MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

Autonomous Institution – UGC, Govt. of India

Accredited by NBA & NAAC with 'A' Grade

NIRF Indian Ranking, Accepted by MHRD, Govt. of India | Band – Excellent, National Ranking by ARIIA

Maisammaguda, Dhulapally, Secunderabad – 500 010, Telangana

A.Y : 2021-22 **VOL.1**

Under

Student Chapter IEEE, IETE & Technical Association Electropheenix

ELEKTOR

HALF YEARLY TECHNICAL MAGAZINE

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

E E E

www.mallareddyecw.com

DEPARTMENT VISION

- To develop competitive industry ready electrical engineers by establishing traditions, which will foster creativity and growth of excellence to effectively meet the technological requirements..

Vision

DEPARTMENT MISION

- To develop proficiency by imparting application oriented knowledge and inculcate analytical thinking to solve the technological problems associated with analyzing, designing and testing electrical systems.

Mission

ABOUT THE DEPARTMENT

The Department of Electrical & Electronics Engineering is accredited by NBA, with an intake of 60 students. The Dept. has state of the art laboratories with latest softwares like MATLAB, ORCAD, SCI LAB, PSPICE and Multisim. We have well qualified faculty members. Several faculty members have received their best teacher awards from institutions of International repute and have been working on research and development projects and regularly publish their work in international journals and conferences. EEE department faculty teams attained patent rights for their technological innovations. The Dept. established IEEE, ISTE student chapters under which it organizes National Level Technical Symposium -FUTURE SASTRA & State Level Technical Symposium- MEDHA every academic year. The Dept. organized National conference on "Emerging Trends in Electrical Systems & Engineering" NCETESE, International Conference on "Emerging Trends in Electrical Systems & Engineering"(ICETESE) every year since 2014, The Dept. organizes Faculty Development Programmes, Refresher courses and workshops in different streams and Student Development Programmes like Workshops, intra college conferences, Industrial visits , Guest lectures and our students actively participate in hackathon programmes conduct at state and National level. Our students are actively participated and won prizes in curricular activities organized by other colleges. The Dept. also organizes regular student seminar sessions of two hours per week for I to IV B.Tech student to enhance their all round performance.

The Dept. also offers value added certification Courses on oxford, Microsoft, CISCO certification through Oxford University, Microsoft Innovation Centre and CISCO Networking Academy respectively. The College Offers Campus Recruitment Training Programmes in collaboration with TIME and FACE Institutions. The Department also publishes the Registered Journal "International Journal of Research in Signal Processing, Computing and Communication-System Design (IJRSCSD) with an ISSN: 2395-3187.

PO'S

PO1	Engineering knowledge	An ability to apply knowledge of mathematics (including probability, statistics and discrete mathematics), science, and engineering for solving Engineering problems and modeling
PO2	Problem analysis	An ability to design, simulate and conduct experiments, as well as to analyze and interpret data including hardware and software components
PO3	Design / development of solutions	An ability to design a complex electronic system or process to meet desired specifications and needs
PO4	Conduct investigations of complex problems	An ability to identify, formulate, comprehend, analyze, design synthesis of the information to solve complex engineering problems and provide valid conclusions.
PO5	Modern tool usage	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice
PO6	The engineer and society	An understanding of professional, health, safety, legal, cultural and social responsibilities
PO7	Environment and sustainability	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and demonstrate the knowledge need for sustainable development.
PO8	Ethics	Apply ethical principles, responsibility and norms of the engineering practice
PO9	Individual and team work	An ability to function on multi-disciplinary teams.
PO10	Communication	An ability to communicate and present effectively
PO11	Project management and finance	An ability to use the modern engineering tools, techniques, skills and management principles to do work as a member and leader in a team, to manage projects in multi-disciplinary environments
PO12	Life-long learning	A recognition of the need for, and an ability to engage in, to resolve contemporary issues and acquire lifelong learning

PSO'S

The graduates of the department will attain:

PSO1: Analyze, Design and Implement application specific electrical system for complex engineering problems, Electrical And Electronics Circuits, Power Electronics and Power Systems by applying the knowledge of basic science, Engineering mathematics and engineering fundamentals

PSO2: Apply modern software tools for design, simulation and analysis of electrical systems to engage in life- long learning and to successfully adapt in multi disciplinary environments

PSO3: Solve ethically and professionally various Electrical Engineering problems in societal and environmental context and communicate effectively

PEO'S

PEO1-PROFESSIONAL DEVELOPMENT

To develop in the students the ability to acquire knowledge of Mathematics, Science & Engineering and apply it professionally within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability with due ethical responsibility.

PEO2-CORE PROFICIENCY

To provide ability to identify, formulate and solve engineering problems with hands on experience in various technologies using modern tools necessary for engineering practice to satisfy the needs of society and the industry.

PEO3- TECHNICAL ACCOMPLISHMENTS

To equip the students with the ability to design, experiment, analyze and interpret in their core applications through multi disciplinary concepts and contemporary learning to build them into industry ready graduates.

PEO4- PROFESSIONALISM

To provide training, exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude towards ethical issues, team work, multidisciplinary approach and capability to relate engineering issues to broader social context.

PEO5- LEARNING ENVIRONMENT

To provide students with an academic environment and make them aware of excellence, leadership, written ethical codes and guidelines and the life-long learning to become a successful professional in Electrical and Electronics Engineering

MESSAGES

Founder Chairman's Message

Ch. Malla Reddy

Founder Chairman, MRGI
Hon'ble Minister, Govt. of Telangana State

MRECW has made tremendous progress in all areas and now crossing several milestones within a very short span of time and now I feel very happy to know that the students and faculty of the EEE department of MRECW are bringing out the volume-1 of the Technical magazine Elektor in A.Y 2021-22. As I understand this magazine is intended to bring out the inherent literary talents in the students and the teachers and also to inculcate leadership skills among them. I am confident that this issue will send a positive signal to the staff, students and the persons who are interested in the educational and literary activities

Principal's Message

I congratulate the department of EEE, MRECW for bringing out the first volume of the prestigious half yearly department technical Magazine Elektor under A.Y: 2021-22, I am sure that the magazine will provide a platform to the students and faculty members to expand their technical knowledge and sharpen their hidden literary talent and will also strengthen the all round development of the students. I am hopeful that this small piece of literary work shall not only develop the taste for reading among students but also develop a sense of belonging to the institution as well. My congratulations to the editorial board who took the responsibility for the arduous task most effectively. I extend best wishes for the success of this endeavor.

Dr. Y. Madhavee Latha

Principal

HOD'S MESSAGE

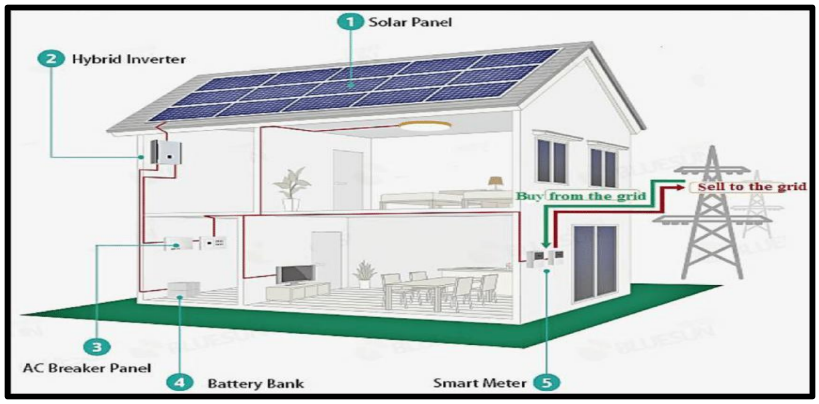
It is an occasion of great pride and satisfaction for the department of EEE, MRECW to bring out the first volume of the half yearly of the Technical magazine Elektor under A.Y:2021-22, it gives me immense pleasure to note that the response to the magazine has been over whelming. The wide spectrum of articles gives us a sense of pride that our students and faculties possess creative potential and original thinking in ample measures. Each article is entertaining interesting and absorbing. I applaud the contributors for their stimulated thoughts and varied hues in articles contributed by them.

Dr. N. Vengadachalam

HOD

FACULTY ARTICLES

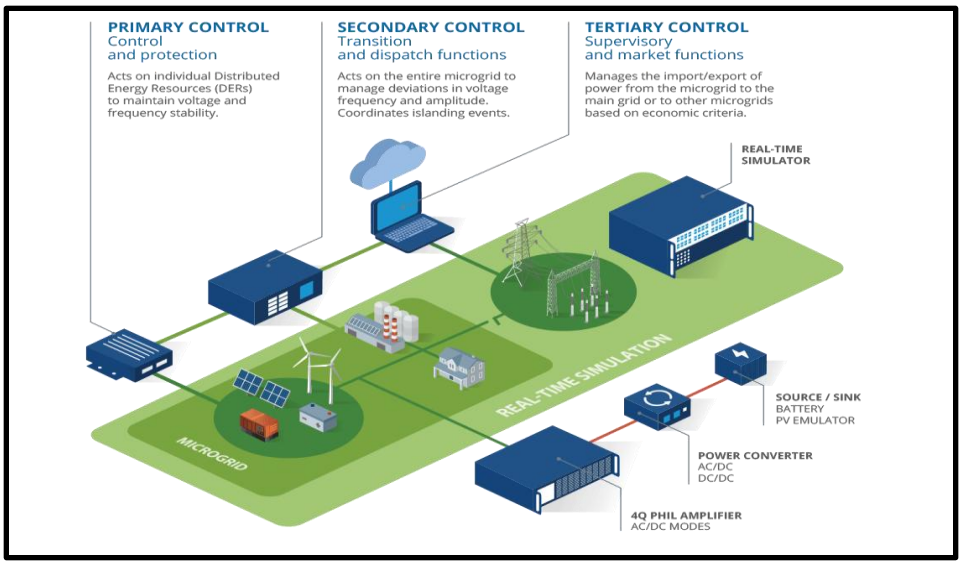
ASSESSMENT OF PV SOLAR ENERGY SYSTEM AND SMART GRID



Presently a day's sun oriented energy structure is the new patterns of age of power as non-ordinary energy framework. This article presents part of sun based energy framework in clean advancement component and improvement of keen city in India. It is a charming spot for creates power by sun based energy framework since India is thickly populated and has high sunlight based radiation. India's hypothetical sun based power gathering, on just its territory range is around 5000(PWh/year).The everyday normal sun oriented radiation occurrence over India shifts from 4 to 7KWh/m^2 with around 1500-2000 sun sparkle hours for each year. In year 2009, India talks to a 19 billion US dollar intend to deliver 20 GW of sun oriented power by 2020.The measure of sun based energy created in India in 2007 was under 1% of the aggregate energy request. The lattice intelligent sunlight based power as of December 2010 was only 10MW. Government subsidized solar energy in India represented roughly 6.4 MW/Year of energy starting at 2005, 25.1 MW was included 2010 and 468MW of every 2011. By July 2012 the introduced framework associated PV had expanded to 1040.67MW and India hopes to introduce an extra 10,000MW by 2017 and an aggregate of 20,000MW by 2022.The measure of land required for sun arranged power plants—at display approximately per km^2 for each 20– 60 megawatts (MW) created. The designing more suitable for a vast bit of India would be an exceedingly spread game plan of individual roof control age systems, all related by methods for a close-by organize.

VADALMUDI NARESH
Asst. Professor, EEE

ONLINE VOLTAGE CONTROL OF DC MICRO-GRIDS



This ARTICLE presents a contemplate study on online voltage control strategy with different loading conditions in a DC micro-grid using particle swarm optimization (PSO). DC micro-grids consist of many converters and it is an important issue to stabilize network voltage by properly designing their controllers. Conventional feedback controls have been often used as a primary control for voltage stabilization with optimizing control parameters such as droop gains. Moreover, the optimal control parameters should be flexibly updated when the system condition dynamically changes so as to maintain high voltage control performance under sudden and unexpected changes in system conditions. In that context, this paper introduces an online voltage control using an advanced PSO technique to frequently update control gains. The primary control was modeled as a proportional-derivative controller, and the optimization problem was defined based on the eigenvalue analysis. A parallel operation of local and global searches is conducted in the proposed method to search optimal control gains by allocating a part of particles to move in a random pattern. The validation of the proposed method was performed using a simplified 3-bus DC micro grid model with two generator sets and two constant power loads.

Radhika P.
Asst.Professor

STUDENT ARTICLES

ELECTRIC TRACTOR

Farmer always tries to make farming easy and accomplish it in a way so that less amount of money or labour is needed. The main cost due to which Farming becomes expensive is the use of Tractors. Tractors consume a lot amount of fuel which adds to the cost. But technology has came to rescue and provided a solution. The use of DC Batteries in place of Fuel proposed by Electrical Engineering world has given Farmers a less expensive and reliable machine known as Electric Tractor. Due to Electric Tractor, Farming becomes easy and economical. With the deterioration of environments and increase of energy depletion, developing agriculture with environmental friendliness, resource conservation and high efficiency is prospective and necessary. Some special agricultural environments such as greenhouse and courtyard agriculture, have more and more urgent needs for agricultural machineries with zero emission, no pollution and low noise. By using a tractor, tasks like ploughing, tilling and planting etc. have been carried out every day. These tractors cause a lot of pollution due to emissions from diesel engines, which may directly affect the crop. Tractors use petroleum based fuels mainly diesel.

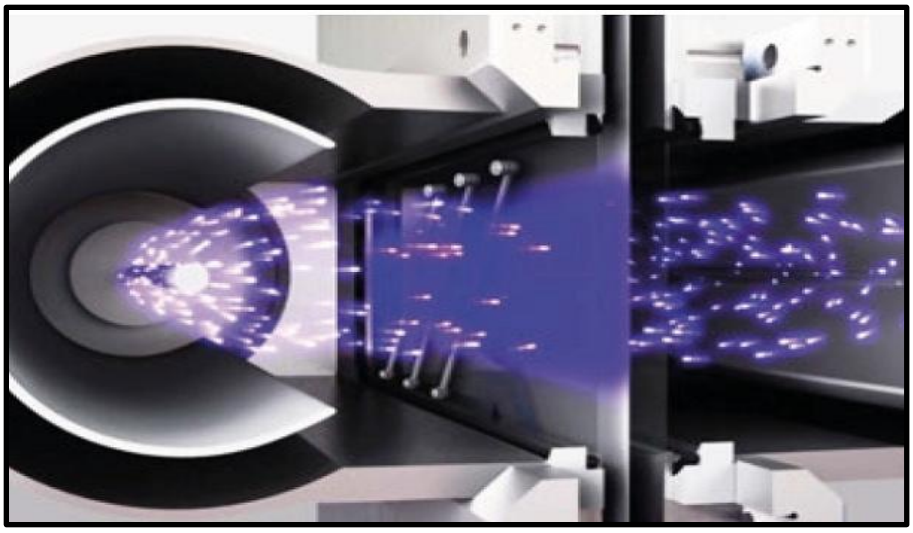
P MANASA
19RH1A0223

DEVELOPMENT OF SEMI-AUTOMATIC BRINING MACHINE FOR SMOKED FISH PRODUCTION

Traditional fish processing in the Philippines consist of different paces that require adequate control and sanitation and one of these processes is brining. However, brining process done in traditional fish processing poses serious food safety issues. This study focuses to design, fabricate, assemble, evaluate, and test a semi-automatic brining machine for smoked fish production. The prototype is an innovative brining machine design that will comply with the food safety and hygiene principles of food processing and production. Viable inputs were used to formulate the electrical diagram, process flow, and the prototype assembly. The machine was fabricated using SS316L and SS304 stainless steel which are the standard materials required in the development of kitchen and food processing equipment. Upon deployment, the machine was tested for its functionality and its finished product was subjected to microbial testing (Aerobic Plate Count) which shows that the bacterial content of brined fish from the machine was less than the traditional brining process and adheres to FDA-approved values. Prototype evaluators were chosen from the fields of Mechanical Technology, Welding and Fabrication Technology, Electrical Engineering, Local Government Unit and the Tinapa Making Industry. The evaluation on the performance of the developed prototype is based on the six (6) criteria namely: functionality, aesthetics, workability, durability, economy and safety.

K NAVYASREE
18RH1A0224

E-BEAM TECHNOLOGY



Electron beams are particle accelerators. In this case, the particles being accelerated are electrons and the beam generated is the equivalent of beta radiation. An electron beam's size and power are best described by the voltage and current. The voltage is the force that accelerates the electrons. The current, measured in amps, is the rate of flow of electrons. A highly reliable accelerator design used around the world and at E-BEAM Services is the Dynamotor. This is a linear accelerator and it works on the same principle as a cathode ray tube (CRT) in a television set. Electrons are generated by heating a filament. A voltage gradient draws the electrons away from the filament and accelerates them through a vacuum tube. The resultant beam can then be scanned by means of an electromagnet to produce a "curtain" of accelerated electrons. The CRT inside a TV set operates at 20 kilovolts (keV), whereas modern industrial accelerators can operate up to 5,000 kilovolts (5 MeV) or more. Electrons accelerated to 5 MeV are traveling at approximately 99.6% of the speed of light when they exit the beam tube. In a television set, the beam current is a few microamps, whereas an industrial beam's current is 10,000 times higher. Since electrons have mass, their penetration into materials is limited by their energy and the density of the target material. The high energy and current of industrial electron beams allow efficient processing of products by producing rapid reactions between the electrons and irradiated products.

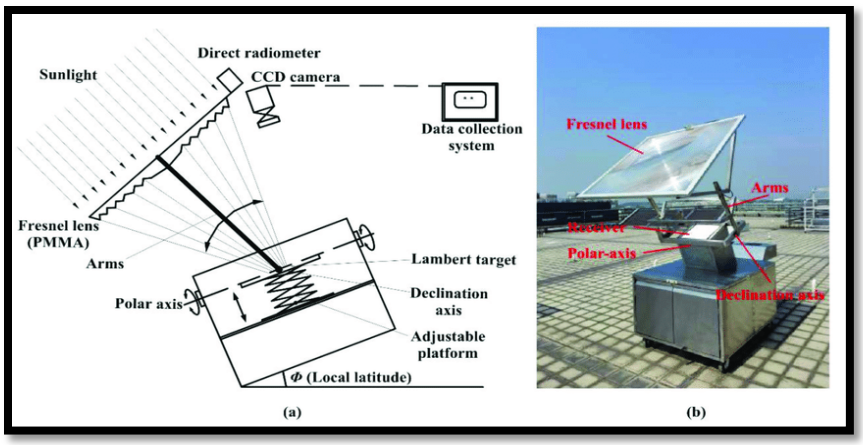
N SPANDANA
19RH1A0244

REALIZING ECOSYSTEM-SAFE HYDROPOWER FROM DAMS

For clean hydropower generation while sustaining ecosystems, minimizing harmful impacts and balancing multiple water needs is an integral component. One particularly harmful effect not managed explicitly by hydropower operations is thermal destabilization of downstream waters. To demonstrate that the thermal destabilization by hydropower dams can be managed while maximizing energy production, we modeled thermal change in downstream waters as a function of decision variables for hydropower operation (reservoir level, powered/spillway release, storage), forecast reservoir inflow and air temperature for a dam site with in situ thermal measurements. For data-limited regions, remote sensing-based temperature estimation algorithm was established using thermal infrared band of Landsat ETM+ over multiple dams. The model for water temperature change was used to impose additional constraints of tolerable downstream cooling or warming (1–6 °C of change) on multi-objective optimization to maximize hydropower. A reservoir release policy adaptive to thermally optimum levels for aquatic species was derived. The novel concept was implemented for Detroit dam in Oregon (USA). Resulting benefits to hydropower generation strongly correlated with allowable flexibility in temperature constraints. Wet years were able to satisfy stringent temperature constraints and produce substantial hydropower benefits, while dry years, in contrast, were challenging to adhere to the upstream thermal regime.

M.R. NIKHITHA
18RH1A0232

APPLICATION-BASED DESIGN OF THE FRESNEL LENS SOLAR CONCENTRATOR



A novel genetically themed hierarchical algorithm (GTHA) has been investigated to design Fresnel lens solar concentrators that match with the distinct energy input and spatial geometry of various thermal applications. Basic heat transfer analysis of each application decides its solar energy requirement. The GTHA incorporated in MATLAB® optimizes the concentrator characteristics to secure this energy demand, balancing a minimized geometry and a maximized efficiency. The optimum concentrator is then simulated to ensure the algorithm validity. To verify the algorithmic-optimization and simulation-validation processes, two experimental applications were selected from the literature, a solar welding system for H13 steel plates and a solar Stirling engine with an aluminum-cavity receiver attached to the heater section. In each case, a flat Fresnel lens with a spot focus was algorithmically designed to supply the desired solar heat, and then a computer simulation of the optimized lens was conducted showing great comparability to the original experimental results. While projecting on the future of renewable energy, it is inevitable to include innovations in algorithmic thinking and artificial intelligence, and how it is contributing toward more applicable and efficient designs. Solar singularity has become a scientific obsession to reach a time when solar energy is the cheapest and most reliable source of power, and research have been on the right path toward this world-changing achievement

M. LIKHITHA
19RH5A0205

SELF-SUFFICIENCY OF 3-D PRINTERS: UTILIZING STAND-ALONE SOLAR PHOTOVOLTAIC POWER SYSTEMS

A self-replicating rapid prototype (RepRap) is a type of 3-D printer capable of printing many of its own components in addition to a wide assortment of products from high-value scientific or medical tools to household products and toys. There is some evidence that these printers could provide low-cost distributed manufacturing in underprivileged rural areas. For the most isolated communities without access to the electric grid, a low-cost alternative energy is needed. Solar energy can be harvested through a stand-alone photovoltaic (PV) power system specifically designed to match the needs of the Riprap. The voltage and current requirement for the printer demands the use of buck along with a bidirectional DC converters to ensure proper operation. This paper provides the design for a stand-alone PV—lithium ion battery power system with an efficient controller. Robust and agile PI controller schemes are utilized to efficiently maintain the distribution of energy through the power system. The system was defined with ordinary differential equations, simulated and tested for two operational conditions in MATLAB/Simulink. The results showed that the controller developed operates the system in a stable condition and the simulation shows steady acceptable behavior that makes this system highly suitable for hardware implementation. 3-D printing using fused filament fabrication (FFF) is the process of producing a solid object by accumulating successive layer of normally polymer-based materials following a digital CAD model. Historically, 3-D printing was limited to rapid prototyping in well-funded laboratories and large manufacturing firms.

T . PRANAYA
18RH1A0256

LOW-COST VIRTUAL INSTRUMENTATION OF PV PANEL CHARACTERISTICS USING EXCEL AND ADRIANO IN COMPARISON WITH TRADITIONAL INSTRUMENTATION

This paper presents a low-cost solution of virtual instrumentation to provide a new technique for real-time instrumentation of the PV panel characteristics such as voltage, current and power. The system design is based on a low-cost Arduino acquisition board. The acquisition is made through a low-cost current and voltage sensors, and data are presented in Excel by using the PLX-DAQ data acquisition Excel Macro, which allows communication between the ATMega328 microcontroller of an Arduino UNO board and the computer by UART bus. Hence, the *I–V* and *P–V* characteristics, which processed under real-time conditions, can be obtained directly and plotted on an Excel spreadsheet without needing to reprogram the microcontroller. A comparison between this low-cost virtual instrumentation and the traditional instrumentation is drawn in this work. It is found that our solution presents several benefits compared to the traditional solution such as the data can be presented in graphical form in real time. Thus, several experimental tests to confirm the effectiveness of the developed virtual instrumentation system are presented in this study.PV panels are the main equipment of solar power generation system that serve to convert solar light energy into DC electrical energy (Ozdemir et al. 2014; Jean et al. 2015). The energy generated by the PV systems depends on the environmental conditions such as temperature, solar irradiance, direction and spectrum of sunlight (Singh 2013; Motahhir et al. 2015). And under the standard test conditions (STC), characteristics of the PV panel are provided by the manufacturers

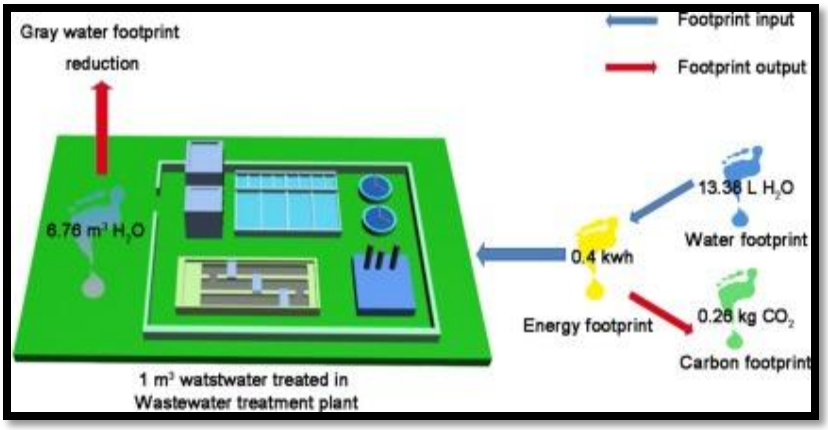
S BETHALA
19RH5A0201

AN EXPERIMENTAL STUDY ON EFFECT OF DUST ON POWER LOSS IN SOLAR PHOTOVOLTAIC MODULE

In today's era of globalization, every work done has a hidden outcome of itself. The change in climate is one of the toughest challenges faced by today's world. The production of electricity is the main cause for industrial pollution which is not only causing threats to the environment but also affecting the amount of limited traditional energy sources, e.g., coal, petrol and diesel etc. This has led to the search of some alternative energy sources, called as renewable energy sources, e.g., solar and wind. Renewable sources are natural sources that can be replenished over a period of time, and the energy that comes from these sources is called as renewable energy (RE).There are different forms of RE such as solar, wind, biofuel, geothermal and tides. RE supports in the power consumption 16% globally. Out of 16%, biomass is used 10%, hydroelectricity is used 3.4% and other 3% is from newer forms of RE such as modern biomass, geothermal, solar, wind and biofuels. RE has many advantages; some of them are: (1) inexhaustible, (2) clean, i.e., eco-friendly in nature, (3) deployed mostly everywhere and without the expensive power lines, (4) require less maintenance than non RE source.PV cells convert sunlight into electricity by an energy conversion process. In most of the cases of PV cells, photons (light energy) falls on the cells that results in exciting electrons in the atoms of a semiconductor material. Silicon is the main element for making PV systems.

Y . SHILPHA
18RH1A0260

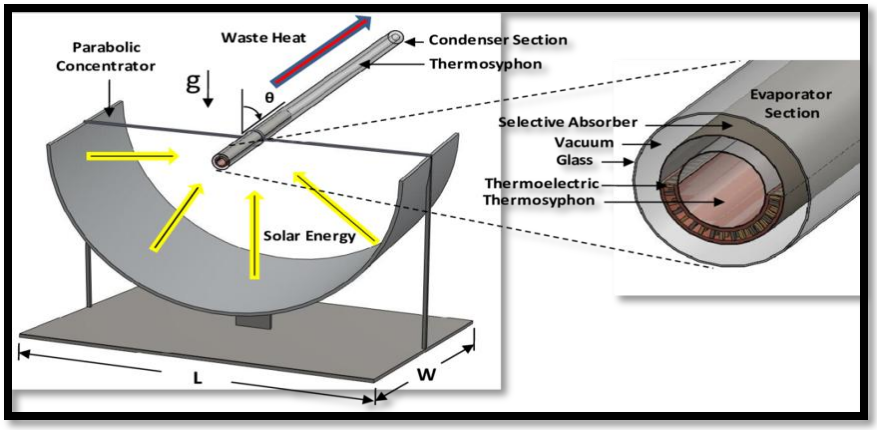
IMPROVING THE CARBON FOOTPRINT OF WATER TREATMENT WITH RENEWABLE ENERGY



A life cycle assessment (LCA) was carried out on three separate drinking water production options—a groundwater treatment plant (GWTP), surface water treatment plant and seawater desalination plant (electro dialysis) in order to calculate the carbon footprint associated with each process and to identify the areas of production with high levels of GHG emissions in order to develop strategies for reducing their carbon footprint. The results obtained from the LCA show that the highest GHG emissions are from the seawater desalination plant via electro dialysis (ED) where the GHG emissions were 2.46 kg CO2 equivalent (eq). By comparison, the GWTP has the lowest carbon footprint emitting some 0.38 kg CO2 eq for water delivery to households. The GHG emission contribution of electricity generation for the GWTP, surface water treatment plant and seawater ED plants was 95, 82 and 98 %, respectively. Furthermore, the GHG emissions associated with this production process can be further reduced by including renewable energy power generation in its operations. The demand for electricity and chemicals for operating these treatment plants will increase to meet the future water demand. Consequently, GHG emissions associated with increased energy and chemical consumption will increase due to increase in the water treatment capacities of these plants. It is therefore important to use an environmental management tool that will allow identifying environmental mitigation opportunities in the water treatment process. Life cycle assessment has widely been used to assess GHG emissions and other associated environmental impacts for water supply and wastewater treatment options in Australia and elsewhere in the world.

P. SHRAMALA
19RH1A0245

A HYBRID TEG/EVACUATED TUBE SOLAR COLLECTORS FOR ELECTRIC POWER GENERATION AND SPACE HEATING



Electrical energy is the most fascinating form of energy resulting from the flow of electric charge and can be used easily in various applications and needs, especially for residential, commercial, and industrial applications. Electrical energy can be produced from various sources, either renewable or non-renewable. The main problem facing energy in general is the storage of energy. Heating consumes approximately one-third of the electrical energy used in residential applications. Thermoelectric generators (TEGs) are thought of as direct, small solid-state energy conversion devices that can be used to directly convert waste heat into electricity as a heat recovery system. The See beck effect is the basis of the electricity generated from the TEGs. When a heat flux passes through a junction of two completely different conductors or semiconductors, an electrical current will be generated. The See beck coefficient is defined as the voltage generated per 1 K difference in temperature. Ignoring the hydraulics-thermal behavior associated, one-dimensional heat conduction theory is used to analyze the performance of TEGs when installed on a heat exchanger, especially in solar cell/module applications.

E. SANJANA
19RH5A0201

IMPORTANT WEBSITES

www.ieee.org/india

www.engineering.careers360

www.technologyreview.com

www.mathworks.in/products/matlab/

www.microwaves101.com/

www.eee.utoronto.ca/student-life-links

https://www.eee.org/

Science Commons.org

MathGV.com:

http://www.engineeringchallenges.org/

http://engineering.stanford.edu/announcement/stanford-announces-16-online-courses-fall-quart

http://www.tryengineering.org/

http://www.engineergirl.org/

http://www.discoverengineering.org/

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