NATIONAL ENGINEERING COLLEGE

(AN AUTONOMOUS INSTITUTION)

K.R.NAGAR,KOVILPATTI-628503.

EEE NEWSLETTER

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Hi Budding Technocrats,

New month; new beginning

New mind-set; new focus

New starts; new intentions

New results

We are so glad to publish the new Volume No. 6 of Issue 4 of our EEE Newsletter. We have now stepped into a new island of knowledge, power and enthusiasm. This month December holds a pride of electrical engineer John Hopkinson's birthday, a British physicist and electrical engineer who worked on the application of electricity and magnetism in devices like the dynamo and electromagnets. Hopkinson's law (the magnetic equivalent of Ohm's law) bears his name.

Leaders are not born and they are made.

So we budding engineers let's start the month with a spirit and goal that we become leaders and masters of electrical engineering.

By

S. Gopinath

Final Year EEE

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STAFF ACTIVITIES/PUBLICATIONS/ACHIEVEMENTS

STAFF ACTIVITIES

S.No.	Name of the Staff	Events/Guest Lecture	Topic/Event	Date	College/ Industry
1.	Mr.R.Muniraj, Assistant Professor(SG)/EEE	Workshop	Control Systems Engineering Theory and Lab with MATLAB/SIMULINK	18.12.2018 – 21.12.2018	Department of Avionics, Indian Institute of Space Science and Technology
2.	Mr.N.Sankar, Assistant Prfoessor/EEE	TEQIP – III Sponsored Short term course	Recent Trends in Electric Vehicles	06.12.2018 – 08.12.2018	Thiagarajar College of Engineering, Madurai
3.	Mr.M.Bakrutheen, Assistant Professor/EEE	Workshop	Electrical Safety Testing	20.12.2018 – 22.12.2018	Mepco Schlenk engineering college, Sivakasi
4.	Mr.M.Sivapalanirajan, Assistant Professor/EEE	Workshop	Artificial Intelligence and Deep Learning	28.12.2018 – 30.12.2018	National Engineering College, Kovilpatti
5.	Ms.G.Shunmugalakshmi, Assistant Professor/EEE	Industry Know How		24.12.2018 – 29.12.2018	Padmavahini Transformers Pvt. Ltd., Coimabtore
6.	Dr.G.Kannayeram & Dr.S.Senthil Kumar, AP(SG)/EEE	Industry Know How		30.11.2018 – 04.12.2018	OPG Power Generation Pvt. Ltd., Chennai
7.	Mr.B.Venkatasamy, Assistant Professor/EEE	Workshop	Issues and Challenges in On-Grid Solar PV System	21.12.2018 & 22.12.2018	Mepco Schlenk engineering college, Sivakasi
8.	Mr.F.Antony Jeffry Vaz, Assistant Professor/EEE	Quality Improvement Programme (QIP)	Internet of Things	03.12.2018 - 07.12.2018	National Institute of Technical Teachers Training and Research, Chennai
9.	Mr.M.Gengaraj, AP/EEE	Coursera	Introduction to Power Electronics	University of Colorado	
10.	Mr.M.Sivapalanirajan, Assistant Professor/EEE		Modern Robotics, Course 1: Foundations of Robot Motion	Northwestern University	

STAFF PUBLICATIONS

- ✓ Piraisoodi T, **M. Willjuice Iruthayarajan**, Kappuva MAK, "***Multi-objective robust fuzzy fractional order proportional–integral–derivative controller design for nonlinear hydraulic turbine governing system using evolutionary computation techniques***", Expert Systems, 2018; e12366. https://doi.org/10.1111/exsy.12366. Impact Factor 1.43.

- ✓ **M.Gengaraj, Dr.L. Kalaivani**, K. Cherma Jeya, P. Eswari Prabha, A.M.Kirthika, M.Vavuniya, "***An investigation on Torque Ripple minimization of Switched Reluctance Motor using Different Power Converter Topologies using Intelligent Techniques***", International Conference on Artificial Intelligence, Smart Grid and Smart City Applications, AISGSC 2019, PSG College of Technology, Coimbatore – Accepted for Publication in Springer International Publishing, USA (Scopus Indexed).

- ✓ **K.Kumar, B.Vigneshwaran,** Vishnu Priya K and Sreevidya ChidambaraVadivoo.T, "***Prediction of flashover voltage on 11kV Composite Insulator using Kernel Support Vector Machine***", 8th International Conference on Soft Computing for Problem Solving, SocPros-2018, VIT University, Vellore, Accepted for Publication in special issue on "Evolutionary Intelligence".

STAFF ACHIEVEMENTS

Dr.G.Kannayeram, **AP(SG)/EEE** have been act as a Adjudicator in the Science Exhibition'18 held at M.M Vidyashram CBSE school, Kovilpatti on 24-11-2018.

R & D ACTIVITIES

1. **Dr. K. Agnes Prema Mary** was completed her **Doctorate in "*Studies on Induction Motor Roller Bearing Fault Analysis using Soft Computing Techniques*",** on 04.01.2019 under the supervision of **Dr.P.Subburaj, Professor/EEE and Dr.R.V.Maheswari, Professor/EEE.**

2. **Dr.A.Karthick** was completed his **Doctorate in** "***Electrical and Thermal Performance Analysis of Building Integrated Photovoltaic Window for Residential Building***" on 14.12.2018 under the joint supervision of **Dr.L.Kalaivani, Professor/EEE.**

DEPARTMENT ACTIVITIES

SPECIAL INTEREST GROUP

POWER AND ENERGY ENGINEERING

The Session was handled by ***Dr. G.Kannayeram Assistant Professor (Sr.G) /EEE*** on 15.12.2018. Importance of Conventional Power Grid and Smart grid were discussed. Basic introduction about Smart grid and its operation is explained.

The topics in the session covers,

Session-I(10.15 AM – 11.30PM)

- Basic working principle of Conventional Power Grid
- Major short comings of power grid in current power scenario
- Importance of Smart Grid and its advantages
- Applications of Smart Grid in self healing and Peak load management issues
- Distribution automation and Energy management system applications
- Comparing Smart Grid with Conventional power grid.

Totally 21 students from third year were attended the SIG class. They got relevant information about Smar grid and its applications.

CONTROL AND INSTRUMENTATION

EEE Department Control and Instrumentation Special Interest Group (SIG) conducted a Hands on Training on the topic "***Tuning of PID Controller Using SISO Toolbox***" on 29th December 2018 in the EEE department, Control and Instrumentation Laboratory. The resource person for the program was ***Ms.E.Anitha AP/EEE***. She gave a brief introduction about the function of SISO Toolbox. Each Student was provided with individual second order transfer function. Students were given hands on training with the ToolBox.

The students calculated the Kp, Ki and Kd values for the PID Controller using Pole placement in SISO tool box. They viewed the linear response analysis of the given system for all the damping cases. MATLAB software was provided for the students to simulate the system. They simulated the system model with their designed PID Controller in SIMULINK/MATLAB. They analyzed the given system in open loop and closed loop by simulating the system without controller and with tuned controller respectively. They were taught to employ the SISO Toolbox to tune PID Controller for any given transfer function of the system.

10 number of prefinal year students of EEE attended the training for updating the knowledge in Controller Tuning. The training was concluded with the discussion of students and the resource person.

HIGH VOLTAGE ENGINEERING

A session on "***Design and Selection of Insulators for High Voltage transmission system***" was conducted on 15.12.2018 by ***Ms. A.M. Diffni Gomez, AP/EEE*** at Seminar Hall/EEE for Special Interested Group (SIG) members.

The objectives of the sessions were:

- To give idea on the design criteria and selection of voltage transmission insulators under polluted conditions
- To impart effect of pollution sources and its influence in pollution flashover phenomenon
- To provide fundamentals, evaluation methods and mitigation techniques for high voltage insulators

Session 1 (10.00AM -10.45 AM)

Ms.A.M. Diffni Gomez AP/EEE gave a brief introduction on the following topics

- Function of Insulator and its types
- Design Criteria – Basic Definitions
- Importance of Pollution Problem
- Pollution Flashover Phenomenon
- Evaluation of Pollution by ESDD and NSDD measurements
- Methods to combat pollution problems
- Advantages of polymeric insulators over ceramic insulators

Totally, 21 students from third year participated and got the relevant information.

EMBEDDED SYSTEMS

A session on "***Hands on Training in Proteus Software***" was handled by ***Mrs.K.Gowthami, AP/EEE***, on 29.12.2018. The objectives of the session are:

- Introduction to PROTEUS and ARDUINO
- How to use PROTEUS and ARDUINO software
- How to get hex file from ARDUINO
- The following exercises were carried out during the session,
  - ✓ LED Interfacing
  - ✓ LCD Interfacing
  - ✓ Sensor Interfacing
  - ✓ Relay Interfacing
  - ✓ Simple application project

The session was started by 11.30 AM and completed by 1.00 PM. Totally 12 students from third year were participated and trained to design an application in PROTEUS using ARDUINO.

POWER & ENERGY ENGINEERING

The objectives of the session are:

- To give an outline about recent optimization methods used in power systems.
- To get an idea about particle swarm optimization.
- To understand the particle swarm optimization program in MATLAB.

The Sessions were handled by ***Ms. S. Balakiruthiha, Assistant professor/EEE***. Totally 12 students from third year were participated.

Session (11.15AM – 12.30PM)

A general introduction about particle swarm optimization was done in the Session I. The topics in the session covers,

- Basic outline of recent optimization methods in power system.
- Idea of particle swarm optimization and its mathematical modeling.
- Problem Solving methods using particle swarm optimization.

EMBEDDED SYSTEM

A seminar on "***Python Programming for Raspberry Pi***" was conducted on 29.12.2018 by **Mr. F.Antony Jeffrey Vaz, Assistant Professor / EEE** at Class Room H3 for Special Interest Group (SIG) members.

The objectives of the session were:

- To discuss about the importance of python programming.
- Make use of the library files available in python.
- To utilize the opens source websites for getting scrap code for project development.
- Introduction to Raspberry Pi 3.
- .Discussed about the features supported in Pi and uses in IoT development.

The Session started with the brainstorming about the use of python and its progress over the years to achieve the today N number of free open source library packages. Then the need for electrical engineer to know about the python code, Discussed about the basic syntax such as decision making, branching and many other useful operation and functions in python language. Introduction was made for the raspberry pi3 and its uses were clearly explained and motivated the student to use Raspberry Pi for their project work. The session was ended with the discussion of Research areas and Challenges in Embedded IoT.

The session was started by 10.30 AM and completed by 11.45AM. Totally 30 students from third year and second year participated in the SIG.

POWER ELECTRONICS & DRIVES

A seminar on "***Electric and Hybrid Vehicles***" was conducted on 29.12.2018 by ***Mr. Sankar N, Assistant Professor /EEE*** at Class Room H5 for Special Interest Group (SIG) members.

The objectives of the session were:

- To discuss the steps taken in Conventional Vehicles to achieve the Fuel Economy.
- To discuss the need for Electric and Hybrid Vehicles.
- To discuss the different types of Hybrid Vehicles, its Components and Configurations.

The Session started with the brainstorming about the Conventional vehicles and its progress over the years to achieve the fuel economy. Then the need for Electric and Hybrid Vehicles and the policies planned by Indian Government were discussed. With the overview of History of Electric vehicles, discussed about the components, different types of configurations of Hybrid Electric vehicles. The session was ended with the discussion of Research areas and Challenges faced by the Electric Vehicle Industries.

The session was started by 11.30 AM and completed by 12.40PM. Totally 14students from third year were participated.

HIGH VOLTAGE ENGINEERING

SIG-high voltage engineering was conducted on 28.12.2018 in lecture hall 3. The session was handled by ***Mr.K.Kumar AP/EEE*** by 11.15AM on the topic **"Application of nanotechnology in development of High Voltage Insulation".** Initially he explained that the need for insulation in high voltage equipments such as electrical insulation, mechanical support, withstand team stress etc. Then he pointed out the high voltage polymeric insulation systems and its usage in Rotating machines, HV capacitors, Gas Insulated Substations, high voltage cables, HV insulators etc. Followed by that he briefly explained the types and classification of polymers as follows.

Polymer Types:

- Thermosets and
- Thermoplastics

Polymer Classification:

- Natural and synthetic polymer
- Organic and inorganic polymers

Crystalline and amorphous polymers. Then he explained the common polymers used electrical insulation applications

Followed by that he pointed out the Epoxy Nano composite Preparation methodology:

Step 1: Material preconditioning
Step 2: High Shear mechanical Mixing
Step 3: Ultrasonic Agitation
Step 4: Hardener Addition
Step 5: Curing
Step 6: Post conditioning of prepared samples.

Finally he showed the video demonstration on preparation of polymer insulators and nano composite polymeric material preparation to the students.

POWER ELECTRONICS

A session on "**HARMONIC ANALYSIS**" was conducted on 15.02.2018 by ***Ms. E.Joe Priscilla AP/EEE*** from 10:00 – 11:15 am for power electronics special interested group (SIG) members. The objective of the session was

- To analyze the symmetry of output waveforms of different converters and the associated harmonics present in them.
- To analyze the performance parameters of inverters using Fourier series.
- To calculate harmonic content in output waveforms of inverters.

An introduction to harmonics and waveform analysis and performance parameters of inverters was discussed. The need for harmonic analysis and the ways to mitigate it was also discussed. Totally 23 students from third year attended the session.

PLACEMENT DETAILS

On behalf of the Chairman, Managing Director, Director, Principal, Head of the Department and staff members, we heartily congratulates the final year students who got placed in the Campus drive in our/off campus during the month of December 2018.

- **Total No. of Students Placed: 14**

A.AASHA

I.JEBISHA GNANADEEPAM

A.JOTHI MEENA

N.RISHIKA

R.PAVITRA

T.SREEVIDYA CHIDAMBARA VADIVOO

S.GOPINATH




G.AJAY KRISHNAN **M.BALA KRISHNAN** **A.KALIRAJAN** **P.KANNAN**

J.SANKARI




C.V.SURYAKUMAR **S. ABISHEK** **N. PRASANNA VENKETESHAN** **K.RAJ KAMAL**

APTITUDE CORNER

1. A fruit seller sells 40% apples and still has 420 apples. Originally, he had
   Ans: 700 apples
2. Find the greatest number that will divide 43, 91 and 183 so as to leave the same remainder in each case. **Ans: 4**
3. The cost price of 20 articles is the same as the selling price of *x* articles. If the profit is 25%, then the value of *x* is **Ans: 16**
4. The average weight of 8 person's increases by 2.5 kg when a new person comes in place of one of them weighing 65 kg. What might be the weight of the new person? **Ans: 85 Kg**
5. The price of 10 chairs is equal to that of 4 tables. The price of 15 chairs and 2 tables together is Rs. 4000. The total price of 12 chairs and 3 tables is Ans: 3900
6. The ratio between the perimeter and the breadth of a rectangle is 5 : 1. If the area of the rectangle is 216 sq. cm, what is the length of the rectangle? **Ans: 18 cm**
7. In a group of 6 boys and 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there? **Ans: 209**
8. The sum of ages of 5 children born at the intervals of 3 years each is 50 years. What is the age of the youngest child? **Ans: 4 years**
9. The sum of the squares of three numbers is 138, while the sum of their products taken two at a time is 131. Their sum is **Ans: 20**
10. When 0.232323..... is converted into a fraction, then the result is Ans: 23/99
11. The square root of (7 + 35) (7 - 35) **Ans: 2**
12. Two numbers are respectively 20% and 50% more than a third number. The ratio of the two numbers is **Ans: 4:5**
13. In a mixture 60 litres, the ratio of milk and water 2 : 1. If this ratio is to be 1 : 2, then the quanity of water to be further added is **Ans: 60litres**
14. On 8th Feb, 2005 it was Tuesday. What was the day of the week on 8th Feb, 2004?
    Ans: Sunday
15. A is thrice as good as workman as B and therefore is able to finish a job in 60 days less than B. Working together, they can do it in **Ans: 22.5 days**

TIME TO KNOW OUR ALUMNI

GANESH KUMAR

Batch : 1997 - 2001

Director, Automotive Business Development at Tata Elxsi

Bengaluru, Karnataka, India

EDUCATION:

2007 – 2008	Indian Institute of Management, Calcutta
1997 – 2001	B.E , National Engineering College, Kovilpatti

WORKING EXPERIENCE:

2014 – Present	Director, Automotive Business Unit Sales	Tata Elxsi
2014 – 2014	Director, Sales & Business Development	Wafer Space
2010 – 2013	Portfolio Manager - Chip design services	Sasken
2008 – 2010	Senior Member Technical Staff	Transwitch
2006 – 2008	Lead Engineer	Sasken
2004 – 2006	Design Engineer	Freescale Semiconductor
2003 – 2004	Design Engineer & PGD	Bitmapper Tech.
2001 – 2003	Project Engineer	NCR based Hydro Electric Co

STUDENT ARTICLES

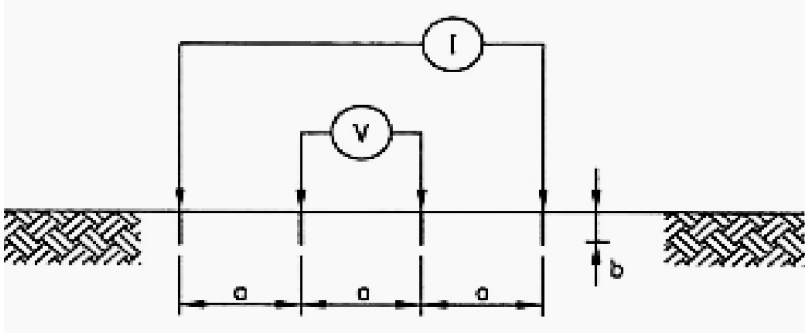
WENNER'S FOUR-PIN METHOD

The design of grounding system begins; soil resistivity measurements need to be taken at the substation. Stations with uniform resistivity throughout the entire area are rarely found. Thus, measurements should be made at multiple locations within the site

It can also be a useful measure in agriculture as a proxy measurement for moisture content.

The Wenner's four-pin method is the most common. This method is also called the Equally-Spaced Four-Pin method.

In this technique, four probes are driven into the ground in a straight line to a depth b, at equal distances a apart. The voltage between the two inner probes is measured and is divided by the current of the two outer probes. This gives a value of the mutual resistance R. The Wenner's four-pin method



The resistivity measurement records should include temperature data and information on the soil moisture conditions at the time that the measurements were done. Also record all data available on any buried conductors all ready known or suspected. Buried conductors in contact with the soil can invalidate readings if they are close enough by altering the test current flow pattern.

The Wenner four-pin method is popular for a number of reasons. This method obtains soil resistivity data for deeper layers without having to drive the test pins to those layers. Also, no heavy equipment is needed.

The results are not greatly affected by the resistance of the test pins or the holes created by driving the test pins into the soil. A shortcoming of the Wenner method is that the magnitude of the potential between the two inner electrodes rapidly decreases when their spacing is increased to large values. And often time commercial instruments cannot measure such low potential values.

- ***Arumugaraj, III - EEE***

AUTOMATED SOLAR STREET LIGHTING SYSTEM

Solar energy is rapidly gaining notoriety as an important means of expanding renewable energy resources. As such, it is vital that those in engineering fields understand the technologies associated with this area. Its energy is both clean and free of cost. So maximizing the use of solar energy help to take the load off from fossil fuels like petrol, diesel, etc. and limit the emission of carbon dioxide hence preventing the pollution. The solar powered street light work on the principle of solar cells or PV cells to absorb the solar energy in the daytime. The PV cells convert solar energy to the electrical energy. The converted energy is stored in the battery and the solar street lights use solar energy.

LED is usually used as lighting source of modern solar street light, as the LED will provide much higher Lumens with lower energy consumption. The energy consumption of LED fixture is at least 50% lower than HPS fixture which is widely used as lighting source in Traditional street lights. Battery will store the electricity from solar panel during the day and provide energy to the fixture during night. The life cycle of the battery is very important to the lifetime of the light and the capacity of the battery will affect the backup days of the lights. Strong Poles are necessary to all street lights, especially to solar street lights as there are often components mounted on the top of the pole: fixtures, panels and sometimes batteries. However, in some newer designs, the PV panels and all electronics are integrated in the pole itself. Wind resistance is also a factor. Nowadays solar street lights are available beside the roads. At the night time the lamps start automatically and it uses the electrical energy which is stored in the battery. Every day this process continues.

The system will include the design and construction of an Arduino-based solar panel tracking system to control the auto intensity of the street lights systems. Solar tracking allows more energy to be produced because the solar array is able to remain aligned to the sun and therefore it will provide the maximum output power used in lightning the street lights at night. This is also designed to detect vehicle movement on highways to switch ON only a block of street lights ahead of it (vehicle), And to switch OFF the trailing lights to save energy. During night all the lights on the highway remain ON for the vehicles, but lots of energy is wasted when there is no vehicle movement. This proposed system provides a solution for energy saving. This is achieved by sensing an approaching vehicle and then switches ON a block of street lights ahead of the vehicle. As the vehicle passes by, the trailing lights switch OFF automatically. Thus, we save a lot of energy. So when there are no vehicles on the highway, then all the lights remain OFF. Older models included lamps that were not fluorescent or LED. Solar lights installed in windy regions are generally equipped with flat panels to better cope with the winds. Latest designs use wireless technology and fuzzy control theory for battery management. The street lights using this technology can operate as a network with each light having the capability of performing on or off the network.

-R.Niferlin, II - EEE

HOLLOW FLASHLIGHT

Ann Makosinski is a 16-year-old student who invented a battery-free flashlight. It is a free energy device that is powered by the heat in your hand. While visiting the Philippines, Ann found that many students couldn't study at home because they didn't have electricity for lighting. Unfortunately, this is a common problem for developing regions where people don't have access to power grids or can't afford the cost of electricity. Ann recalled reading how the human body had enough energy to power a 100-watt light bulb. This inspired her to think of how she could convert body heat directly into electricity to power a flashlight. She knew that heated conductive material causes electrons to spread outwards and that cold conductive material causes electrons to condense inwards. So, if a ceramic tile is heated, and it's pressed against a ceramic tile that is cool, then electrons will move from the hot tile towards the cool tile producing a current. This phenomena is known as the thermoelectric effect. Ann started using ceramic tiles placed on top of each other with a conductive circuit between them (known as Peltier tiles) to create the amount of electricity she needed for her flashlight. Her idea was to design her flashlight so that when it was gripped in your hand, your palm would come in contact with the topside of the tiles and start heating them. To ensure the underside of the tiles would be cooler, she had the tiles mounted into a cut-out area of a hollow aluminum tube.

This meant that air in the tube would keep the underside of her tiles cooler than the heated topside of the tiles. This would then generate a current from the hot side to the cold side so that light emitting diodes (LEDS) connected to the tiles would light-up. But although the tiles generated the necessary wattage (5.7 milliwatts), Ann discovered that the voltage wasn't enough. So she added a transformer to boost the voltage to 5V, which was more than enough to make her flashlight work.Ann successfully created the first flashlight that didn't use batteries, toxic chemicals, kinetic or solar energy, and that always works when you picked it up. She told judges at the Google competition that her first toy was a box of transistors. Time Magazine listed Ann as one of the 30 people under 30 who are changing the world. She is working on bringing her flashlight to market and is also developing a headlamp based on the same technology

– ***B. Pandeeswari, II EEE - B***

TRANSPARENT SMARTPHONE

Polytron, a Taiwan based company has created a phone that is fully transparent and only the circuit board, memory card and camera unit is visible. It is a touchscreen phone that has a fully functional SIM tray, SD card slot, microphone and camera. The company, Polytron Technologies, has already begun marketing a transparent multi-touch phone. Its prototype uses a 'Switchable Glass' technology that is a conductive Organic light - emitting diode (OLED) using liquid crystal molecule to display images. One of the ways to develop transparent display is to coat two pieces of glass with transparent but conductive material like indium tin oxide (ITO), and sandwich a gel of polarizable molecules between them. When an electric field is applied, the liquid crystal changes its alignment and becomes transparent or nontransparent, depending on the materials used. The display is not the problem for the Polytron phone which sports an OLED-based liquid crystal device

The technology being used in the phone is called Polyvision Privacy Glass. It allows a device to turn transparent when an electric current is passed through it. They've also used microscopic wires that have been fed directly into the glass that make it barely visible to the naked eye. When the phone is in off mode, the molecules align to form a milky composition, but when switched on they re-align to form text, icons, and other images. The device still contains some parts that are not transparent, including a SD card and SIM card. The microphone, camera, and batteries are also visible, and will be hidden behind a dark glass cover when the model goes into production. Part of the power of having control over transparent Smartphone is that, not only can you block light, but you can control the properties of the light that you might let pass through it. Transparent lithium-ion batteries have previously been developed based on PDMS. PDMS is a favorite polymer material often used in the life sciences to build transparent micro fluidic sensors and Polytron plans to incorporate these kinds of batteries in future versions of the phone. They will also start using transparent speakers and touch screens on both sides of the final product..

- Pavithra . S , II- EEE

TECHNICAL ARTICLE – STAFF MEMBERS

Ms. N. Sankar, M.E.,
Assistant Professor
Electrical and Electronics Engineering

THE ALTERNATIVE ENERGY SOURCES OF THE FUTURE

In the future, civilization will be forced to research and develop alternative energy sources. Our current rate of fossil fuel usage will lead to an energy crisis this century. In order to survive the energy crisis many companies in the energy industry are inventing new ways to extract energy from renewable sources. While the rate of development is slow, mainstream awareness and government pressures are growing. This article gives insight about some of the future of energy technologies using Solar

1. Harvesting Solar Energy from Space

Country: Japan
Agency: JAXA and SSPS

Space solar poweris unlimited, available 24 hours a day, and expected to last for another four billion or more years. The potential of generating electrical energy from space is so huge that it can provide continuous base load power and meet future global energy requirements.

How it Works?A typical setup will involve building a solar-based power station in space and a ground receiver on the Earth's surface. The solar panels will generate the electrical energy, convert it into microwaves or a laser beam, and wirelessly transmit the energy to a ground receiver. The ground receiver will then convert the received energy into electricity.

Solar Power Satellites consisting of solar panels and large mirrors that will direct the sunlight to the panels. This satellite will be placed in geostationary orbit—about 38,500 kilometers above the Earth. The advantages of geostationary orbit are (1)The solar panels on the satellite will be illuminated throughout the year (2)The amount of sunshine is about five times more than what would be available in terrestrial locations (3)The satellite will have the same rotational period as the Earth and therefore be fixed over one latitude, enabling the ability to more consistently deliver power to the ground receiving site.

The satellite, equipped with a transmitter, will convert the DC energy into either microwaves or a laser beam and transmit this to the Earth in a safe and controlled manner.

2. TULIP Shaped Solar Plants

Country: Ethiopia
Agency: AORA Solar

Ethiopia, on a mission to become carbon neutral by 2025, recently enlisted the help of giant solar tulips to reach its eco-friendly goal.The country partnered with AORA Solar, clean tech company and developer of a modular solar-hybrid systems, to develop a flower power plant.

Each plant consists of a tower surrounded by a field of mirrors designed to track the sun. The mirrors reflect the sun's rays up onto the tower's "bulb." As intense sunlight heats the air inside the bulb to extremely high temperatures, water stored there boils and the steam is used to turn a turbine generator. Even when sunlight isn't available, the tulip's turbine can operate on alternative fuel, such as natural gas, producing uninterrupted utility grade power to help maintain stability in the grid.Each plant has an output capacity of 100 kilowatts-equivalent, which is enough to power roughly 60 to 80 homes

3. Spherical Sun Power Generator

Country: Germany
Agency: Rawlemon

The spherical power generator can harness sun ray during early mornings, overcast days and late evenings. Above all, it can harness moonlight something not available in traditional panels.

The generator is equipped with a special collector that enables it to absorb thermal energy and convert it to power. It is also installed with a crystal globe that concentrates diffused sun rays onto a photocell. The photocell is very sensitive and hyper-efficient enabling it to harness modest sunrays.

The exterior shape of the beta.ray turns it into a natural optical tracking device. This attribute makes it applicable to a large surface for instance walls and inclined surfaces. It is, therefore, considered as the most versatile product of the solar industry where it can be used to power hybrid cars and light up buildings.

4. 3D Printed Solare Energy Tree

Country: Finland
Agency: VTT Technical Research Centre

The tree's leaves are actually flexible organic solar cells, printed using well established mass-production techniques. Each leaf has a separate power converter, creating a multi converter system that makes it possible to collect energy from a variety of sources like solar, wind and heat temperature. The more solar panels there are in a tree, the more energy it can harvest. The trunks are 3d printed using wood-based bio composites. They are mass producible and can be infinitely replicated.

EDITORIAL BOARD