & RESEARCH
FOUNDATION**

SEWLI TELINI PARA, SH 1, MALIR MATH, BARRACKPORE,
NORTH TWENTY FOUR PARGANAS, 700121, WEST BENGAL.
DEPARTMENT OF ELECTRICAL ENGINEERING



CERTIFICATE OF APPROVAL

This is to Certify that the Project Work entitled as "SOLAR POWERED STREET LIGHTING SYSTEM WITH OPTIMUM USE OF BATTERY CAPACITY AND MONITORING SYSTEM" submitted by AVIK MAJHI [26301621028], SUBHAJIT DAS [26301621054], PALASH KUMAR GHARA [26301621020], PRITAM BANERJEE [26301621030], SHATADRU MAJUMDAR [26301621031] under the guidance and supervision of MR. SREEDIP GHOSH, Assistant Professor, Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal to the Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal has been Examined and Evaluated.

This Project Work has been prepared as per the regulation of Maulana Abul Kaam Azad University of Technology, West Bengal and qualities to be accepted in fulfillment of the requirement for the degree of Bachelor of Technology in Electrical Engineering.

Date:-

Place:- Barrackpore, North 24 Parganas, West Bengal.

Sanjib Pal
07/06/2024

Mr. Sanjib Pal.
Professor And Head of the
Department,
Department of Electrical
Engineering,
Regent Education & Research
Foundation, Barrackpore,
North 24 Parganas, West Bengal.



S. Ghosh
Mr. Sreedip Ghosh.
Project Supervisor,
And Assistant Professor,
Department of Electrical
Engineering,
Regent Education & Research
Foundation, Barrackpore,
North 24 Parganas, West Bengal.

Board of External Examiners

1. *[Signature]*
2. *[Signature]*
3. *[Signature]*

ABSTRACT

The emphasis for solar energy has been increasing every day in the context of Nepal with the installment of solar street lights in major cities and addition of solar technologies in buildings, institutions, etc. With a survey around the Barrackpore City, Barrackpore Subdivision, North Twenty Four Parganas District, West Bengal was found that the efficiency of the solar street lights decrease greatly with time as the maximum power from the solar panel can't be extracted properly and improper charging and haphazard discharging of the battery completely undermines the battery life cycle. Most of the solar lights in major city areas were abandoned and non-functioning. This project utilizes MPPT technique incorporated into a battery charging algorithm to solve the problem revolving with the power deliverance and battery charging.

ACKNOWLEDGEMENT

In the current competitive environment, there is a race for existence in which those with willpower will advance and prevail. Project functions as a link between theory and practice. We all agreed to participate in this particular initiative.

First and foremost, we would like to express our gratitude to the Almighty God, who is without a doubt the one who has always led us in the correct direction. Without his kindness, this endeavor would not have been possible.

We feel compelled to take this opportunity to express our sincere gratitude to our mentor, advisor and our project supervisor and guide, **MR. SREEDIP GHOSH**, Assistant Professor, Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal for her noble involvement, unweaving support, director and valuable guidance during the project work. We are indebted to her for her kind help and timely encouragement in making this project work professionally stimulating and professionally satisfying.

Next to her are our parents, to whom we owe a big debt of gratitude for raising us and educating and preparing us for this point in time as well as the future.

We would also like to thank all the other faculty members and teachers of Electrical Engineering Department and our Head of the Department (H.O.D), who is also Professor And Head, Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal, **MR. SANJIB PAL** for his continuous support and encouragement during the work in all year long.

Last but not least, we want to express our gratitude to the management representatives of Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal and our friends for supporting us all year long.

We lack the appropriate words to express our gratitude, but our hearts are still overflowing with the kindness we have all received from everyone.

Date:- 07/05/24

Avik Majhi

AVIK MAJHI
ROLL No.: 26301621028.

Subhajit Das

SUBHAJIT DAS
ROLL No.: 26301621054.

Palash Kumar Ghara

PALASH KUMAR GHARA
ROLL No.: 26301621020.

Pritam Banerjee

PRITAM BANERJEE
ROLL No.: 26301621030.

Shatadru Majumdar

SHATADRU MAJUMDAR
ROLL No.: 26301621031.

SOLAR COOLING SYSTEM



A Project submitted in partial fulfillment of the requirement for the
award of the degree of Bachelor Of Technology

On

Electrical Engineering

To the department of

EE (Electrical Engineering)

Of

Regent Education & Research Foundation

By

1.Tubal kumar das	26301620010
2.Koushik Mondal	26301620012
3 .Vivek kumar	26301620013
4.Aritra Halder	26301620014
5.Nikita Deb	26301621039

Under the guidance of

Enakshmi Nandi

Assistant professor

Department of Electrical Engineering

Regent Education & Research Foundation Group Of Institutions
Barrackpore ,North 24 Parganas, West Bengal , Pin – 700121

CERTIFICATE OF APPROVAL

This is to certify that the entitled

"Solar cooling system"

is the work done by

- | | |
|--------------------|-------------|
| 1. Tubaj kumar Das | 26301620010 |
| 2. Koushik Mondal | 26301620012 |
| 3. Vivek kumar | 26301620013 |
| 4. Aritra Halder | 26301620014 |
| 5. Nikita Deb | 26301621039 |

for the award of degree of "Bachelor of Technology at Regent Education & Research Foundation Group Of Institution, Barrackpore, Kolkata – 700121. Under the supervision & guidance of Professor of EE at Regent Education & Research Foundation Group Of Institutions.

The work is completed and ready for evaluation in partial fulfilment. For the award of Bachelor of Technology, under the 'Maulana Abul Kalam Azad University of Technology' Famliy Known As WBUT.

Sanjib Pal
07/02/2024



Prof. Sanjib Pal

H.O.D

(Department Of Electrical Engineering)

ACKNOWLEDGEMENT

We would like to thank to our respected teacher Enakshmi Nandi (Assistant professor in department of Electrical & Electronics Engineering at Regent Education & Research Foundation, Barrackpore, KOL-700121) for giving us such a wonderful opportunity to expand our knowledge for our own branch and giving us guidelines to present a seminar report. It helped us a lot to realize of what we study for. Secondly, we would like to thank our parents who patiently helped us as we went through our work and helped to modify and eliminate some of the irrelevant and unnecessary stuffs. Thirdly we would like to thank our classmates who helped us to make our work more organized and well stacked till the end. Next, we would thank Microsoft for developing such a wonderful tool like MS-Word. It helped our project report a lot to remain error free. Last but clearly not the least, we would thank the Almighty for giving us the strength to complete the report on time.

1. Tubal Kumar Das *Tubal Kumar Das*
2. Koushik Mondal *Koushik Mondal*
3. Vivek Kumar *vivek kumar*
4. Nikita Deb *Nikita Deb*
5. Anitra Halder *Anitra Halder*

E. Nandi
07/06/24

ABSTRACT

This paper describes current trends in solar-powered air conditioning, which has seen renewed interest in recent years due to the growing awareness of global warming and other environmental problems. Closed-cycle heat-powered cooling devices are based mainly on absorption chillers, a proven technology employing LiBr-water as the working fluid pair. Recent developments in gasfired systems of this type make available double- and triple-effect chillers with considerably higher COP than their single-effect counterparts, which makes it possible to reduce the amount of solar heat required per kW of cooling. These systems require, however, high-temperature solar collectors. The principles of multi-staging absorption systems are described. An economic comparison is provided which shows the total system cost to be dominated by the solar part of the system. At current prices, the high COP, high temperature alternative is still more costly than the low temperature one. Open-cycle desiccant systems employing either solid or liquid sorbents are described. While the main thrust in research on novel closed-cycle absorption systems has been toward increasing the operating temperature in order to improve efficiency through multistaging, open-cycle absorption and desiccant systems have been developed for use with low temperature heat sources such as flat plate solar collectors. A novel open-cycle (DER) system is described, which makes it possible to use the solar heat at relatively low temperatures, for producing both chilled water and cold, dehumidified air in variable quantities, as required by the load.

TRANSFORMERLESS INVERTER

A project report submitted for the partial fulfillment of the bachelor of technology Degree in
Electrical Engineering under Maulana Abul Kalam Azad University Of Technology.

By

SUDIPTA MONDAL

[ROLL NO: 26301621016 REGISTRATION NO: 212630101620028 OF 2021-22]

RASEL MONDAL

[ROLL NO: 26301621048 REGISTRATION NO: 212630101620030 OF 2021-22]

SOUVIK BERA

[ROLL NO: 26301621038 REGISTRATION NO: 212630101620006 OF 2021-22]

SANJAY ROY

[ROLL NO: 26301621044 REGISTRATION NO: 212630101620048 OF 2021-22]

MRINMOY PRAMANICK

[ROLL NO: 26301621053 REGISTRATION NO: 212630101620035 OF 2021-22]

Under the Guidance of:

Assistant Prof. PRODIP MAZUMDAR

Electrical And Electronics Engineering



REGENT EDUCATION AND RESEARCH FOUNDATION

Bara kanthalia, Barrackpore, P.O-Sewli Telini para, Kolkata, West Bengal

Affiliated To

Maulana Abul Kalam Azad University Of Technology

BF-142, Salt Lake, Sector-I, Kolkata 700 064

ACKNOWLEDGEMENT

We should like to take this opportunity to extend our guide to the following revered persons without whose immense support, completion of this project would not have been possible.

We are sincerely grateful to our advisor & mentor **Assistant prof. Prodip Mazumder** of the electrical engineering department, Regent research foundation, for this constant support & generating interest for this project,

Last but not the list, we would like to extend our warm regards to our families & peers who have kept supporting us & always had faith in our work.

SUDIPTA MONDAL

REGISTRATION NO: 212630101620028

Dept of electrical engineering

Regent Education & Research Foundation

Sudipta Mondal

RASEL MONDAL

REGISTRATION NO: 212630101620030

Dept of electrical engineering

Regent Education & Research Foundation

Rasel Mondal

SOUVIK BERA

REGISTRATION NO: 212630101620006

Dept of electrical engineering

Regent Education & Research Foundation

Souvik Bera

SANJAY ROY

Sanjay Roy
REGISTRATION NO: 212630101620048

Dept of electrical engineering

Regent Education & Research Foundation

MRINMOY PRAMANICK

REGISTRATION NO: 212630101620035

Dept of electrical engineering

Regent Education & Research Foundation

Mrinmoy Pramanick

Abstract

This project explores the design, development, and evaluation of a transformer less inverter system for power conversion applications.

Traditional inverters often rely on bulky transformers for voltage conversion, leading to increased size, weight, and cost. The proposed transformer less inverter aims to mitigate these drawbacks by employing advanced power electronics and control techniques.

By eliminating the need for a transformer, the system achieves higher efficiency, reduced size, and enhanced reliability. The project involves theoretical analysis, simulation studies, hardware implementation, and performance testing to validate the effectiveness and practicality of the transformer less inverter.

Potential applications include renewable energy systems, uninterruptible power supplies (UPS), and electric vehicle charging stations.

Santosh Patel
07/08/2024

Signature of the H.O.
(Electrical engineering)



B. S. G. S.

Signature of the Examiner

B. S. G. S.

Signature of Project Guide



REGENT EDUCATION & RESEARCH FOUNDATION

CERTIFICATE OF APPROVAL

We are hereby certify that

Project prepare by " SUDIPTA MONDAL, RASEL MONDAL, SOUVIK BERA
SANJAY ROY , MRINMOY PRAMANICK "entitled **TRANSFORMERLESS INVERTER** be
accepted in Partial fulfillment of the requirements for awarding the degree of " Bachelor Of Technology
In Electrical Engineering "session[2021-2024] in the department of Electrical engineering at Regent
Education & Research foundation, Barrackpore. The forgoing project is hereby approved as a credible
study of an engineering subject carried out & present in manner of satisfactory to warrant its acceptance
as a pre requisite to the degree for which it has submitted.

It is notified to be understood that by this approval, the undersigned do not necessarily endorse or
approve any statement made, opinion expressed & conclusion draw therein but approve the project only
for the purpose for which it has been submitted.

Prodip Mojumder 07/06/24

MR. PRODIP MOJUMDER

Assistant Professor

Department of Electrical Engineering

Regent Education & Research Engineering
Engineering

Barrackpore, N 24 Pgs.

Sanjib Paul
09/08/2024

MR. SANJIB PAUL

Head of the department

Department of Electrical Engineering

Regent Education & Research

Barrackpore, N 24 Pgs.



A PROJECT REPORT ON

SOLAR CITY

Submitted in partial fulfillment of the requirements
For the award of the degree

**BACHELOR OF TECHNOLOGY
IN
ELECTRICAL ENGINEERING**

SUBMITTED BY

ANKIT BANERJEE - 26301620006

SANDIP CHOWDHURY - 26301620004

ATRI MUKHERJEE - 26301620008

ARIJIT KUMAR KUNDU - 26301621017

AKASH DAS - 26301620007

Under the Guidance of

MR. SANDEEP CHAKRABORTY



DEPARTMENT OF ELECTRICAL ENGINEERING
REGENT EDUCATION AND RESEARCH FOUNDATION GROUP OF INSTITUTIONS
BARRACKPORE, NORTH 24 PARGANAS
AFFILIATED TO
LAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL
JUNE, 2024

ACKNOWLEDGEMENT

I take this opportunity to place on record my deep sense of gratitude to **Mr. SANDEEP CHAKRABORTY** for his valuable guidance, encouragement and helpful criticism during the course of this project work. My thanks are also to **Mr. SANJIB PAL**, Head of Electrical Engineering Department for his constant encouragement during my work and for providing necessary facilities to carry out the project. I also grateful to **PROF. SAMIK CHAKRABORTY**, Principal, RERFGI for giving me this opportunity to be a part of this esteemed institution and facilitate me for carrying out the project work. Last, but not the least, I thank all the staff members of Electrical Engineering Department, RERFGI for helping me to carry out the thesis. Finally I am grateful to my all family member for giving their continuous support and encouragement throughout the process from beginning.

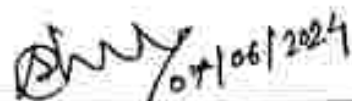


REGENT EDUCATION AND RESEARCH FOUNDATION GROUP OF INSTITUTE

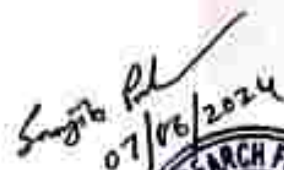
CERTIFICATE

We hereby certify that the project report prepared by *Mr. Ankit Banerjee, Mr. Sandip Chowdhury, Mr. Arijit kumar kundu, Mr. Atri Mukherjee and Mr. Akash Das* entitled "**SOLAR CITY**" be accepted in partial fulfilment of the requirements for awarding the degree of "**Bachelor of Technology in Electrical Engineering**" Session [2023-2024] in the Department of Electrical Engineering, RERFGOI, Barrackpore. The forgoing PROJECT is hereby approved as a creditable study of an Engineering Subject carried out and presented in a manner of satisfactory to warrant its acceptance as a pre-requisite to the DEGREE for which it has been submitted.

It is notified to be understood that by this approval, the undersigned do not necessarily endorse or approve any statement made, opinion expressed and conclusion drawn herein but approve the PROJECT only for the purpose for which it has been submitted.

 07/06/2024

Mr. Sandeep Chakraborty
(Project Guide)
Assistant. Professor

 07/06/2024



Mr. Sanjib Pal
Assistant. Professor
(Head of the Department)
Department of Electrical Engineering
Regent Education & Research
Foundation
Barrackpore, North 24 Parganas



REGENT EDUCATION AND RESEARCH FOUNDATION GROUP OF INSTITUTE



RECOMMENDATION

I hereby recommend that the project entitled "SOLAR CITY" being submitted by **ANKIT BANERJEE** (Roll No- 26301620006), **SANDIP CHOWDHURY** (Roll No- 26301620004), **ATRI MUKHERJEE** (Roll No- 26301620008), **ARIJIT UMAR KUNDU** (Roll No- 26301621017), **AKASH DAS** (Roll No- 26301620007), to AKAUT for the award of the degree of Bachelor of Technology in Electrical Engineering on the basis of the record of his Bonafide research work carried out under my supervision and guidance. The results presented in this thesis have not been submitted elsewhere for the award of any other degree or diploma.

His work in my opinion, has reached the standard of fulfilling the requirement for the award of Degree of Bachelor of Electrical Engineering.

It is notified to be understood that by this approval, the undersigned do not necessarily endorse or approve any statement made, opinion expressed and conclusion drawn therein. I approve the PROJECT only for the purpose for which it has been submitted.

SOLAR LIGHTING SYSTEM WITH 5W SOLAR PANEL

Project submitted in partial Fulfillment

Of

The requirements for B.Tech

In

Electrical Engineering



Submitted By

1. Masud Ul Rahaman

Roll No - 26301621046

2. Pijin Maji

Roll No - 26301621022

3. Deepradeb Dngal

Roll No - 26301621013

4. Sk. Hyder Ali

Roll No - 26301621036

Under guidance of

Mr. Sanjib Pal

Assistant Professor

Department of Electrical Engineering

Regent Education & Research Foundation

Barrackpore, North 24 Parganas, West Bengal, Pin- 700121

GROUP MEMBERS

ROLL NO.	NAME	REGISTRATION NO.
26301621046	MASUD UL RAHAMAN	212630101620004
26301621022	PIKIN MAJI	212630101620034
26301621013	DEEPRADEB DINGAL	212630101620039
26301621036	SK. HYDER ALI	212630101620010

RECOMMENDATION

I hereby recommend that the project entitled "SOLAR LIGHTING SYSTEM WITH 5W SOLAR PANEL" being submitted by----" PIKIN MAJI, MASUD UL RAHAMAN, DEEPRADEB DINGAL, SK. HYDER ALI ." To MAKAUT for the award of the degree of Bachelor of Technology in electrical engineering is the record of his Bonafied research work carried out under my supervision and guidance. The results presented in this thesis have not been submitted elsewhere for the award of any other degree or diploma. This work in my opinion has reached the standard of fulfilling the requirement for the award of degree of Bachelor of Electrical Engineering. It is notified to be understood that by this approval, the undersigned do not necessarily endorse or approve any statement made opinion expressed and conclusion drawn therein but approve the PROJECT only for the purpose for which it has been submitted. Project Guide Mr. Sanjib Pal Electrical Engineering Department Regent Education & Research Foundation Barrackpore, North 24 pgs.

Sanjib Pal



Project Guide

Mr. Sanjib Pal

Electrical Engineering Department

Regent Education & Research Foundation

Barrackpore, North 24 pgs.



REGENT EDUCATION & RESEARCH FOUNDATION GROUP OF INSTITUTIONS

CERTIFICATE FOR APPROVAL

We hereby certify that the project prepared by Masud Ul Rahaman, Pikh Maji, Deepradeb Dingal -- " SOLAR LIGHTING SYSTEM WITH 5W SOLAR PANEL " be accepted in partial fulfillment of the requirement of rewarding the degree of "Bachelor of technology in Electrical Engineering." Session [2021-2024] in the department of Electrical Engineering at Regent Education Research Foundation, Barrackpore. This project is hereby approved as suitable study of an Engineering subject carried out and present in a manufacture satisfactory to warrant its acceptance as a pre certified to the Degree for which it has been submitted. It is notified to be understood that by this approval, the undersigned do not necessarily endorse or approved made, opinion expressed and conclusion drawn there in but approve the project only for the purpose for which it has been submitted.

(Signature of Mentor)

Mr. Sanjib Pal

(Signature of HOD)

Mr. Sanjib Pal



ABSTRACT

Due to increasing concerns about global warming and climate change, renewable energy sources like wind and solar are receiving greater attention from researchers world-wide. Solar PV is an excellent source of energy available all over the globe but in DC form. If it can be utilized without converting this into AC, it can be really energy efficient. LEDs for lighting purposes have become extremely popular lately due to their higher lumens yield with less wattage consumption; also, they work on DC. So, Solar PV-LED is an ideal combination for outdoor lighting. This paper explores this combination for domestic purposes. The solar light is being equipped with a Li-ion battery whose charging and discharging are also controlled by DC-DC converters. This paper explores the combination of a solar PV with USB supplying power to a Domestic LED light. This system can also be used for other dc apparatus with appropriate rating.

A PROJECT REPORT ON **SOLAR INVERTER**

Submitted in the partial fulfilment of the
requirements for award of the degree

Bachelor of Technology

in

Electrical Engineering

from

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY

by,

ERSHITA SINGHA (26301621033)

SWARNALI CHATTERJEE (26301621037)

SOUVIK BISWAS (26301621034)

SAYAN SARKAR (26301621024)

ARINDAM MONDAL (26301621018)

UNDER GUIDANCE OF

MR. PRABAL KUMAR BASAK



Regent Education & Research Foundation

(Affiliated to Maulana Abul Kalam Azad University of Technology, West Bengal)

Campus: Sewli Telini Para, SH 1, Malir Math, Barrackpore,

North Twenty Four (24) Parganas District, Pin-700121, West Bengal, India

Regent Education & Research Foundation

Sewli Telini Para, SH 1, Malir Math, Barrackpore,
North Twenty Four (24) Parganas District, Pin-700121, West Bengal, India

Department of Electrical Engineering



CERTIFICATE OF RECOMENDATION

This is to Certify that ERSHITA SINGHA (26301621033), SWARNALI CHATTERJEE (26301621037), SOUVIK BISWAS (26301621034), SAYAN SARKAR (26301621024), ARINDAM MONDAL (26301621018) are the student of Bachelor of Technology (B.Tech), Final Year, 8th Semester, Electrical Engineering Department in Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal under Maulana Abul Kaam Azad University of Technology, West Bengal is continuing their Project Entitled As "SOLAR INVERTER" under our guidance and supervision. This Project was authentically created under our direction and supervision and meets the requirements for the award of Bachelor of Technology in Electrical Engineering during the academic year 2021-2024 at Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal (Affiliated to Maulana Abul Kalam Azad University of Technology, West Bengal, Approved By-AICTE). To the best of our knowledge other university or institute has received a request for the matter contained in the report in order to issue a Degree or Diploma in Engineering or Technology.

Sanjib Pal



Mr. Sanjib Pal
Professor And Head of the Department
Department of Electrical Engineering
Regent Education & Research Foundation
Barrackpore, North 24 Parganas, West Bengal.

Basak

Mr. Prabal Kumar Basak
Project Supervisor
Department of Electrical Engineering
Regent Education & Research Foundation
Barrackpore, North 24 Parganas, West Bengal

Regent Education & Research Foundation

Sewli Telini Para, SH I, Malir Math, Barrackpore,
North Twenty Four (24) Parganas District, Pin-700121, West Bengal, India

Department of Electrical Engineering



CERTIFICATE OF APPROVAL

This is to Certify that the Project Work entitled as "SOLAR INVERTER" submitted by ERSHITA SINGHA (26301621033), SWARNALI CHATTERJEE (26301621037), SOUVIK BISWAS (26301621034), SAYAN SARKAR (26301621024), ARINDAM MONDAL (26301621018) under the guidance and supervision of Mr. Prabal Kumar Basak, Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal to the Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal has been Examined and Evaluated.

This Project Work has been prepared as per the regulation of Maulana Abul Kaam Azad University of Technology, West Bengal and qualities to be accepted in fulfillment of the requirement for the degree of Bachelor of Technology in Electrical Engineering.

Date:-

Place:- Barrackpore, North 24 Parganas, West Bengal.

Mr. Sanjib P.
Professor And Head of the
Department

Department of Electrical Engineering
Regent Education & Research
Foundation
Barrackpore, North 24 Parganas, West
Bengal.



Mr. Prabal Kumar Basak
Project Supervisor
Department of Electrical
Engineering

Regent Education & Research
Foundation
Barrackpore, North 24 Parganas,
West Bengal

Board of External Examiners

1.

2.

3.

ACKNOWLEDGEMENT

In the current competitive environment, there is a race for existence in which those with willpower will advance and prevail. Project functions as a link between theory and practice. We all agreed to participate in this particular initiative.

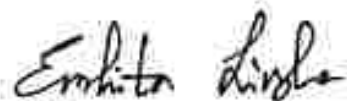
First and foremost, we would like to express our gratitude to the Almighty God, who is without a doubt the one who has always led us in the correct direction. Without his kindness, this endeavor would not have been possible. We feel compelled to take this opportunity to express our sincere gratitude to our mentor, advisor and our project supervisor and guide, Mr. Prabal Kumar Basak, Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal for her noble involvement, unweaving support, director and valuable guidance during the project work. We are indebted to her for her kind help and timely encouragement in making this project work professionally stimulating and professionally satisfying.

Next to her are our parents, to whom we owe a big debt of gratitude for raising us and educating and preparing us for this point in time as well as the future.

We would also like to thank all the other faculty members and teachers of Electrical Engineering Department and our Head of the Department (H.O.D), who is also Professor And Head, Department of Electrical Engineering, Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal, Mr. Sanjib Pal for his continuous support and encouragement during the work in all year long.

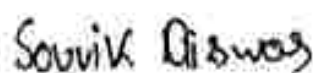
Last but not least, we want to express our gratitude to the management representatives of Regent Education & Research Foundation, Barrackpore, North 24 Parganas, West Bengal and our friends for supporting us all year long.

We lack the appropriate words to express our gratitude, but our hearts are still overflowing with the kindness we have all received from everyone.



ERSHITA SINGHA

(26301621033)



SOUVIK BISWAS

(26301621034)



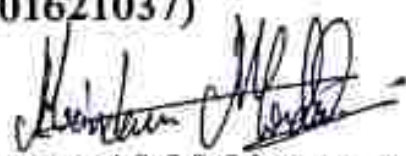
SAYAN SARKAR

(26301621024)



SWARNALI CHATTERJEE

(26301621037)



ARINDAM MONDAL

(26301621018)

Footstep Power Generation using Piezoelectric Transducers: Harvesting Energy from Every Step

A Project Report Submitted In Partial Fulfillment of the
Requirements for the Award of Degree of

**B.Tech
In
Electrical Engineering**

Submitted by

Name	Registration No.	Roll No.
Joy Sarkar	212630101620031	26301621021
Mithun Biswas	212630101620021	26301621025
Bikash Gole	212630101620023	26301621026
Samir Dam	212630101620024	26301621027
Bishal Debnath	212630101620036	26301621047

Under the guidance of
Mr. Mrinmoy Das

Assistant Professor of Electrical Engineering Department
Regent Education & Research Foundation Group of Institutions



Department of Electrical Engineering
Regent Education & Research Foundation Group of Institutions

Bara Kanthalia, Sewli Telini Para, North 24 Parganas, Barrackpore, 700121

West Bengal, India

June, 2024

DECLARATION

Joy Sarkar, Mithun Biswas, Bikash Gole, Samir Dam & Bishal Debnath, here declared that the work which is been presented in this report entitled "**Footstep Power Generation using Piezoelectric Transducers: Harvesting Energy from Every Step**" in partial fulfillment of the requirements for award of degree of **B.Tech in Electrical & Electronics Engineering** at Regent Education & Research Foundation Group of Institutions, Barrackpore is an authentic record of my own work carried out under the supervision of Asst. Prof. Mrinmoy Das and refers other researcher's work which are duly listed in the reference section.

The matter embodied in this report as not be submitted for the award of any other degree to any other university.

Date: 07.06.2024

Joy Sarkar

JOY SARKAR

Mithun Biswas

MITHUN BISWAS

Bikash Gole

BIKASH GOLE

Samir Dam

SAMIR DAM

Bishal Debnath

BISHAL DEBNATH



REGENT EDUCATION & RESEARCH FOUNDATION

Group of Institutions

Recommendation

I hereby recommended that the project report entitled "Footstep Power Generation using Piezoelectric Transducers: Harvesting Energy from Every Step" submitted by Joy Sarkar, Mithun Biswas, Bikash Gole, Samir Dam and Bishal Debnath be accepted in partial fulfilment of the requirement for the degree of B.Tech in Electrical Engineering from the Regent Education & Research Foundation Group of Institutions, Barrackpore.

Project Guide

Mr. Mrinmoy Das

Assistant Professor

Regent Education & Research Foundation Group of Institutions

Campus : Regent Education & Research Foundation Group of Institutions

E-mail: rerfkolkata@gmail.com Website: www.rerf.in

Campus Address:

Bara Kanthalia, Barrackpore

P.O: Sewli Telinipara, P.S.: Mohanpur

Kolkata - 700 121

Tel: 033-3008-5442/432/431, Fax: 033-3008-5442

Head Office Address:

11/3, Birendra Gohu Street

7th Floor, Kolkata - 700 017

Tel: 033-3221-3013



REGENT EDUCATION & RESEARCH FOUNDATION

Group of Institutions

CERTIFICATE

This is to certify that the report entitled **Footstep Power Generation using Piezoelectric Transducers: Harvesting Energy from Every Step** submitted by **Joy Sarkar, Mithun Biswas, Bikash Gole, Samir Dam and Bishal Debnath** to the REGENT EDUCATION and RESEARCH FOUNDATION GROUP of INSTITUTIONS for the award of the degree of **B.Tech in Electrical Engineering** a bona-fide record of the work carried out by her under my/our supervision during the year 2023-2024. The contents of this report, in full or in parts, have not been submitted to any other Institute or University for the award of any degree.

Date: 07.06.2024

Mr. Mrinmoy Das
Asst. Professor
Dept. of Electrical Engineering
Regent Education & Research Foundation
Group of Institutions



Mr. Sanjib Pal
Head of Department,
EE Department
Regent Education & Research Foundation
Group of Institutions

Campus : Regent Education & Research Foundation Group of Institutions
E-mail: rer@kolkata@gmail.com Website: www.rer.in

Campus Address:

ura Kanthalia, Barrackpore
O: Sewli Teliaipara, P.S.: Mohanpur
Kolkata - 700 121
el: 033-3008-5442/432/431, Fax: 033-3008-5442

Regd. Office Address:

11/3, Biresw Guha Street
7th Floor, Kolkata - 700 017
Tel.: 033-3221-3013

ACKNOWLEDGMENT

The analysis of the project work wishes to express our guide to **Asst. Prof. Mrinmoy Das** for allowing the degree attitude and providing effective guidance in department of this project work. His conscription of the topic and all the helpful hints, he provided, contributed greatly to successful development of this work, without being pedagogic and overbearing influence.

We also express my sincere guidance to **Asst. Prof. Sanjib Pal**, Head of Department of Electrical Engineering of Regent Education and Research Foundation Group of Institutions for giving the scope of successfully carrying out the project work.

Finally, we take this opportunity to thank to **Dr. Samik Chakraborty** Principal of Regent Education and Research Foundation Group of Institutions for giving me the scope of carrying out the project work.

Date: 07.06.2024

Joy Sarkar

JOY SARKAR

Roll No- 26301621021

Mithun Biswas

MITHUN BISWAS

Roll No- 26301621025

Bikash Gole

BIKASH GOLE

Roll No- 26301621026

Samir Dam

SAMIR DAM

Roll No- 26301621027

Bishal Debnath

BISHAL DEBNATH

Roll No- 26301621047

ABSTRACT

In the quest for sustainable and renewable energy sources, innovative approaches are being explored to harness energy from everyday activities. One such approach is the generation of electrical power through the use of piezoelectric transducers embedded in floors to capture energy from human footsteps. This concept, known as footstep power generation, leverages the piezoelectric effect, where certain materials generate an electric charge in response to applied mechanical stress.

This paper presents a comprehensive study on the design, implementation, and efficiency of footstep power generation systems using piezoelectric transducers. The primary objective is to convert the mechanical energy from footsteps into usable electrical energy, which can be stored and utilized for low-power applications such as LED lighting, sensors, and portable electronic devices.

The study includes the selection of suitable piezoelectric materials, such as PZT (lead zirconate titanate) and PVDF (polyvinylidene fluoride), which exhibit high piezoelectric coefficients and mechanical durability. The design considerations include the optimal placement and configuration of the transducers to maximize energy capture while ensuring durability and user comfort.

Experimental setups involve integrating piezoelectric transducers in various flooring materials and testing under different load conditions to simulate real-world foot traffic. The results demonstrate the voltage and power output under typical usage scenarios. Factors such as the frequency of footfalls, the weight of individuals, and the type of footwear are analyzed to understand their impact on energy generation efficiency.

The findings indicate that while the energy generated per footstep is relatively small, the cumulative effect in high-footfall areas such as train stations, shopping malls, and pedestrian walkways can be substantial. Additionally, advancements in energy storage technologies and power management systems can enhance the viability of this renewable energy source.

This paper concludes by discussing the potential applications and future directions for footstep power generation systems, emphasizing the integration with smart grid technologies and the Internet of Things (IoT) for intelligent energy management. The study suggests that with continued advancements in materials science and engineering, footstep power generation could become a valuable component of the broader strategy for sustainable urban development and energy efficiency.