



**Department of Electrical and Electronics Engineering**

**Research Laboratory**

1.	Name of the Research Laboratory	Renewable Energy
2.	Faculty In-charge	Dr.S.Sumathi, Mr.P.C.Sivakumar, Mr.K.Karthikeyan
3.	Objectives	<ul style="list-style-type: none"><li>• To carry out advanced interdisciplinary research activities in the area of energy to the needs of the society.</li><li>• To conduct training programmes in the related areas for technical skill enhancement.</li><li>• To generate Intellectual Properties (IP) in terms of patents and high quality technical publications.</li><li>• To optimize energy systems for the best performance.</li><li>• To assist companies by designing cost-effective technology for sustainable development.</li></ul>
4.	Research Focus Areas	<ul style="list-style-type: none"><li>• Design and optimization of solar photovoltaic (PV) systems for various applications.</li><li>• Development and testing of wind energy conversion systems including small turbines.</li><li>• Study and implementation of hybrid renewable energy <b>systems</b> (solar-wind-storage).</li><li>• Development of MPPT algorithms for maximum efficiency in power conversion</li></ul>
5.	List of Major Equipments	<ul style="list-style-type: none"><li>• Solar PV Training System</li><li>• SolarPV grid Training System</li><li>• Solar Emulator</li><li>• Solar Concentrator training system - Study of Energy transfer</li><li>• Solar PV panel setup (18KW)</li></ul>
6.	Research Work	<ul style="list-style-type: none"><li>• Development of smart solar powered irrigation using artificial intelligence funded by AICTE</li></ul>
7.	Funding Agency and Funding Amount (Government /Non Government )	Fund received from AICTE-Research Promotional Schemes - Rs.17,01,960/-

8.	Student Involvement	<ul style="list-style-type: none"> <li>• Design and execution of mini and major projects on solar, wind, and hybrid systems.</li> <li>• Participation in hands-on training <b>sessions</b> for solar PV installation and maintenance.</li> <li>• Internships with industries and research centers focused on green energy solutions.</li> <li>• Contributions to research publications and conference papers under faculty mentorship.</li> <li>• Involvement in patent filing for innovative energy devices and IoT-integrated systems.</li> <li>• Simulation and analysis using MATLAB / Simulink and other energy software tools.</li> <li>• Data collection and performance analysis of solar panels, wind turbines, and batteries.</li> <li>• Participation in national innovation contests and hackathons on energy sustainability.</li> </ul>
9.	Faculty Contributions	<ul style="list-style-type: none"> <li>• Guided student projects on solar PV systems, hybrid energy models, and smart microgrids.</li> <li>• Published research papers in peer-reviewed journals on renewable energy technologies.</li> <li>• Filed patents related to innovative energy conversion and storage solutions.</li> <li>• Organized workshops and hands-on training programs on solar, wind, and biomass systems.</li> <li>• Developed curriculum content for courses in renewable energy and energy management.</li> <li>• Established industry collaborations for joint R&amp;D and Energy audit projects.</li> <li>• Delivered guest lectures at FDPs and national seminars on energy efficiency and green tech.</li> <li>• Secured funding from AICTE for lab development and research.</li> <li>• Reviewed technical papers and served as resource persons in conferences.</li> <li>• Mentored students for innovation contests and national-level energy competitions.</li> </ul>
10.	Industry Collaboration	<ul style="list-style-type: none"> <li>• Mangla Smart Energy Solutions, Tirupur.</li> </ul>
11.	Academic Collaboration	Prof. Dr. Bernhard Glueck Senior Expert Service (SES), German.
12.	Outcome expected from the Lab	<ul style="list-style-type: none"> <li>• Enhanced student competency in renewable energy systems through practical exposure.</li> <li>• Development of functional prototypes such as solar-powered vehicles and micro grids.</li> <li>• Increased number of research publications in energy and sustainability domains.</li> <li>• Filing of patents and IP related to green technologies and smart energy devices.</li> <li>• Industry-ready graduates with hands-on experience in</li> </ul>

		<p>solar, wind, and hybrid systems.</p> <ul style="list-style-type: none"> <li>• Collaboration with industries for consultancy, product development, and internships.</li> <li>• Successful participation in national-level innovation and startup contests.</li> <li>• Support for institutional green campus initiatives through in-house energy generation.</li> <li>• Strengthening of academic-industry-research linkages for long-term sustainability projects.</li> </ul>
13.	Future Research Directions	<ul style="list-style-type: none"> <li>• Fabricated a hybrid solar-wind energy model for demonstration and student research.</li> <li>• Won awards in national-level innovation contests like Smart India Hackathon and Energy Challenge.</li> <li>• Published over 10+ research papers in reputed journals and conferences in the renewable domain.</li> <li>• Established MoUs with renewable energy companies for training and live project collaboration.</li> <li>• Installed a rooftop solar PV system on campus, contributing to energy savings.</li> <li>• Conducted 5+ training programs/workshops attended by students, faculty, and industry professionals.</li> <li>• Guided more than 10 UG and PG projects aligned with SDGs and clean energy goals.</li> <li>• Developed IoT-based energy monitoring systems</li> </ul>
14.	Mapping of Program Outcome	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12
15.	Mapping of Program Specific Outcome	PSO2, PSO3
16.	Mapping of Program Educational Objectives	PEO1, PEO2, PEO3



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

**CENTRE FOR RENEWABLE ENERGY**



Students of Mahendra Higher Secondary School, Namakkal visited to our Solar Power Plant on 05-4-2022 and got exposure on innovation in Solar Irrigation System





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## Department of Electrical and Electronics Engineering

Date: 25.03.2024

### Discussion with Faculty Members Recent Advancements on Solar PV Panels and its integration



**Date: 26.03.2024 and 10/04/2024**

**Centre of Excellence – Renewable Energy System**

Name of the Head	Dr.R.V. Mahendra Gowda Principal, Mahendra Engineering College		
Name of the Advisor	Dr.R.Uthirasamy, Professor & HoD/EEE		
Name of the Coordinator	Dr.S.Sumathi, Professor/EEE		
Name of the Faculty Members	Mr.K.Karthikeyan, Assistant Professor/EEE Mr.P.C.Sivakumar, Assistant Professor/EEE		
Student Members	<b>S.No.</b>	<b>Name</b>	<b>Year/Department</b>
	1	Gokulakannan.M	II Year EEE
	2	Janani.R	II Year EEE
	3	Kathirvelan.K	II Year EEE
	4	Shrika.K.S	II Year EEE
	5	Nishanth.S	II Year EEE
	6	Ranjithkumar.K	II Year EEE
	7	Sridhar S	II Year ECE
	8	Sudharsan K	II Year ECE
	9	Arun Prasad M.G	II Year ECE
	10	Aadhithya B.	II Year ECE
	11	Premkumar S.	II Year ECE
	12	Magesh Kumar R	II Year ECE
	13	Dinsmilton.J	III Year EEE
	14	Karthick.K	III Year EEE
	15	Yuvanesh Kumar.V	III Year EEE
	16	Pragadeeshwaran.A	III Year EEE
	17	Dinesh Kumar.S	III Year ECE
	18	Dharnish.R	III Year ECE
	19	Moulieswarn. V	III Year ECE
	20	Sathiya Narayanan.A	III Year ECE
Work Progress	<p>The Renewable Energy Centre aims to provide sustainable energy for present and future generations:</p> <ul style="list-style-type: none"> <li>➤ A 10 kW Solar system is developed and integrated with Grid systems</li> <li>➤ A 2.5 kW Solar Photovoltaic system is designed for BLDC motor operated water Pumping system</li> <li>➤ A 2.5 kW solar tracking PV system has been established for research activities.</li> <li>➤ Developed a prototype model of hybrid converter for integrating Solar and Wind energy conversion system</li> <li>➤ Research scholars, UG and PG students have undertaken research works and publish the papers in SCI, Scopus and web of science indexed journals</li> <li>➤ Published patents in Solar and Wind energy conversion systems</li> </ul>		

### Time Line/Plan of Work

Target Date	Work Description	Project/ Product	Faculty In-charge
15/04/2024 to 26/04/2024	Design of Solar PV modules Selection of Solar PV modules	Design and Development of hybrid converter for integrating Solar and Wind energy conversion system	Mr.K.Karthikeyan Assistant Professor/EEE
29/04/2024 to 10/05/2024	Frame work, Design of Wind Blades		
13/05/2024 to 24/05/2024	Design of Converters, Procumbent of Power Switches		
27/05/2024 to 07/06/2024	Design of MPPT Controllers, Design of PIC Controller modules		
10/06/2024 to 21/06/2024	Pulse generation using IR2110 ICs		
24/06/2024 to 05/06/2024	Design of Inverters		
08/06/2024 to 19/06/2024	Implementation of Optimization techniques		
22/02/2024 to 02/07/2024	Design of Battery Bank		
05/07/2024 to 16/07/2024	Integration of Solar & Wind, Converter and Controllers		
19/07/2024 to 26/07/2024	Implementation and Testing		
29/07/2024 to 09/08/2024	Selection of Solar PV modules	Design and Development of Solar PV systems for smart irrigation system	Mr.P.C.Sivakumar Assistant Professor/EEE
12/08/2024 to 23/08/2024	Design of Power Supply Unit		
26/08/2024 to 13/09/2024	Simulation of Power Converter module		
16/09/2024 to 27/09/2024	Design of Controller module		
01/10/2024 to 18/10/2024	Design of Power Converters PCB Layout and Assembly		
21/10/2024 to 04/11/2024	Generation of Firing Pulse using PIC Controller		
05/10/2024 to 22/10/2024	Design of Sensors and Peripheral Ports		
25/10/2024 to 13/12/2024	Integration of Sources, Controllers and Converters		
16/12/2024 to 31/12/2024	Implementation and Testing		

### Outcomes

At the end of the CoE activities learners will be able to

- ❖ Experience advanced interdisciplinary research activities in the areas of renewable energy
- ❖ Conduct training programmes in the related areas for technical skill enhancement
- ❖ Publish Patents in the areas of renewable energy
- ❖ Optimize energy systems to meet the energy demand









## International Seminar on “Grid-Tied Solar PV Plants: Integration, Operation, and Economics

### Report on Events (RoE)

1.	Name of the Event (Seminar/Workshop/Conference /FDP /Any others)	International Lecture
2.	Date of the Event	10.04.2024
3.	Title	International Lecture on ‘Grid Tied Solar PV Plants: <b>Integration, Operation and Economics</b> ’
4.	Name & Address of the Guest	Prof. Dr. Bernhard Gluck Senior Experten Service Germany
5.	Total Participants	101
6.	Beneficiary (Students (branch /year) / Staffs)	Third Year Students
7.	Description about the Programme	<b>The course objectives of the programme are :</b> <ul style="list-style-type: none"><li>❖ To learn the concepts of distribution networks, node voltage offset, and lower access costs for the location and capacity of photovoltaic power supply</li><li>❖ To explore the recent Technologies for integrating the renewable energy resources in India and abroad</li><li>❖ To learn the operation of PV systems and to analyze the impact of installing grid-connected PV plants</li><li>❖ To impart knowledge on the safety measures of grid-connected PV plants</li></ul>



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Nadu 637503, India



GPS Map Camera



Mallasamudram West, Tamil Nadu, India  
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## Department of Electrical and Electronics Engineering

### Centre of Excellence- Renewable Energy

Date: 10/03/2025	
Time	Work Description
10.00 am to 10.30 am	<p>Interaction with Faculty Members</p>  <p>Mallasamudram West, Tamil Nadu, India F2g2+q48, Mallasamudram West, Tamil Nadu 637503, India Lat 11.476972° Long 78.000313° 10/03/25 11:58 AM GMT +05:30</p> <ul style="list-style-type: none"><li>❖ Discussed about the recent advancements in solar PV systems</li><li>❖ Discussed about the parasitic capacitance in solar panels</li></ul>

<p>10.30 am to 11.30 am</p>	<p>Discussion on “Solar Tracking Systems”  A.Kannan Arumugam  K. Jeevitha  A. Lathiksree  U. Monisha  Faculty Coordinator :Dr.G.Jayanthi, AP/EEE</p> <ul style="list-style-type: none"> <li>❖ Discussed about the efficiency of tracking systems</li> <li>❖ Discussed about the comparative analysis of solar PV systems</li> <li>❖ Discussed on the frame stability</li> </ul> <div data-bbox="527 485 1429 993" data-label="Image"> </div> <div data-bbox="527 993 987 1497" data-label="Image"> </div>
<p>11.30 am to 11.45 am</p>	<p>Refreshment</p>
<p>11.45 am to 12.45pm</p>	<p>Discussion on “Hybrid Renewable Energy based Power Generation”</p> <p>Third Year EEE Students:  E. Ragavan  S. Dineshkumar  N. Balaji  N. Dinesh  Faculty Coordinator : Mr. K. Karthikeyan, AP/EEE</p> <ul style="list-style-type: none"> <li>❖ Design of Solar PV modules</li> <li>❖ Selection of Solar PV modules</li> <li>❖ Frame work, Design of Wind Blades</li> <li>❖ Design of Converters, Procumbent of Power Switches</li> </ul>

	<ul style="list-style-type: none"> <li>❖ Design of MPPT Controllers, Design of PIC Controller modules</li> <li>❖ Pulse generation using IR2110 ICs</li> <li>❖ Design of Inverters</li> <li>❖ Implementation of Optimization techniques</li> <li>❖ Design of Battery Bank</li> <li>❖ Integration of Solar &amp; Wind Energy systems</li> <li>❖ Integration of Controllers and Converter</li> <li>❖ Implementation of Controllers and Converter</li> <li>❖ Implementation and Testing</li> </ul> 
12.45 am to 2.00 pm	Lunch
2.00 pm to 3.30 pm	<p>Discussion on “Solar Based Irrigation System”</p> <ul style="list-style-type: none"> <li>❖ Selection of Solar PV modules</li> <li>❖ Design of Power Supply Unit</li> <li>❖ Simulation of Power Converter module</li> <li>❖ Design of Controller module</li> <li>❖ Design of Power Converters</li> <li>❖ PCB Layout and Assembly</li> <li>❖ Generation of Firing Pulse using PIC Controller</li> <li>❖ Design of Sensors and Peripheral Ports</li> <li>❖ Integration of Sources</li> <li>❖ Integration of Converters and driver units</li> <li>❖ Integration of Sources and Controllers</li> <li>❖ Integration of Sources, Controllers and Converters</li> <li>❖ Implementation and Testing</li> </ul> <p>Faculty Coordinator: Dr. S. Sumathi, Professor/EEE</p>
3.30 pm – 4.00 pm	<p>Discussion on “Solar Panel Cleaning Systems”</p> <ul style="list-style-type: none"> <li>❖ 1.5HP Automatic Solar Panels Cleaning System with Advance Motor Dry Run Protection sensor</li> <li>❖ Automatically clean the solar panels according to the time set by user</li> <li>❖ Water-sprinkler based programmable cleaning systems</li> <li>❖ Automatic as well as manual mode for solar panels cleaning</li> <li>❖ Latest MCU based technology</li> </ul>



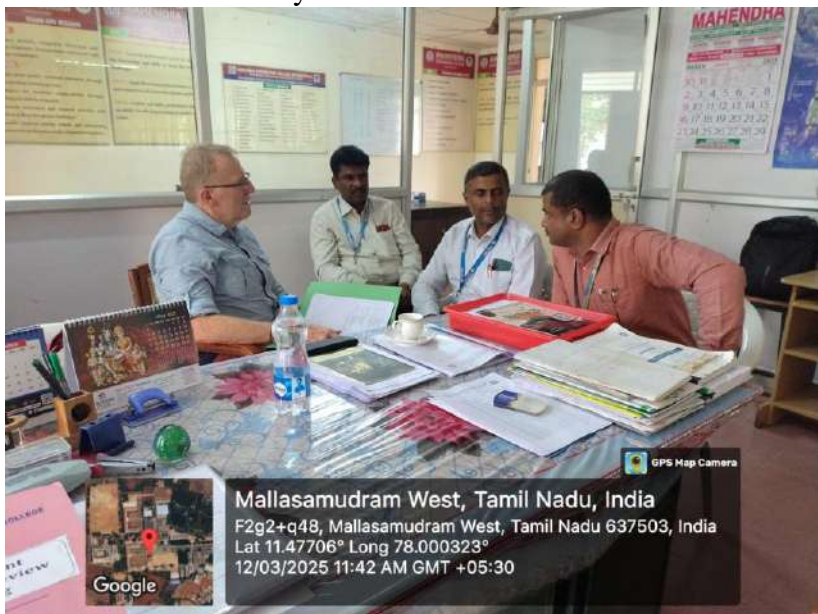

- ❖ Cleaning system for Residential and Commercial installations
- ❖ Advance Motor Dry Run Protection sensor
- ❖ Pump Dry run protection sensors available which protect your pump running in dry run (no water) conditions
- ❖ Set system Cleaning time 1 & 2 minutes
- ❖ set system Cleaning mode Daily & Alternate day
- ❖ Compact design and Powerful operation
- ❖ Long life span
- ❖ More Reliable, Powerful & smooth Device
- ❖ Low power consumption
- ❖ Water empty indication by Buzzer tones
- ❖ Shock free connection
- ❖ 0.5Hp to 10Hp open well Submersible Motor pump Handling capacity
- ❖ Capable for all types of submersible pump control
- ❖ Power cut does not effect on system operation
- ❖ Easily reprogrammed





Faculty Coordinator: Dr. S. Sumathi, Professor/EEE



**Department of Electrical and Electronics Engineering**  
**Centre of Excellence- Electric Vehicles Mobility**

Date: 12/03/2025	
Time	Work Description
10.00 am to 10.30 am	<p>Interaction with Faculty Members</p>  <p>Discussion on Design of transmission system and Design of converters for EVs</p>
10.30 am to 11.30 am	<p>Discussion on “IoT based battery management system for Hybrid Electric Vehicles”</p>  <p>Final Year EEE Students: Bhavithrakumar. S Dhino Kavin.V V Gokulraj L</p>

	<p>Faculty Coordinators : Dr.M.Muthuvinayagam, AsP/EEE Mr.P.Parathraju, AP/EEE</p> <p>Discussion on “Design of Hybrid Electric Vehicle”</p> <p>Final Year EEE Students: Chandru.S Joseph.P Kabilan.P</p> <p>Faculty Coordinators : Dr.M.Muthuvinayagam, AsP/EEE Mr.P.Parathraju,AP/EEE</p>  <p>Discussion on “Electric Tricycle”</p> <ul style="list-style-type: none"> <li>❖ Frame work, Selection of solar panles</li> <li>❖ Design of Outer frame structure</li> <li>❖ Design of Battery Bank</li> <li>❖ Power Supply unit assembly</li> <li>❖ Design of Charge Controller</li> <li>❖ Design of Gate driver circuits</li> <li>❖ Integration of solar panels and charge controller</li> <li>❖ Design of Horn and Bluetooth systems</li> <li>❖ Design of converters</li> <li>❖ Integration of controller and converter</li> <li>❖ Integration of solar panels, controller and converter</li> <li>❖ Implementation and Testing</li> </ul>
11.30 am to 11.45 am	Refreshment
11.45 am to 12.45pm	 <p>Seminar on Solar PV Systems</p>



12.45 am to 2.00 pm	Lunch
2.00 pm to 3.30 pm	<p>Discussion on “Analysis of Dual mode Electric Bicycle”</p> <p>Final Year EEE Students: Saranraj.K Sethu.G Shreeram.J</p> <p>Faculty Coordinator: Dr.R.Uthirasamy, Professor/EEE</p> <p>The main objectives of the proposed project are:</p> <ul style="list-style-type: none"> <li>❖ To design a smart WiFi enabled alarm system for rider’s safety and security</li> <li>❖ To design and implement a health care monitoring system</li> <li>❖ To develop a Fingerprint based locking and unlocking system</li> <li>❖ To develop a smart feature technology assisted drive system for automatic gear shifting</li> <li>❖ To create a clean and hygienic environment</li> </ul>  
3.30pm to 4.00 pm	Refreshment
4.00 pm to 4.30 pm	Discussion on “Performance Analysis of BLDC Hub motor for Electric Vehicle applications”



Final Year EEE Students:

Chezhiyan.S.

Abishek.D

Marimuthu.A

Faculty Coordinator

Dr.P.Umasankar, Professor/EEE



- ❖ Frame work design
- ❖ Design of triwheeler dynamics
- ❖ Design of Battery Bank
- ❖ Design of Charge Controller
- ❖ Integration of Power Supply unit
- ❖ Design of Gate driver circuits
- ❖ Integration of charge controller and battery bank
- ❖ Design of transmission system
- ❖ Design of converters
- ❖ Integration of controller and converter
- ❖ Integration of controller and converter
- ❖ Implementation and Testing