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INSPIRATIONAL SCRIPTS, PERSONALITIES AND INNOVATIVE RESEARCHES OF EEE

VOLUME 1 - ISSUE 1 - APRIL 2013

A JOURNAL WHERE THE WORLD MEETS REAL ENGINEERS

K.L.N. COLLEGE OF ENGINEERING

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An ISO 9001 : 2008 Certified Institution

Pottapalayam - 630 011, Sivagangai Dt., Tamilnadu

# SYNOPSIS

## MESSAGE FROM THE HEAD OF DEPARTMENT

**Dr. S.M. Kannan**

**HOD/EEE,**

**K.L.N College of Engineering**

### MESSAGE

Sharing of information is very essential for everyone to update one's skills. Floods of information are available everywhere. Selecting the information suitable for one's profession is difficult. For any technical professional or student, such information is available in various media, such as Internet, Journals, Magazines and Newspapers. These informations are provided by people who are experts in the field. This magazine is an opportunity for exhibiting such talents in our departments, to expose them for the betterment of others. It is an opportunity to every individual, good or average in studies, to exhibit one's own skills. Students should make use of such opportunity to submit relevant materials, suitable to their branch of study. Not only technical part but general information can also be discussed. I'm expecting more in the next issue. Definitely I will present one such article very soon.

I congratulate the editorial board member, particularly Mr. S.P. Rajaram, AP2, EEE, for bringing out the first issue with amazing facts and findings. I also congratulate those students who have shown their interest in this. Hope, we will discuss more in the next issue.

My Advice: Take curd rice, onion, idly for your breakfast/lunch/dinner during the month of April/May/June to avoid any health problem.

Best wishes to all

**(Dr. S.M. Kannan)**

**Head of Department**

**EEE**

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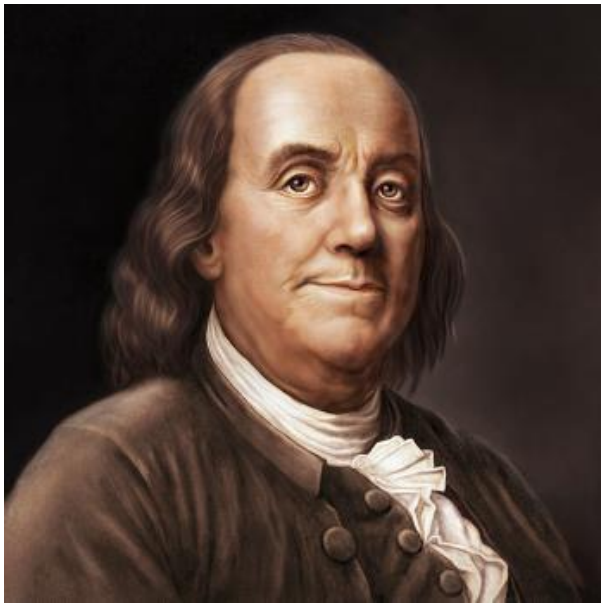
# CHAPTER 1

# PILLARS OF ELECTRICAL ENGINEERING

# BEN'S BIG IDEA



"Aw, Go Fly a Kite!"

Benjamin Franklin's wildly dangerous kite experiment has grown into an American legend. Almost everyone has heard of Franklin flying a kite with a key in an electrical storm, but few of us actually understand how the experiment works. Ben hypothesized that lightning is an electrical phenomenon and that the electrical effect of lightning might be transferable to another object and cause an effect that could be recognized as electricity. He set out to prove it in an experiment.

In 1752, on a dark June afternoon in Philadelphia, the 46 year-old Ben Franklin decided to fly a kite. With the help of his son, William, they attached his kite to a silk string, tying an iron key at the other end. Next, they tied a thin metal wire from the key and inserted the wire into a Leyden jar, a container for storing an electrical charge. Finally, as the sky darkened and a thunderstorm approached, they attached a silk ribbon to the key. Holding onto the kite by the silk ribbon, Ben flew the kite and once it was aloft, he retreated into a barn so that he would not get wet. The thunder storm cloud passed over Franklin's kite, whereupon the negative charges in the cloud passed onto his kite, down the wet silk string, to the key, and into the jar. Ben however, was unaffected by the negative charges because he was holding the dry silk ribbon, insulating him from the charges on the key. When he moved his free hand near the iron key, he received a shock. Why? Because the negative charges in the key were so strongly attracted to the positive charges in his body, a spark jumped from the key to his hand. Franklin's experiment successfully showed that lightning was static electricity. You can experience this same reaction when you shuffle your feet on a carpet and reach for a metal doorknob.


Franklin was actually lucky to have survived, for after this famous incident, several other would-be-scientists who performed this same kite experiment were electrocuted.

Realizing that this form of electricity could be charged over a conductor and into the ground, he invented the lightning rod and conductor, providing the lightning an alternative path to the earth. Later in his life, lightning struck his own house, but his lightning rod saved it from burning.

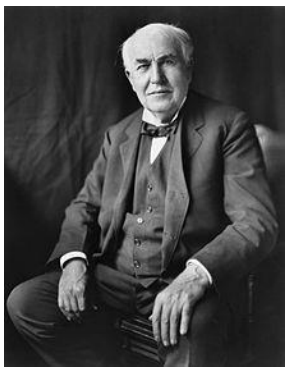
REFERENCE:

http://www.codecheck.com/cc/BenAndTheKite.html

**THOMAS EDISON**

**N.E.GANGA (120218)**
**M.E/PSE – I Year**

Edison patented 1,093 inventions in his lifetime, earning him the nickname ***"The Wizard of Menlo Park."*** The most famous of his inventions was an incandescent light bulb. Besides the light bulb, Edison developed the phonograph and the kinetoscope, a small box for viewing moving films. He also improved upon the original design of the stock ticker, the telegraph, and Alexander Graham Bell's telephone. Edison was quoted as saying, "Genius is one percent inspiration and 99 percent perspiration."



**Early life**

Thomas Edison was born in Milan, Ohio, and grew up in Port Huron, Michigan. He was the seventh and last child of Samuel Ogden Edison, Jr. (1804–96, born in Marshalltown, Nova Scotia, Canada) and Nancy Matthews Elliott (1810–1871, born in Chenango County, New York). His father had to escape from Canada because he took part in the unsuccessful Mackenzie Rebellion of 1837 Edison reported being of Dutch ancestry.

In school, the young Edison's mind often wandered, and his teacher, the Reverend Engle, was overheard calling him "addled". This ended Edison's three months of official schooling. Edison recalled later, "My mother was the making of me. She was so true, so sure of me; and I felt I had something to live for, someone I must not disappoint." His mother taught him at home. Much of his education came from reading R.G. Parker's *School of Natural Philosophy.*

Edison obtained the exclusive right to sell newspapers on the road, and, with the aid of four assistants, he set in type and printed the *Grand Trunk Herald*, which he sold with his other papers. This began Edison's long streak of entrepreneurial ventures, as he discovered his talents as a businessman. These talents eventually led him to found 14 companies, including General Electric, which is still one of the largest publicly traded companies in the world.

**Electric light**


*Fig: Thomas Edison's first successful light bulb model, used in public demonstration at Menlo Park, December 1879*

Edison did not invent the first electric light bulb, but instead invented the first commercially practical incandescent light. Many earlier inventors had previously devised incandescent lamps, including Alessandro Volta's demonstration of a glowing wire in

1800 and inventions by Henry Woodward and Mathew Evans. Others who developed early and commercially impractical incandescent electric lamps included Humphry Davy, and Heinrich Göbel. Some of these early bulbs had such flaws as an extremely short life, high expense to produce, and high electric current drawn, making them difficult to apply on a large scale commercially.

Although the patent described several ways of creating the carbon filament including "cotton and linen thread, wood splints, papers coiled in various ways", it was not until several months after the patent was granted that Edison and his team discovered a carbonized bamboo filament that could last over 1,200 hours.

In 1878, Edison formed the Edison Electric Light Company in New York City with several financiers, including J. P. Morgan and the members of the Vanderbilt family. Edison made the first public demonstration of his incandescent light bulb on December 31, 1879, in Menlo Park. It was during this time that he said: "We will make electricity so cheap that only the rich will burn candles.

Mahen Theatre in Brno (in what is now the Czech Republic) was the first public building in the world to use Edison's electric lamps, with the installation supervised by Edison's assistant in the invention of the lamp, Francis Jehl. In September 2010, a sculpture of three giant light bulbs was erected in Brno, in front of the theatre.

**Electric power distribution**

Edison patented a system for electricity distribution in 1880, which was essential to capitalize on the invention of the electric lamp. On December 17, 1880, Edison founded the Edison Illuminating Company. The company established the first investor-owned electric utility in 1882 on Pearl Street Station, New York City. It was on September 4, 1882, that Edison switched on his Pearl Street generating station's electrical power distribution system, which provided 110 volts direct current (DC) to 59 customers in lower Manhattan.

Earlier in the year, in January 1882, he had switched on the first steam-generating power station at Holborn Viaduct in London. The DC supply system provided electricity supplies to street lamps and several private dwellings within a short distance of the station. On January 19, 1883, the first standardized incandescent electric lighting system employing overhead wires began service in Roselle, New Jersey.

# WILLIAM GILBERT

**M.John Baptista (102024)**

**B.E/EEE - III Year – A Section**

**FAMOUS AS: Astronomer, Physicist and Physician** **BORN ON: 24 May 1544**

**NATIONALITY: United Kingdom** **DIED ON: 30 November 1603**

William Gilbert, also known as 'Gilberd', was a famous researcher in magnetism. He was famous during the time of Queen Elizabeth I and is best known for his publication, 'De Magnete'. Credited as one of the originators of the term of electricity, **William Gilbert is also known as the father of electricity, magnetism and electrical engineering.** He travelled extensively and wrote many publications such as 'Magnetisque Corporibus' and 'ET de Magno Magnete Tellure' during his lifetime. Apart from being a scientist, Gilbert led a parallel career as an astronomer. He studied the moon's surface without a telescope and concluded that the craters were in fact land, and the white patches on the moon's surface were water bodies. One of his other significant contributions was when he pointed out that the motion of the skies occurred due to the rotation of the earth. One of the first people to try to map the markings of the moon's surface, Gilbert was a celebrated astronomer and scientist. His theories on magnetism and electricity had also been the subject of controversy for many of his successors.

## CHILDHOOD & EARLY LIFE

William Gilbert was born to Jerome Gilbert and his wife on May 24, 1544 in Colchester. Most of the information on Gilbert's childhood has vanished into obscurity, but there are a few vague sources of information about his early life. It is believed that Gilbert was educated at St. John's College at Cambridge, where he developed a passion for science. Following high school, Gilbert earned his MD from the University of Cambridge. From here, he worked for a short while as bursar before leaving Cambridge to practice medicine in London. In 1573, he was elected a Fellow of the College of Physicians and was also elected as the President of the College in 1600, just after his career kick-started.

## Career

The accredited father of the science of electricity, William Gilbert, started his career as a physician practicing medicine in London in 1573. His principal work, 'De Magnete', 'Magnetisque Corporibus' and 'Magno Magnete Tellure' were all written and published in 1600, giving a full account of his research on electrical attractions and magnetic bodies. Much of these works were inspired by his predecessor, Robert Norman. During the years of his astronomical study, Gilbert used a model earth called '**terrella**' to describe most of his experiments and observations.

From one of these experiments, Gilbert concluded that **the earth was** infact **'magnetic' in the core** and this was one of the reasons as to why the pins of compasses pointed towards the north. He refuted the theories of his predecessors wherein they

believed the pole star (North Pole) was a large magnetic island, which is why the arrows pointed towards the north. Gilbert was the first to argue correctly that the center of the Earth, in fact, comprised of iron and there were two distinct hemispheres in the Earth, the north and south poles. Some of his other astronomical works focused on the diurnal rotation of celestial objects. Through some of his observations, Gilbert concluded that the stars were also located at remote variable distances rather than fixed spots in an imaginary sphere.

**William Gilbert also invented the first electrical measuring instrument, the electroscope** and a **pivoted needle**, which he called the '**versorium**'. Like other scientists in his day, he also believed that crystal (quartz) was compressed ice and a solid form of water.

**Gilbert & 'Electricus'**

The word 'electricity' was first coined by Sir Thomas Browne, which he derived from Gilbert's publication in 1600. The term that Gilbert used was 'electricus' which meant 'like amber'. Gilbert studied that the friction with two or more objects released a substance called 'effluvium', which would cause the attraction to return back to the object in the form of an electric charge. What Gilbert did not discover was that this theory was applicable to almost all materials.

**Gilbert's Arguments & Later Life**

William Gilbert argued that magnetism and electricity were entirely two different theories. He proposed that electricity disappeared with heat and not magnetism, even though this theory was proved wrong later. Following Gilbert's death, a couple of scientists argued that both electric and magnetic fields were indeed the same and had common effects. This led to the birth of 'electromagnetism'. The theories of Gilbert's magnetism misled many of his successors such as Kepler, while governing planetary motions and the attraction among other celestial objects. Towards the end of his life, Gilbert was appointed as a physician to Queen Elizabeth I, and upon her death, he was appointed as physician to King James I, shortly before his own death.

**Death & Legacy**

William Gilbert died on November 30, 1603, aged 59, in London. Though there have been various discussions on the causes behind his death, it is often said that Gilbert could have possibly died due to the bubonic plague. Known as the father of the science of 'electricity', Gilbert's works became extremely popular following his death and his unfinished publication, 'De Mundo Nostro Sublunari Philosophia Nova' was also published posthumously. 'The Gilberd School' in Colchester was also named after him.

**WILLIAM GILBERT TIMELINE**

1544:
Was born on 24 May in Colchester

1569:
Gained his MD

1573:
Elected a Fellow of the College of Physicians

1590:
Made his first attempt to map the surface markings of the Moon

1600:
Published his major works—'De Magnete', 'Magnetisque Corporibus' and 'Magno Magnete Tellure'.

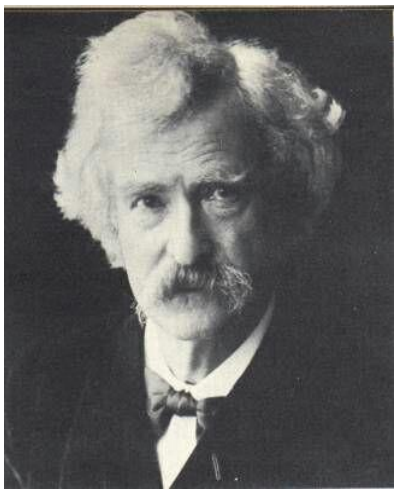
1603:
Passed away on 30 November

# THE MAN OF SPARK – Nikola Tesla

**G.Rajesh (112044)**

**B.E/EEE - II Year**

Nikola Tesla symbolizes a unifying force and inspiration for all nations in the name of peace and science. New York State and many other states in the USA proclaimed July 10, Tesla's birthday- Nikola Tesla Day. Nikola Tesla was born on July 10, 1856 in Smiljan, Lika, which was then part of the Austo-Hungarian Empire, region of Croatia. His father, Milutin Tesla was a Serbian Orthodox Priest and his mother Djuka Mandic was an inventor in her own right of household appliances. Tesla studied at the Realschule, Karlstadt in 1873, the Polytechnic Institute in Graz, Austria and the University of Prague. At first, he intended to specialize in physics and mathematics, but soon he became fascinated with electricity. He began his career as an electrical engineer with a telephone company in Budapest in 1881. Before going to America, Tesla joined Continental Edison Company in Paris where he designed dynamos. Nikola Tesla developed poly phase alternating current system of generators, motors and transformers and held 40 basic U.S. patents on the system, which The Tesla coil, which he invented in 1891, is widely used today in radio and television sets and other electronic equipment. That year also marked the date of Tesla's United States citizenship. His alternating current induction motor is considered one of the ten greatest discoveries of all time. Among his discoveries are the fluorescent light, laser beam, wireless communications, and wireless transmission of electrical energy, remote control, robotics, Tesla's turbines and vertical takeoff aircraft. Tesla is the father of the radio and the modern electrical transmissions systems. Tesla made what he regarded as his most important discovery-- terrestrial stationary waves. By this discovery he proved that the Earth could be used as a conductor and would be as responsive as a tuning fork to electrical vibrations of a certain frequency. He also lighted 200 lamps without wires from a distance of 25 miles (40 kilometers) and created man-made lightning. At one time he was certain he had received signals from another planet in his Colorado laboratory, a claim that was met with disbelief in some scientific journals. A lifelong bachelor he led a somewhat isolated existence, devoting his full energies to science. In 1894, he was given honorary doctoral degrees by Columbia and Yale University and the Elliot Cresson medal by the Franklin Institute. In 1934, the city of Philadelphia awarded him the John Scott medal for his poly phase



power system. He was an honorary member of the National Electric Light Association and a fellow of the American Association for the Advancement of Science. On one occasion, he turned down an invitation from Kaiser Wilhelm II to come to Germany to demonstrate his experiments and to receive a high decoration. In 1915, a New York Times article announced that Tesla and Edison were to share the Nobel Prize for physics. Oddly, neither man received the prize, the reason being unclear. It was rumored that Tesla refused the prize because he would not share with Edison, and because Marconi had already received his.(Tesla's friend Mark Twain, famous American writer)On his 75th birthday in 1931, the inventor appeared on the cover of Time Magazine. On this occasion, Tesla received congratulatory letters from more than 70 pioneers in science and engineering including Albert Einstein. These letters were mounted and presented to Tesla in the form of a testimonial volume. Tesla died on January 7th, 1943 in the Hotel New Yorker, where he had lived for the last ten years of his life. Room 3327 on the 33rd floor is the two-room suites he occupied.

Tesla was awarded the Edison Medal, the most coveted electrical prize in the United States. Nikola Tesla's name has been honored with an International Unit of Magnetic Flux Density called "Tesla". The United States Postal Service honored Tesla with a commemorative stamp in 1983.Tesla was inducted into the Inventor's Hall of Fame in 1975.The Nikola Tesla Award is one of the most distinguished honors presented by the Institute of Electrical Engineers. The award has been given annually since 1976.The Nikola Tesla Statue is located on Goat Island to honor the man whose inventions were incorporated into the Niagara Falls Power Station in 1895. Tesla is known as the inventor of poly phase alternating current.

## ELECTRICAL INVENTIONS

**M.A.Arul Flawrence (112904)**

**B.E/EEE - II Year - A Section**

| INVENTION | INVENTOR | YEAR | COUNTRY |
|---|---|---|---|
| Transformer | Michael Faraday | 1831 | Britain |
| Electric motor(DC) | Ginob Gramy | 1873 | Belgium |
| Electric motor(AC) | Nikola Tesla | 1888 | USA |
| Galvanometer | Andre Marie Ampere | 1834 | France. |
| Telephone | Alexander Graham Bell | 1876 | USA |
| Radar | A.H.Taylor, Leo Young | 1922 | USA |
| Lift | Elisha Gotis | 1852 | USA |
| ATM | John Shepherd Barron | 1967 | North Scotland |
| Fountain pen | Louis Waterman | 1884 | USA |
| Pendulum clock | Christen Huygens | 1696 | Netherland |
| Atom Bomb | Robert Openhirmer | 1945 | USA |

# CHAPTER 2

# NOBEL PRIZE

## FACTS ABOUT NOBEL PRIZE

**V.Yuvaraj (112047)** **K.K.Vignesh (122901)**

**B.E/EEE - II Year – C Section**

Bernard-Shaw has received Nobel Prize as well as Oscar award.

When Nobel Prize was introduced, Economics was not included in the will. Only, Since 1968 Nobel Prize is being offered in Economics.

Hitler opposed three from receiving Nobel Prize announced, but when he died, the three scholars received their prize.

Nobel Prize for peace was not given to Gandhi ji. When he was nominated in 1948, unfortunately he was assassinated. Hence, in that year the Nobel Prize for peace was not given to anyone!

Mother Teresa spent the Nobel Prize money for social welfare.

Generally, Nobel prize is not given to those who are dead. But in 2011, Nobel Prize for Medicine was declared to Stain Men. But unfortunately he died three days ago.

Courtesy: Vikatan Year Book-2013

# THE ORIGIN OF NOBEL PRIZES

**R.VIJAY KANNAN (102319)**
**B.E/EEE - III Year – B Section**

## Where does the money for the Nobel Prizes come from?

At the age of 17, Swedish *Alfred Nobel* spoke five languages fluently. Nobel became an inventor and businessman, and at the time of his death on 10 December 1896, he had 355 patents worldwide – one of them was the patent on dynamite. Furthermore, he had started 87 companies all over the world. According to his will, Alfred Nobel's enormous fortune was to be used to establish prizes to award those who had done their best to benefit mankind in the fields of physics, chemistry, medicine, literature and peace. The first Nobel Prizes were awarded in 1901, five years after Nobel's death. In 1969, another prize was added "The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel".


Alfred Nobel (1833-1896) never married and lived most of his life in France and Italy.

### The Nobel Prize Award Ceremonies

The Nobel Laureates are announced at the beginning of October each year. A couple of months later, on 10 December, the anniversary of Alfred Nobel's death, they receive their prizes from the Swedish King – a Nobel diploma, a medal, and 10 million Swedish crowns per prize. All Nobel Prizes are awarded in Stockholm, Sweden, except for the Nobel Peace Prize, which is awarded in Oslo, Norway. (When Alfred Nobel was alive, Norway and Sweden were united under one monarch until 1905. From 1905, Norway became an independent kingdom with its own king.)Norway and Sweden are situated in Scandinavia, northern Europe. Oslo is the capital of Norway and Stockholm is the capital of Sweden.

**Ronald Ross - Awarded Nobel Prize in Physiology or Medicine in 1902**
**Born:** 13 May 1857, Almora, India
**Died:** 16 Sep 1932, Putney Heath, UK
**Affiliation at the time of the award:** University College, Liverpool, UK
**Prize motivation:** "for his work on malaria, by which he has shown how it

enters the organism and thereby has laid the foundation for successful research on this disease and methods of combating it"

**Rudyard Kipling - Awarded Nobel Prize in Literature in 1907**
**Born:** 30 Dec 1865, Bombay, British India
**Died:** 18 Jan 1936, London, UK
**Residence at the time of the award:** UK
**Prize motivation:** "in consideration of the power of observation, originality of imagination, virility of ideas and remarkable talent for narration which characterize the creations of this world-famous author"
**Language:** English

**Rabindranath Tagore – Awarded the Nobel Prize in Literature 1913**
**Born:** 7 May 1861, Calcutta, India
**Died:** 7 Aug 1941, Calcutta, India
**Residence at the time of the award:** India
**Prize motivation:** "because of his profoundly sensitive, fresh and beautiful verse, by which, with consummate skill, he has made his poetic thought, expressed in his own English words, a part of the literature of the West"
**Language:** Bengali and English

**Chand**
**rasekhara Venkata Raman - The Nobel Prize in Physics 1930**
**Born:** 7 Nov 1888, Trichinopoly, India
**Died:** 21 Nov 1970, Bangalore, India
**Affiliation at the time of the award:** Calcutta University, Calcutta, India
**Prize motivation:** "for his work on the scattering of light and for the discovery of the effect named after him"
**Field:** Atomic physics, electromagnetism.

**Mother Teresa – Awarded the Nobel Peace Prize 1979**
**Born:** 26 Aug 1910, Uskup (now Skopje), Ottoman Empire (now Republic of Macedonia)
**Died:** 5 Sep 1997, Calcutta, India
**Residence at the time of the award:** India
**Role:** Leader of Missionaries of Charity, Calcutta
**Field:** Humanitarian work

**Amartya Sen - Awarded the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 1998**
**Born:** 3 Nov 1933, Santiniketan, India
**Affiliation at the time of the award:** Trinity College, Cambridge, United Kingdom
**Prize motivation:** "for his contributions to welfare economics"
**Field:** Welfare economics
**Contribution:** Research on fundamental problems in welfare economics, research work on social choice, welfare measurement and poverty.

**Har Gobind Khorana - Awarded the Nobel Prize in Physiology or Medicine 1968**
**Born:** 9 Jan 1922, Raipur, India
**Died:** 9 Nov 2011, Concord, MA, USA
**Affiliation at the time of the award:** University of Wisconsin, Madison, WI, USA
**Prize motivation:** "for their interpretation of the genetic code and its function in protein synthesis"

**Subramanyan Chandrasekhar - Awarded the Nobel Prize in Physics 1983**
**Born:** 19 Oct 1910, Lahore, India (now Pakistan)
**Died:** 21 Aug 1995, Chicago, IL, USA
**Affiliation at the time of the award:** University of Chicago, Chicago, IL, USA
**Prize motivation:** "for his theoretical studies of the physical processes of importance to the structure and evolution of the stars"
**Field:** Astrophysics

**REFERENCE:**
http://www.nobelprize.org
http://www.wikipedia.org

# CHAPTER 3

# TECHNICAL CONTEXT

# WIRELESS POWER SUPPLY

**VIGNESH.M.M (112116)**

**B.E/EEE – II Year – C Section**

Wireless power is transitioning from a technology to an industry, and many questions ranging from what consumers really expect to which technology is the safest and most efficient solution are generating an increasing amount of debate as proprietary products come to market and a wireless power standard is introduced. As wireless power reaches a tipping point, it is important that developers and consumers alike understand the realities of the different technological approaches, especially the safety and efficiency concerns surrounding them, and the current and future states of the technology as it gains momentum.

DESCRIPTION:

The cables that once restricted electronic equipment are gradually being rendered unnecessary by wireless communication technology, and as circuits shrink, only the power cords and huge batteries continue to chain mobile gear down.Research into using wireless technology to supply power to terminals began about a century ago, when the first electronics technology appeared, and it is finally beginning to be realized providing means to cut the final chains. It entered limited use about a decade ago, and is expected to see widespread use in everyday applications like mobile phone handsets and portable music players from the second half of 2007 through 2008.

WHY?

With wireless transmission of electric power, irritating tasks such as replacing batteries or using a charger to recharge batteries will be drastically reduced. In some cases, it will be possible to dispense completely with power cords. It offers complete wireless power supply and charging. Diverse commercial applications are expected from the second half of 2007. These technologies are attracting so much attention from manufacturers and researchers lately due to the following reasons

- market growth
- developments in technology
- delay in competing technologies

**EXECUTIVE SUMMARY:**

The power supply works by using the concept of resonance, which allows the efficient transmission of energy between items which resonate at the same frequency. They have likened the theory to that of an opera singer smashing a glass of wine with their voice - the glass will only smash if the liquid is filled to a level which ensures both the singers voice and the glass resonate on the same frequency. A simple copper antenna designed to have long-lived resonance

could transfer energy to a laptop with its own antenna resonating at the same frequency. The computer would be truly wireless. Any energy not diverted into a gadget or appliance is simply reabsorbed.Wireless power supply technologies at present can be divided into three groups according to their principle of operation. The first non-contact technology achieving widespread adoption in many portable terminals is electromagnetic induction. Two coils are brought close to each other and when current is passed through one, the generated magnetic flux causes electromotive force to be generated in the other. Another technology very close to commercial use makes use of the fact that energy can be transmitted and received directly as radio waves. This is fundamentally the same principle of operation as used in the crystal sets of a century ago, with alternating current (AC) radio waves converted into direct current (DC) without amplification. Recent improvements in efficiency have made it possible to consider this technology for commercial applications. The third principle is electromagnetic resonance. Resonance technology is extensively utilized in electronics, but this specific application uses only the electric or magnetic field, instead of electromagnetic waves, current, etc. A group under Asst Prof Marin Soljacic, Physics Dept, Massachusetts Institute of Technology (MIT) of the US was the first in the world to announce its potential for use as a power supply technology, in November 2006.

## CONCLUSIONS:

Wireless power solutions today provide hope for additional freedoms in the future, but many hurdles still stand in the way. Some of these hurdles will be adjusting to the wide range of expected operating requirements yet undefined by consumer use. Meanwhile, consumers are looking for simple comparisons within the advancements of wireless power technologies, while a steady stream of media confuses coil-to-coil efficiency or conversion efficiency with system efficiency, which is a dramatic misconception.It must be recognized that wireless power is making the transition from a technology to an industry – products are commercially available, and a wireless power standard is evolving. In the near term, more products will be adopted and accepted by consumers. And, though the real stability of any one technology can be defined as a solution that allows the most flexibility through multiple commercial applications while meeting consumer expectations, the ultimate scenario is for the best solutions to meld together as wireless power as a whole evolves. As scenarios continue to play out and the industry continues to be defined, there are several key considerations that need to be fully explored.

# POWER CRISIS - ELECTRICITY FROM MICROBES

**J.R.THAKSHAAYENE (112048)**
**B.E/EEE - II Year – C Section**

**Engineers at** Oregon State University(OSE) **have made a breakthrough in the performance of microbial fuel cells that can produce electricity directly from wastewater, opening the door to a future in which waste treatment plants not only will power themselves, but will sell excess electricity.**

The new technology developed at OSU can now produce **10 to 50** times the **electricity,** per volume, than most other approaches using microbial fuel cells, and **100 times more electricity** than some.The new approach would produce significant amounts of electricity while effectively cleaning the wastewater.The findings have just been published in Energy and Environmental Science, a professional journal, in work funded by the National Science Foundation."If this technology works on a commercial scale the way we believe it will, the treatment of wastewater could be a huge energy producer, not a huge energy cost," said Hong Liu an associate professor in the OSU Department of Biological and Ecological Engineering. "This could have an impact around the world, save a great deal of money, provide better water treatment and promote energy sustainability."

***Experts estimate that about 3 percent of the electrical energy consumed in the United States and other developed countries is used to treat wastewater, and a majority of that electricity is produced by fossil fuels that contribute to global warming.***

With new concepts - reduced anode-cathode spacing, evolved microbes and new separator materials - the technology can now **produce more than two kilowatts per cubic meter of liquid reactor volume.** This amount of power density far exceeds anything else done with microbial fuel cells.The system also works better than an alternative approach to create electricity from wastewater, based on anaerobic digestion that produces methane. It treats the wastewater more effectively, and doesn't have any of the environmental drawbacks of that technology, such as production of unwanted hydrogen sulfide or possible release of methane, a potent greenhouse gas.The OSU system has now been proven at a substantial scale in the laboratory.Continued research should also find **even more optimal use of necessary microbes, reduced material costs and improved function of the technology at commercial scales,** OSU scientists said. Once advances are made to reduce high initial costs, researchers estimate that the capital construction costs of this new technology should be comparable to that of the activated sludge systems now in widespread use today - and even less expensive when future sales of excess electricity are factored in.

This technology cleans sewage by a very different approach than the aerobic bacteria used in the past. Bacteria oxidize the organic matter and, in the process, produce electrons that run from the anode to the cathode within the fuel cell, creating an **electrical current.** Almost **any type of organic waste material can be used to produce electricity** - not only wastewater, but also grass straw, animal waste, and byproducts from such operations as the wine, beer or dairy industries. The approach may also have special value in developing nations, where access to electricity is limited and sewage treatment at remote sites is difficult or impossible as a result.

***The ability of microbes to produce electricity has been known for decades, but only recently have technological advances made their production of electricity high enough to be of commercial use.***

# THE CURRENT WARS

**BALAJI K.J (112042), II Year, B.E/EEE – A Section**
**GANESH KUMAR N.K.B (112109), II Year, B.E/EEE – A Section**

Electric current is necessary for each and every activity in our day-to-day life. Generally there are two types of current, Alternating Current (AC) and Direct Current (DC).In AC, the flow of electric charges periodically reverses and in DC, the current is unidirectional. We use AC for power supply and DC for small electric appliances which is produced by sources such as Batteries, solar cells etc..,

AC is the worldwide standard for power distribution. This wasn't always the case, however. Back in the days when electricity was first being put to practical use, direct current was the normal way to distribute electricity. The biggest champion of direct current was none other than Thomas Edison himself, the Great American Inventor who is credited with inventing just about everything from the light bulb.

In 1880, Edison's unproved system of electrical power distribution based on direct current and first public electric utility company in 1882, providing electricity to 59 customers in New York. By 1890, he had more than 100 power plants operating nationwide. Thomas Edison's biggest rival was a fellow named George Westinghouse, an American who invented Railway Air Brake. He advocated the use of alternating current for power distribution and promoted a system developed by the brilliant but eccentric inventor Nicola Tesla.

The AC developed for distribution in Europe, proved itself much more practical for large-scale distribution. Though both kinds of current flow just as quickly through copper wire and other conductors, DC could not be distributed economically over more than one mile and but AC can.

Edison worried that he would lose money, and so responded to the negative publicity of direct current by launching a Smear campaign. In 1887, a man was accidentally killed when he touched bare power lines.

However, Edison launched a nationwide publicity campaign to convince the public that alternating current was so dangerous that it was used in prisons to kill condemned murderers.

At the end, AC became popular because Tesla was right. AC is more efficient than DC and it is cheaper to supply too. Fortunately, the Smear campaign didn't work. The benefits of alternating current eventually won out. The turning point came when the alternating current generators at Niagara Falls began operating in 1896, delivering power 20 miles away to Buffalo, New York. By the early part of the twentieth century, nearly all power distribution

worldwide was done with alternating current.

The main reason everyone say that AC is better than DC is the issue of transmitting electricity over long distances. The transfer of DC voltages has limited ranges due to the resistances of the wire. But in Edison's time that may have been true. Transformers only work with alternating current and Edison had no way to convert to high voltages needed for efficient transport. Now there is, and DC is actually better for long distances. Economist says that even now the transfer of DC voltages of sufficiently high voltages is cheaper than AC for transmitting over long distances. Not having to support three phases, as AC does, DC requires only fewer conductors. DC also uses transmission cables more efficiently.

The real problem, according to the Economist, has been the circuit breakers. DC at high voltage is hard to turn off. Now, a new hybrid high voltage direct current breaker has been developed by ABB, a lead in power and automation technologies. ABB finally came up with a circuit breaker. It amounts to stopping power cable of feeding a large city much faster than an eye blink! This high speed protects the DC transmission system and prevents losses.

Direct current distribution lasted much longer than you might think, however. Con Edison, one of the largest electric companies in the world and the direct descendant of Edison’s original electric company, did not convert its last few holdout customers over to alternating current until 2007.

# AN INTRODUCTION TO SMART GRID AND DEVELOPMENT

**K.P.RAM PRASATH (120215)**
**M.E/PSE – I Year**

This article presents information on Smart Grid. Using recent data and knowledge about Smart Grid, this paper mainly introduces the meaning of Smart Grid, the significance and goals of Smart Grid, history of Smart Grid development Smart Grid must have self-healing, consumer participation, resist attack, high quality power, accommodate generation options, enable electricity market, optimize assets, enable high penetration of intermittent generation sources. In contrast, for today electric power system, major questions exist about its ability to continue providing citizens and businesses with relatively clean, reliable, and affordable energy services.

## INTRODUCTION: What is Smart Grid?

A **smart grid** is an *electrical grid* that uses *information and communications technology(*ICT) to gather and act on information, such as information about the behaviors of suppliers and consumers, in an automated fashion to improve the efficiency, reliability, economics, and sustainability of the production and distribution of electricity.

Smart Grid is a concept regarding digital technology application and electric power network. Smart Grid includes electric network, digital control appliance, and intelligent monitoring system. All of these, can deliver electricity from producers to consumers, control energy flow, reduce the loss of what, and make the performance of the electric network more reliable and controllable. In the short term, a smarter grid will function more efficiently, enabling it to deliver the level of service we have come to expect more affordably in an era of rising costs, while also offering considerable societal benefits – such as less impact on our environment.

Smart Grid can offer a lot of potential economic and environmental benefits and Significance:

- Improve reliability of power quality and transmission
- Increased power distribution efficiency and conservation
- Reduced costs for electric utilities
- Reduced expenditures on electricity by households and businesses
- Lower Greenhouse Gas(GHG) and other gas emissions

## History of Development: When and Where did smart grid start to be used?

The power grid started in 1896, based in part on Nikola Tesla's design published in 1888, but recently, in the past 50 years, electricity networks have not kept pace with modern challenges, such as: security threats, national power employment and distribution, high demand of power quality and so on. Therefore, the concept of Smart Grid came out, and the term smart grid has been in use since 2005.

**The earliest and largest Smart Grid**

Installed by ENEL S.P.A of Italy, and completed in 2005, the Teleogestore project was highly different from other system in the utility world. Its general architecture integrates electronic meter, provides metering, and contracts management and PLC communication functions. The Automatic Meter management communicates by public telecommunication networks (such as GSM, GPRS, PSTN & satellite) with LV concentrators (CBT) installed in every MV substation. LV Concentrators are able to manage the communication in both directions: half-duplex communication between Remote Metering Central System and Electronic Meters.

**In the US**

States such as Texas, California, New Jersey, Illinois, New York, Ohio and others are already actively exploring ways to raise the use of tools and technologies toward the realization of a smarter grid.

The main Smart Grid System list as follows:

- Distribution Management System (DMS) Platform by the University of Hawaii
- Perfect Power by Illinois Institute of Technology (IIT)
- West Virginia Super Circuit by Allegheny Energy
- Beach Cities Micro Grid by San Diego Gas & Electric
- High Penetration of Clean Energy Technologies by The City of Fort Collins

**In other countries**

In Ontario, Canada, Hydro One is in the midst of a large-scale Smart Grid initiative. By the end of 2010, this system will serve 1.3 million customers in the province of Ontario.

In China, the government has embarked on a 10-year project to build a 'smart grid' that will catapult power transmission into the digital age, securing electricity supplies and boosting energy conservation. The program is expected to be a boon to companies that provide equipment and technology to the power industry.

**Technologies of Smart Grid**

Smart Grids is a new concept for electricity networks. The initiative responds to the rising challenges and opportunities, bringing benefits to all users, stakeholders and companies that perform efficiently and effectively. Smart Grid Technologies are already used in other applications such as manufacturing and telecommunications and are being used in grid operation.

Department of Energy (DOE) lists five fundamental technologies that will drive the Smart Grid:

- Integrated communications, connecting electronic components to get information and control every part in real time, on the other hand, make every part of the Smart Grid both 'listen' and 'talk'.
- Sensing and measurement technologies, to provide faster and more accurate response information of each important part of Smart Grid, such as remote monitoring, real time thermal rating, electromagnetic signature analysis, real-time pricing and demand-side management.
- Advanced components, to apply the latest research in

superconductivity, storage, power electronics and diagnostics. they include: flexible alternating current transmission system devices, high voltage direct current, first and second generation superconducting wire, high temperature superconducting cable, distributed energy generation and storage devices, composite conductors, and "intelligent" appliances.

- Advanced control methods, to monitor essential components, enabling rapid diagnosis and precise solutions appropriate to any event. There are three categories for advanced control methods: distributed intelligent agents, analytical tools, and operational application.
- Improved interfaces and decision support, information systems reduce the complexity of Smart Grid to make both operator and manager use it more efficiently and easily, to amplify human decision-making.
- New technologies bring new functions to Smart Grid, which make Smart Grid more competitive than the old power grid.

**Functions of Smart Grid**

The government and utilities funding development of grid modernization have defined the functions required for smart grids. According to the United States Department of Energy's Modern Grid Initiative report a modern smart grid must have:

- Self-healing from power disturbance events
- Enabling active consumer participation and operating resiliently against attack.
- Providing power quality and optimizing assets.
- Accommodating all generation and enabling new products, services, and markets

**Features: Implementations of Smart Grids**

Existing and planned implementations of smart grids provide a wide range of features to perform the required functions.

- Load Reduction
- Elimination of the demand fraction
- Distribution of power generation

# BLUE EYES TECHNOLOGY

**C.MONISHAA (102007)**
**B.E/EEE - III Year – A Section**

The 'Blue' in this term stands for Bluetooth, which enables reliable wireless communication and the 'Eyes' because the eye movement enables us to obtain a lot of interesting and important information. The basic idea behind this technology is to give computer human power.

The idea of giving computers personality or, more accurately, emotional intelligence" may seem creepy, but technologists say such machines would offer important advantages. Despite their lightning speed and awesome powers of computation, today's PCs are essentially deaf, dumb, and blind. They can't see you, they can't hear you, and they certainly don't care a whit how you feel. Every computer user knows the frustration of nonsensical error messages, buggy software, and abrupt system crashes. We might berate the computer as if it was an unruly child, but, of course, the machine can't respond. "It's ironic that people feel like dummies in front of their computers, when in fact the computer is the dummy," says Rosalind Picard, a computer science professor at the MIT Media Lab in Cambridge.

A computer endowed with emotional intelligence, on the other hand, could recognize when its operator is feeling angry or frustrated and try to respond in an appropriate fashion. Such a computer might slow down or replay a tutorial program for a confused student, or recognize when a designer is burned out and suggest he take a break. It could even play a recording of Beethoven's "Moonlight Sonata" if it sensed anxiety or serve up a rousing Springsteen anthem if it detected lethargy. The possible applications of "emotion technology" extend far beyond the desktop. A car equipped with an affective computing system could recognize when a driver is feeling drowsy and ad-vise her to pull over, or it might sense when a stressed-out motorist is about to explode and warn him to slow down and cool off. These machines have got their own personality and this personality depends upon the moods of the user. Adding extraordinary perceptual abilities to computers would enable computers to work together with human beings as intimate partners. Researchers are attempting to add more capabilities to computers that will allow them to interact like humans, recognize human presents, talk, listen, or even guess their feelings. The BLUE EYES technology aims at creating computational machines that have perceptual and sensory ability like those of human beings. It uses non obtrusive sensing method, employing most modern video cameras and microphones to identifies the users actions through the use of imparted sensory abilities . The machine can understand what a user wants, where he is looking at, and even realize his physical or emotional states.

Some of the blue Eyes enabled devices are discussed below:

**1) POD:** The first blue Eye enabled mass production device was POD, the car manufactured by TOYOTA. It could keep the driver alert and active. It could tell the driver to go slow if he is driving too fast and it could pull over the driver when he feels drowsy. Also it could hear the driver some sort of interesting music when he is getting bored.

**2) PONG:** IBM released a robot designed for demonstrating the new technology. The Blue Eyes robot is equipped with a computer capable of analyzing a person's glances and other forms of expressions of feelings, before automatically determining the next type of action. IBM has released a robot called PONG, which is equipped with the Blue Eyes technology. PONG is capable of perceiving the person standing in front of it, smiles when the person calls his name, and expresses loneliness when it loses sight of the person. IBM is showing this robot to the public at the company's exhibition called "IBM Fair 2000" at the Japan Convention Center (Makuhari Messe) in Chiba prefecture, March 1-3.

**3) SECURE PAD:** This is an electronic badge that can identify the wearer and track his movements and activities with an array of sensors. The device was designed for a major health-care provider to track the activities of doctors and other personnel at large medical facilities. It knows who you are and where you are, and it has a pretty good idea of what you are doing and when you are doing it. Although that may sound ominous, the device will ultimately benefit patients by enhancing the security and accountability of medical facilities. For example, the device will know who has accessed a drug locker and what drugs were removed. It will also allow doctors to access confidential medical information without carrying around paper charts, which can be misplaced or read by unauthorized personnel. When a doctor wearing the Secure Pad enters a patient's room, the patient's medical records will automatically appear on a wall monitor when the doctor looks at it. When he looks away, or another person enters the room, the records will disappear. Another advantage of Secure Pad is that it's interchangeable; when a wearer removes the badge from her body, the device automatically deactivates, its slate wiped clean until the next person puts it on.

**CURRENT SCENARIO:** Pioneers in this field are IBM, MIT (Massachussets Institute of Technology), Sony. The scope of the technologies now under study has already been discussed. Limited success is achieved in translating neurological activities into identifiable emotional states implanting electrodes in the rain. Research is still going on and commercial availability is supposed to happen within the next few years.

**FUTURE**: Future applications of this technology are limitless: from designing cars and developing presentations to interactive

entertainment and advertising. Also it may become very common in our household devices also. For example: A blue eyes enabled TV set would become active when we look in its directions. Voice commands could then tune your favorite channel and adjust the volume.

**CONCLUSION**

Blue eyes technology ensures a convenient way of simplifying the life by providing more delicate and user friendly facilities in computing devices. The gap between the electronic and physical world will be reduced. The computers can be run by using the implicit commands instead of the explicit commands.

# POWER SCENARIO IN TAMILNADU


## E.JEYASREE (120226)

## M.E/PSE – I Year


### TAMIL NADU

**1. INSTALLED CAPACITY (AT THE END OF 11TH PLAN i.e. 31.03.2012) (FIGURES IN MW)**

| SECTOR | HYDRO | THERMAL | | | | NUCLEAR | R.E.S. | TOTAL |
|---|---|---|---|---|---|---|---|---|
| | | COAL | GAS | DIESEL | TOTAL | | (MNRE) | |
| STATE | 2122.2 | 2970 | 523.2 | 0 | 3493.2 | 0 | 118.55 | 5733.95 |
| PRIVATE | 0 | 250 | 503.1 | 411.66 | 1164.76 | 0 | 7219.46 | 8384.22 |
| CENTRAL | 0 | 2959.37 | 0 | 0 | 2959.37 | 524 | 0 | 3483.37 |
| **TOTAL** | **2122.2** | **6179.37** | **1026.3** | **411.66** | **7617.33** | **524** | **7338.01** | **17601.54** |
| % | 12.06 | 35.11 | 5.83 | 2.34 | 43.28 | 2.98 | 41.69 | 100 |

**2. INSTALLED CAPACITY AS ON 31.10.2012 (FIGURES IN MW)**

| SECTOR | HYDRO | THERMAL | | | | NUCLEAR | R.E.S. | TOTAL |
|---|---|---|---|---|---|---|---|---|
| | | COAL | GAS | DIESEL | TOTAL | | (MNRE) | |
| STATE | 2122.20 | 3570.00 | 523.20 | 0.00 | 4093.20 | 0.00 | 118.55 | 6333.95 |
| PRIVATE | 0.00 | 250.00 | 503.10 | 411.66 | 1164.76 | 0.00 | 7304.29 | 8469.05 |
| CENTRAL | 0.00 | 2959.37 | 0.00 | 0.00 | 2959.37 | 524.00 | 0.00 | 3483.37 |
| **TOTAL** | **2122.20** | **6779.37** | **1026.30** | **411.66** | **8217.33** | **524.00** | **7422.84** | **18286.37** |
| % | **11.61** | **37.07** | **5.61** | **2.25** | **44.94** | **2.87** | **40.59** | **100.00** |

**3.ACTUAL POWER SUPPLY POSITION**

| PERIOD | PEAK DEMAND (MW) | PEAK MET (MW) | PEAK DEFICIT/ SURPLUS (MW) (- / +) | PEAK DEFICIT/ SURPLUS ( % ) (- / +) | ENERGY REQUI-RMENT (MU) | ENERGY AVAIL-ABILITY (MU) | ENERGY DEFICIT/ SURPLUS (MU) (- / +) | ENERGY DEFICIT/ SURPLUS ( % ) (- / +) |
|---|---|---|---|---|---|---|---|---|
| 9TH PLAN END | 7158 | 6218 | -940 | -13.1 | 46232 | 42951 | -3281 | -7.1 |
| 10TH PLAN END | 8860 | 8624 | -236 | -2.7 | 61499 | 60445 | -1054 | -1.7 |
| 2007-08 | 10334 | 8690 | -1644 | -15.9 | 65780 | 63954 | -1826 | -2.8 |
| 2008-09 | 9799 | 9211 | -588 | -6.0 | 69668 | 64208 | -5460 | -7.8 |
| 2009-10 | 11,125 | 9,813 | -1,312 | -11.8 | 76,293 | 71,568 | -4,725 | -6.2 |
| 2010-11 | 11,728 | 10,436 | -1,292 | -11.0 | 80,314 | 75,101 | -5,213 | -6.5 |
| 2011-12 | 12,813 | 10,566 | -2,247 | -17.5 | 85,685 | 76,705 | -8,980 | -10.5 |
| APR-SEP,2012 | 12,606 | 11,053 | -1,553 | -12.3 | 46,120 | 39,193 | -6,927 | -15.0 |
| SEP,2012 | 12,606 | 10,348 | -2,258 | -17.9 | 7,990 | 6,606 | -1,384 | -17.3 |
| APR-OCT,2012* | 12,606 | 11,053 | -1,553 | -12.3 | 53,164 | 44,578 | -8,586 | -16.2 |
| OCT,2012* | 12,544 | 10,269 | -2,275 | -18.1 | 7,044 | 5,385 | -1,659 | -23.6 |

*Provisional

**4. ANTICIPATED POWER SUPPLY POSITION DURING 2012-13 AS PER THE LGBR**

| Peak Demand (MW) | Peak Met (MW) | Peak Deficit/ Surplus (MW) (- / +) | Peak Deficit/ Surplus ( % ) (- / +) | Energy Requi-rment (MU) | Energy Avail-ability (MU) | Energy Deficit/ Surplus (MU) (- / +) | Energy Deficit/ Surplus ( % ) (- / +) |
|---|---|---|---|---|---|---|---|
| 13,427 | 9,299 | -4,128 | -30.7 | 92,637 | 65,260 | -27,377 | -29.6 |

**5.CAPACITY ADDED DURING 11TH PLAN LOCATED IN THE STATE OF TAMIL NADU :**

| | **(MW)** |
|---|---|
| CENTRAL SECTOR: | 750 |
| STATE SECTOR: | 92 |
| PRIVATE SECTOR: | NIL |

### 6. BENEFIT TO THE STATE OF TAMILNADU WITH THE CAPACITY ADDITION DURING 11TH PLAN

| PROJECT NAME | TYPE | INSTALLED CAPACITY (MW) | CAPACITY ADDITION DURING XITH PLAN (MW) | BENEFITS/ SHARES OF STATE (MW) | STATE PROJECT LOCATION | UNIT WISE COMMISSIONING DATE (CAPACITY MW) |
|---|---|---|---|---|---|---|
| **CENTRAL-SECTOR** | | | | | | |
| NEYVELI II LIG | T | 2X250=500 | 250 | 115 | TN | 04.02.2012 (250 MW) |
| SIMHADRI ST EXT. U-3,4 | T | 2X500=1000 | 1000.00 | 198 | AP | 31.03.2011(500MW) 30.03.2012 (500MW) |
| VALLUR (ENNORE) JV TPP PH-I U-1,2 | T | 1000.00 | 500 | 347 | TN | 28.03.2012 (500MW) |
| KAIGA U-3 & 4 | N | 2X220 =440.00 | 440.00 | 91 | KARNATAKA | 11.04.2007 (220MW) 19.01.2011 (220MW) |
| **CENTRAL-SECTOR TOTAL:-** | | | | **751** | | |
| **STATE-SECTOR** | | | | | | |
| VALUTHUR PH-II GT,ST | T | GT 1X59.8 ST 1X32.4 | 92.20 | 92 | TN | 6.02.2009 ( 59.8 MW) 17.02.2009 (32.4MW) |
| **STATE - SECTOR TOTAL:-** | | | | **92** | | |
| **GRAND-TOTAL:-** | | | | **843** | | |

### 7. LIKELY BENEFIT TO THE STATE OF TAMILNADU DURING 12TH PLAN

| PROJECTS | TYPE | STATUS | STATE PROJECT LOCATION | SECTOR | IC (MW) | BENEFITS SHARES OF STATE (MW | UNIT WISE COMMISSIONING DATE (CAPACITY MW) |
|---|---|---|---|---|---|---|---|
| TUTICORIN TPP JV U1,2 | T | UC | TN | C | 2X500=1000 | 387 | |
| VALLUR TPP U2, 3 | T | UC | TN | C | 2X500=1000 | 694 | |
| NEYVELI - II LIG U2 | T | UC | TN | C | 1X250=250 | 115 | |
| KUDANKULAM U 1,2 | N | UC | TN | C | 2X1000=2000 | 925 | |
| PFBR(KALAPAKKAM) * | N | UC | TN | C | 1X500=500 | 250 | |
| **SUB TOTAL CENTRAL SECTOR SHARE** | | | | | | **2371** | |
| BHAWANI BARRAGE II & III | H | UC | TN | S | 4X15=60 | 60 | |
| METTUR EXT U1 | T | UC | TN | S | 1X600=600 | 600 | |
| NORTH CHENNAI EXT U1,2 | T | UC | TN | S | 2X600=1200 | 1200 | |
| **SUB TOTAL STATE SECTOR** | | | | | | **1860** | |
| IND BARATH TPP U1 | T | UC | TN | P | 2X660=660 | 660 | |
| **SUB TOTAL PRIVATE SECTOR** | | | | | | **660** | |
| **GRAND TOTAL (TN)** | | | | | | **4891** | |

NOTE: T- THERMAL, H-HYDRO ,N-NUCLEAR , COMM-COMMISSIONED, UC UNDER CONSTRUCTION, C-CENTRE, S-STATE, P-PRIVATE
* SHARES FROM CENTRAL SECTOR PROJECTS FOR WHICH M.O.P. ORDERS ARE YET TO BE ISSUED ARE TENTATIVE

### 8. T&D LOSSES

| YEAR | T&D LOSSES % |
|---|---|
| 2003- 04 | 17.16 |
| 2004-05 | 19.28 |
| 2005-06 | 18.66 |
| 2006-07 | 19.54 |
| 2007-08 | 18.71 |
| 2008-09 | 18.14 |
| 2009-10 | 18.41 |

### 9.PEAK & ENERGY TABLE (As per 18th EPS Report )

| YEAR | ENERGY DEMAND(MU) | PEAK DEMAND(MW) |
|---|---|---|
| 2012-13 | 91625 | 14174 |
| 2013-14 | 97865 | 15736 |
| 2014-15 | 104529 | 17497 |
| 2015-16 | 111648 | 19489 |
| 2016-17 | 119251 | 20816 |

### 10. ANNUAL PER CAPITA CONSUMPTION OF ELECTRICITY

| YEAR | PER CAPITA CONSUMPTION (KWH) |
|---|---|
| | (AS PER U.N. METHODOLOGY ) |
| 2009-10 | 1210.81 |

# CHAPTER 4

# CAREER EYE OPENERS

# GATE – DOORSTEP TO BRIGHT FUTURE

**M.Poomanirajan (120204)**
**M.E/PSE – I Year**

GATE - **G**raduate **A**ptitude **T**est in **E**ngineering, it is conducted by IIT every year. It is mainly to encourage engineers to do higher studies and research. MHRD will provide stipend every month for those who are admitted under GATE category. There are 15 IIT's, 20 NIT's, IISC, and various central universities that provide M.E/M.Tech under GATE category. In 2011alone around 7 lakh candidates appeared for GATE, and in 2012 it is increased to around 13 lakh, since PSU's(**P**ublic **S**ector **U**ndertaking) are recruiting engineers with GATE score, the candidates to appear for GATE has increased.

GATE score is valid for **TWO** years only for those who want to do higher studies.

Nowadays, Candidates are not interested in doing higher studies, so MHRD's motto is in dilemma. To overcome this, GATE committee has decided to change GATE pattern in 2014, which may comprise prelims and main. This would be easier to separate candidates for higher studies and employment. Mere pass in GATE won't offer admission for higher studies.

NITs are conducting CCMT (Centralized counseling for M.Tech admissions) to get admission in any NIT through online counseling from 2012. This makes admission process easier and cut-off to get admission has increased. Till 2011, with GATE score of around 500 for 1000 will fetch top IITs but from 2012 scenario has changed, with that score will get only low NITs.

Scoring in GATE is not a tedious thing; candidate should be very clear with the basic concepts in Engineering. Solving previous year GATE question papers will fetch clear idea to solve problems. Questions are of application oriented.

# JOB TIPS

**R.Siva (120211)** **V.Siva Kumar (120213)**

**M.E/PSE – I Year**

**Job hunting tips for freshers:**

Being young doesn't mean you are given a free ticket to act casually during job interviews. You are already in the professional world and although you are young, you can show yourself as respectable as the president of the company by being professional.

**Clean your profile:**

Even before we reach college we are already members of different social networking sites. We often post pictures in these websites so that we can share with our friends our adventures and even the crazy things that we have done. Before you even apply for a job, check your profile and delete the pictures that could hinder you from being employed. Also advise your friends to do the same so that you can completely clean your online profile.

**Resume for every company:**

Resumes used to be simple sources of data of the applicant. But that situation is long gone and resumes are used as a tool for increasing your chances of getting hired. Know the company philosophy and the skills they require and customize your resume based on that information. By customizing your resume to each company you are planning to work with, you are highlighting the skills and personalities the company are looking for from a candidate.

**Team Communication:**

A healthy team communication can help eliminate many misunderstandings and frustrations which develop within the team. It is thus essential to learn on improving team communications to address misunderstanding and to improve team efficiency.

**Feedback mechanism:**

Feedback is an important part of a team communication. Make sure that you take the opinions and views of the team member involved. A proper feedback mechanism will ensure that your team responds as required to your communication and that everyone had received the same message.

**Do's and don'ts for freshers:**

Life for any fresher is challenging. You may visit multiple job boards (Naukri, Monster and TimesJobs) with dedicated pages for freshers or websites of special interest to freshers (freshersworld, walkinjobstoday). You must also have a proper e-mail ID so that you can send soft copies of your resume via e-mail to companies. Sometimes companies -- especially in the IT industry -- have their own format for filling information on their websites. They ask for the same information in your resume (contact details, school and college, extra-curricular activities, etc.) If

you have any of your friends or relatives working for IT companies, ask them to refer your resume. If there are few vacancies, it will usually be filled through employee referral only. Check your mailbox at least once every day. IT companies do not allow people to submit resumes on hand. You have to hunt your first job online only.

**DRESSING FOR SUCCESS:**

If you work environment is very casual, then you can wear semi formals like Khaki, gabardine or cotton pants with light colored formal /semi-formal shirts with a cotton/linen blazer. In creative fields pairing a blazer with a shirt and classic jeans is also allowed.

Accessories (Both men and Women)Wear nice, clean/polished shoes that are easy to walk in. Women can wear sandals or dark shoes (pumps) with kitten heels depending on the clothes they are wearing. Avoid anything that bling or metallic. Formal leather shoes in dark colors (with dark colored socks) are the best bet for men.

Women can accessorize with some simple jewelry like Small hoops/studs will look nice as well as a small pendant necklace. Avoid stacking up jewelry. Men should stick to wearing a good watch. A Portfolio or briefcase will complete you professional attire.

# TIPS TO CRACK COMPETITIVE EXAMINATIONS

**R.ANDALPRIYATHARSHINI (120202)** **V.KEERTHANA (120223)**
**M.E/PSE – I Year**

**Get your fundamentals right**: Students spend months to prepare for the exam. However, to secure a seat it is really important that you get your fundamentals right. GATE is one such exam which tests you on your fundamentals.

**Read different and unique study material**: It is really important while preparing for exam you read books written by various authors on various topics. Reading and preparing from one books or two books is not sufficient to crack the exam. So it is really important that you prepare for GATE exam from different books which cater your needs. The study material of the books should be unique so it will add value to your knowledge not just repetition of what you already know.

**Discuss quality questions**: It is really important that you prepare for quality questions. It is really important to solve the tricky questions. Rather than solving simple questions and wasting your time, it is better that you spend more time on solving concept based questions.

**Solve previous year's papers**: To understand the pattern of the exam and get familiar with it, aspirants should solve the previous year's papers of GATE exam. It will also brushes up your basic concepts and exposes you to real exam pattern.

**Solve mock test papers**: While preparing for the exam it is really important that you should solve as many papers as you can. Solve mock papers to understand the basic concepts. Mock test will give you the image of real paper and make you aware about what type of question will be asked in the exam. So try to solve as much papers as you can.

**ABOUT IES PREPARATION**

All over preparation for IES is easy we can say even compared with GATE. The difference in preparation for GATE and IES is, For GATE, around 5 technical important subjects with Math and Quantitative Aptitude may be sufficient to crack 95 to 98 percentile. We may have to even work out Exercise problems also for those subjects and may have to study multiple books for the same topic. But for Engineering Service Exam (ESE), we may need not practice Exercise problems or may need not study multiple books for the same topic. Instead we may have to study multiple books for the same subject but for not same topic.

We need only 50% of marks from the written test. All over to write 20 to 25% questions, we need not prepare anything. Those will be that much easy. Around 40 to 50% of questions will be average standard which need preparation. Remaining questions may be difficult, for that above average to extreme preparation may be needed. Again, for ES exam, 30 to 35% questions (At least models) will be repetitive from Old question papers. So, we need to analyze old question papers starting from General Studies to Descriptive papers from 2004. Now, is it difficult to get 50% of marks IF WE PLAN PROPERLY? PRACTICE, PRACTICE, PRACTICE, is the Mantra. All you have to do is practice constantly for IES. You have to do the same example problems thrice. You have to read same topic in the SAME book thrice. You are done. You can expect IES. Frankly IES don't need any talent, but perseverance and consistency in preparation.

**About Objective paper:** For objective papers we recommend preparing all subjects. For Electrical, communications may be difficult or for Telecommunications Material science/Power Electronics may be difficult. But prepare those subjects also at least to Basic level. If you are unable to understand B.Tech books, go for Diploma books. You will be able to follow those and then try for graduation standard books. But don't leave any subject. Old question papers from 2004, you have to prepare, least mug up those in few areas. Also prepare old civil services preliminary exam questions for objective.

About Descriptive papers: For descriptive we need to practice a lot. See 3 to 4 subjects which are important/which is carrying more weightage. Prepare all example problems; solve all old question papers for these subjects. For other subject prepare at basic level.

Objective is more important than Descriptive (THERE ARE NO MERCY MARKS WITH UPSC): We may get 70% of allotted marks, if we get correct solution with procedure for Descriptive papers. As calculators are allowed, we can expect problems which need to be solved properly with calculator. But for Objective, we will get 100% of marks, that to as they don't allow calculator, we can expect simple problems, which need not be too much cautious.

General Studies & General English: General studies preparation is not much difficult task to do. We need to prepare last 10 years question papers for conventional side (Polity, Geography, History etc.). Get an idea. Take year book and prepare least those mentioned topics from that. For current affairs, take Civil Services Chronicle from January to April. Prepare NCERT $9^{th}$standard and 10 standard Geography books. For polity you can opt for Laksmi kanth. As more questions come from Modern History (Preparation of Ancient and Medieval is a wee bit tough) you can prepare only Modern History. For this Spectrum Series book is more than sufficient. For General English, last 10 years old question papers are more than enough.

All over we can expect 120 to 140 marks in each objective papers, 90 to 110 marks in each descriptive and in General English/General Studies objective paper even if we get around 60 marks it is enough.

**About IAS EXAM PREPARATION:**

On the first thought of appearing in the Civil Services Examination (C.S.E.), the first issue is the selection of optional. In a way, selection of right optional is the most crucial step. Post-graduates in any discipline, generally prefer taking up their parent subject for Prelims. Though such selection is quite logical, aspirants with any science discipline as their base subject must ponder over the issue more seriously. Maths, Physics, Geology etc., optionals for Prelims must be opted for, only if one is out and out thorough with the subject. As UPSC ensures that 'some' candidates from every discipline must qualify for the Mains, aspirants with a science subject must judge themselves correctly regarding their own capability to be included in these 'some'. Some of the social sciences (e.g. History, Sociology and Public Administration) opted by quite a significant majority can, however, be a much safer bet, particularly for those (ordinary science graduates) who do not have any specific parent subject or for those who are not able to develop confidence in their parental subject. In either case, the formal preparation must start from the basic fundamentals, even if a person is already a post-graduate in that subject.

General Studies (GS) has to be prepared on quite a different plane because the content of this paper is too spread out and because any issue, major or minor, can be asked objectively. Traditionally, 10 + 2 level books of NCERT or any state education board had been covering a major part of the content but, these days, the items in news during the last one year or so, are being asked quite frequently. Problems are generally faced in everyday science (by the candidates with social sciences background) or in mental ability or in the fundamentals of economics. The most important aspect for the preparation of GS Prelims, therefore, is to identify the loop-holes and plug them urgently.

Many of you prepare a subject in terms of "reading" (once, twice, thrice etc.) with or without underlining the important facts. It results not only in longer time of preparation, but also many important points may skip. Also, even if you underline the highlighting points, most of you have the tendency to read the text in full while going for the subsequent readings. It is, therefore, advisable that texts must be read once and all important points (likely to be forgotten) recorded separately so that you need not study voluminous texts again. This would save on your time and should result in greater efficiency.

***The Mains:***

For right approach, the preparation of Mains should start before or at least concurrent with Prelims. Just because you have to prepare for Essay, GS and the two optional (English and a regional language, the one/two other compulsory, do not require a separate preparation) you never get enough time (to prepare for all these) after the declaration of Prelims' results. Further, while Prelims is only a screening test, it is on the basis of your performance in Mains, on which mainly depends the final outcome of your efforts. Strategically, therefore, the preparation for the examination should start about one year in advance and you should think about appearing in the Prelims only when you have had a strong grip over the Mains' subject matter.

Many of you, particularly those with a professional degree in science, tend to ignore the preparation of GS and concentrate mainly on their optional subjects. This attitude is more like a bad gamble because you are not aware about the level of preparation of other aspirants. Economy (for the science background aspirants), Science & Technology (for the social science background aspirants) and Statistical Analysis are the only three areas that can pose problems in scoring. If you have prepared economy for your Prelims, doing it for the mains must not be difficult. Statistical analysis has to be practiced with the help of previous years' solved questions given in all the guides as also the NCERT's Statistical Analysis. One year regular reading of a good national daily, India Yearbook (Publication Division) relevant NCERT books and a good magazine for the purpose are the basic necessities that you must go through. Scoring in GS is mathematical and any additional score gained through serious preparations should be welcome.

Essay paper, re-introduced in 1993, created a sort of storm among the aspirants. A rumor was spread that the step has been taken to neutralize the scoring pattern which is highly skewed in favour of some subjects. Though there is no denying the fact that many subjects (like Math, Physics, Commerce etc.) do not encourage the development of language skill, those of you with such an academic background but a natural flair for writing developed during school or college days, should be definitely at an advantage.

Writing an essay is an art and if you are not naturally inclined to write that way, you will have to spend at least some time in practicing; more so because many of the issues asked in the form of essay are the ones that you generally prepare for your GS where you limit your preparation up to about 250 words. Stretching this content to form an essay is really an uphill task. Candidates are, therefore, advised to keep a thorough eye on all the happenings (in terms of broad areas) of the last one year with critical evaluation of those which could be asked in the form of an essay.

Regarding the compulsory language paper(s) which is (are) of qualifying nature only, I should just say that if you are apprehensive about the language papers too, better forget about the civil services.

The two optional, that form a major part of your score, have to be decided judiciously. Candidates living in the major centers of Civil Services related activities generally do not face much problem in finalizing their optional but others, living in smaller towns or where there is no such environment, do faultier. For those of you post-graduate in any subject or having a professional degree, the first optional is the one that you have pursued for the last few years. But, for ordinary graduates the choice of first optional too, is equally problematic. Most of the candidates undecided about the optional, are strongly influenced by the interviews (given by the previous years' successful candidates) that appear in various magazines. Decisions made on this basis, can, at times, land you in the no man's land.

While selecting an optional I would suggest that you care for the following: (a) The Syllabus: Whether it looks comprehensible at the first glance. (b) Content: Find out whether the relevant books/study-material is easily available. (c) Interest: After going through some of the literature, find out whether it has been able to generate interest in you. (d) Expertise: Whether any specialist of the subject is available or approachable, the one that you can solve your problems and satisfy your queries. (e) Success rate: What has been the scoring pattern and the success-rate of the subject—this you can know from any coaching institute of repute or from some of the magazines too. (f) Friends' advise: Particularly of those who have not made into the list of successful aspirants of the previous years. The steps need not be followed in this sequence.

The last decade has seen a catastrophic change of the sort, regarding the preference of the candidates for traditional subjects as also regarding the scoring pattern. The last five years in particular have seen the emergence of Physics-Math combination opted by the IITians, as the most successful one. Mid-Eighties saw the upsurge of Anthropology, a subject which is taught in the least number of Universities in India, followed by creation of Public Administration as a separate subject and its instant success in terms of candidates attracted as also in the scoring pattern. Geography has been making silent strides and the literatures of various regional languages have proved their credibility time and again. These subjects affected the popularity of History and Psychology that went out of favour because of revision and substantial increase in the syllabus undertaken during that period. Sociology suffered at the hands of Anthropology because the two can not be opted together and the wind favored Anthropology.

During the last three years, however, Psychology and Sociology gained some ground while Public Administration has declined slightly in popularity. Regional languages have shown a spectacular rise

while Anthropology has stagnated at the top. Philosophy, another fascinating optional, is restricted in popularity and there is not much to write about it. Change in the syllabi of many popular optional along with bringing parity in the papers of various optional is bound to bring many significant changes that should be reflected in the results of IAS ’2000. Math is not going to be a popular subject any more. Engineering subjects too are likely to lose in popularity. Anthropology, Geography and Literature (despite the revision of syllabi) should emerge as major successful optional. Psychology too may improve is tally. Sociology and Public Administration should attract larger chunk of aspirants but in terms of results, both these optional may prove disastrous.

If you are looking for the smallest syllabus, the obvious choice should fall on Anthropology, but wait, preparing this subject through self-study may not be that easy because the subject combines biological and sociological aspects. If you intend to choose a subject with scientific orientation, your choice should fall on Geography, Psychology or Anthropology.

If you have a good command on the language, any subject can be chosen provided you can develop interest in that subject. Otherwise, those of you who do not have good writing skill, then please for your sake do not opt for History, Sociology, Philosophy or Political Science. Candidates with a command on any regional language or Hindi can taste success by opting for a literature as an optional paper. With a strong base in Economics or Commerce, Geography can be a good second optional.

There is no standard formula for success in the competition. The only rule is that you realize your real capacities and capabilities and chalk out your own strategy. How to perform well in Mains and Personality Test are the issues that should be dealt at length and I shall discuss these issues with you at the appropriate time.

# JOB SEARCH ENGINES – THE REAL GOOGLE OF A JOB SEARCHING GRADUATE

**SUGANYA**
**M.E/PSE – I Year**

Naukri
Monster India
Times Jobs
JobsAhead
Devnetjobs India
CareerBuilder India
Bixee.com
Clickjobs.com
CareerAge.com
Freshersworld.com
Shine
Recruit.net
Career Jet
Rediff Job Search
Career Khazana
Indian Job Site
Placement India
Jobs Bazaar India
Jobs Bank
Bharat Careers
Jobs DB India
Career Age
Freshers World
Career India
Accessenterprises
Career1000
Alltimejobs.com
Career Mosaic India
Jobs for Disabled
Recruiters community
Jobswizard
Job Bazaar
Jobs database
Government Jobs
Jobstreet
Jobs online
CareerBuilder
CareerCity
ChoiceCareers
Career Resource
Career Management
Flipdog
Career Connector

Career Services
Employ Central
Career Marketplace
Career Center
Recruiters OnLine Network
Career Search
CareerBuilder
Career Resource Center
CareerSite
Computer Register
CareerMart
Careers OnLine
Careers2000
Choice
Career Bank
Cityjobs
Engineers Employment Services
The Monster Board
CareerMosaic
Free job site
Creative Central
DiscoverJobs
Exec-U-Net
Jobs Information System
FlipDog
Jobs Exchange
GeoSearch
GeoSpatial GIS Cafe
GIS Jobs
gotajob
HirePlanet
IDEAS Job Network
International Sales, Marketing Job-Site
Job Locator
Job Explorer
Job Wire
jobfind
JobFront

Jobs Careers
Jobs - Programmers
Jobs search
Jobs on the Web
CareerWEB
Online Career Center
Professionals Online
JobCenter
job listings
JobSafari
JobStreet
Jobware
MegaJobSites
MinorityCareer
Nokri
Online-Jobs
PeopleBank
Job market resource
Job services
Swapjobs
Talents
Technology Jobs
Technology Jobbank
Techuniverse
Todaysjobs
Vault
VisaJobs
Wall Street Journal Careers
Workopolis
WorkSite
Jobsite UK
Gradunet
Careerscape
Job Pilot
JobSearch UK
London Careers
Reed Job Services
U.K Appointments Section
Top Jobs on the Net
SalesSeek

# CHAPTER 5

# Industries In-Detail

# NTPC – AN INDUSTRY EVERY ENGINEER MUST KNOW ABOUT

**B.Varun Kumar (112315)**
**B.E/EEE - II Year**

India's largest power company, NTPC was set up in 1975 to accelerate power development in India. NTPC is emerging as a diversified power major with presence in the entire value chain of the power generation business. Apart from power generation, which is the mainstay of the company, NTPC has already ventured into consultancy, power trading, ash utilization and coal mining. NTPC was ranked 337$^{th}$ in the '2012 Forbes Global 2000' rankings of the world's biggest companies. NTPC became a Maharatna company in May, 2010, one of the only four companies to be awarded this status. The total installed capacity of the company is 40,174 MW (including JVs) with 16 coal based and 7 gas based stations, located across the country. In addition under JVs, 7 stations are coal based & another station uses Naphtha/LNG as fuel. The company has set a target to have an installed power generating capacity of 1, 28,000 MW by the year 2032. The capacity will have a diversified fuel mix comprising 56% coal, 16% Gas, 11% Nuclear and 17% Renewable Energy Sources(RES) including hydro. By 2032, non-fossil fuel based generation capacity shall make up nearly 28% of NTPC's portfolio. NTPC has been operating its plants at high efficiency levels. Although the company has 17.75% of the total national capacity, it contributes 27.40% of total power generation due to its focus on high efficiency. In October 2004, NTPC launched its Initial Public Offering (IPO) consisting of 5.25% as fresh issue and 5.25% as offer for sale by Government of India. NTPC thus became a listed company in November 2004 with the Government holding 89.5% of the equity share capital. In February 2010, the Shareholding of Government of India was reduced from 89.5% to 84.5% through further public Offer. The rest is held by Institutional Investors and the Public. At NTPC, People before Plant Load Factories the mantra that guides all HR related policies. NTPC has been awarded No.1, Best Workplace in India among large organizations and the best PSU for the year 2010, by the Great Places to Work Institute, India Chapter in collaboration with The Economic Times. The concept of Corporate Social Responsibility is deeply ingrained in NTPC's culture. Through its expansive CSR initiatives, NTPC strives to develop mutual trust with the communities that surround its power stations.

# ABB Group

**N.E.GANGA (120218)**
**M.E/PSE – I Year**

| | |
|---|---|
| Type | Publicly traded limited company |
| Traded as | SIX: ABBN, NYSE: ABB, OMX: ABB, NSE: ABB, BSE: 500002 |
| Industry | Electrical equipment |
| Founded | 1988 through merger of ASEA (1883) of Sweden and Brown, Boveri & Cie (1891) of Switzerland |
| Headquarters | Zürich, Switzerland |
| Area served | Worldwide |
| Key people | Joe Hogan (CEO), Hubertus von Grünberg (Chairman) |
| Products | Power technology, Industrial automation |
| Revenue | US $39.337 billion (2012) |
| Operating income | US $3.838 billion (2012) |
| Profit | US $2.704 billion (2012) |
| Total assets | US $28.002 billion (2012) |
| Total equity | US $16.906 billion (2012) |
| Employees | 145,000 (June 2012) |
| Website | www.abb.com |

ABB (SIX: ABBN) is a multinational corporation headquartered in Zurich, Switzerland, operating in robotics and mainly in the power and automation technology areas. It was ranked 143rd in the Forbes Ranking (2010).

ABB is one of the largest engineering companies as well as one of the largest conglomerates in the world. ABB has operations in around 100 countries, with approximately 145,000 employees during June 2012, and reported global revenue of $40 billion for 2011.

ABB traded on the 'SIX Swiss Exchange' in Zürich and the 'Stockholm Stock Exchange' in Sweden since 1999, and the New York Stock Exchange in the United States since 2001.

**History:**

ABB's history goes back to the late 19th century. ASEA was incorporated by Ludwig Fredholm in 1883 and Brown, Boveri & Cie (BBC) was formed in 1891 in Baden, Switzerland, by Charles Eugene Lancelot Brown and Walter Boveri as a Swiss group of electrical companies producing AC and DC motors, generators, steam turbines and transformers.

Organizational structure

ABB is the world's largest builder of electricity grids and is active in many sectors, its core businesses being in power and automation technologies. The company has one corporate division and five production divisions since reorganisation in January 2010.

**Power Products**

Power products are the key components for the transmission and distribution of electricity. The division incorporates ABB's manufacturing network for transformers, switchgear, circuit breakers, cables, and associated high voltage and medium voltage

equipment such as digital protective relays. It also offers maintenance services. The division is subdivided into three business units - High Voltage Products, Medium Voltage Products and Transformers.

**Power Systems**

Power Systems offers turnkey systems and service for power transmission and distribution grids, and for power plants. Electrical substations and substation automation systems are key areas. Additional highlights include flexible AC transmission systems (FACTS), high-voltage direct current (HVDC) systems and network management systems. In power generation, Power Systems offers the instrumentation, control and electrification of power plants. The division is subdivided into four business units - Grid Systems, Substations, Network Management, and Power Generation.

**Discrete Automation and Motion**

The division Discrete Automation and Motion provides products and services for industrial production. It includes electric motors, generators, drives, programmable logic controllers (PLCs), analytical[clarification needed], power electronics and industrial robots. ABB has installed over 200,000 robots.[6] In 2006, ABB's global robotics Manufacturing headquarters moved to Shanghai, China. Also, wind generator and solar power inverter products belong to this division.

**Low Voltage Products**

The Low Voltage Products division manufactures low-voltage circuit breakers, switches and control products, wiring accessories, enclosures and cable systems to protect people, installations and electronic equipment from electrical overload. The division further makes KNX systems that integrate and automate a building's electrical installations, ventilation systems, and security and data communication networks. Low Voltage Products also incorporates a Low Voltage Systems unit manufacturing low voltage switchgear and motor control centres. Customers include a wide range of industry and utility operations, plus commercial and residential buildings.

Management

On July 17, 2008, the Board of Directors of ABB Ltd. announced the appointment of Joseph M. Hogan as Chief Executive Officer and Member of the Executive Committee of The ABB Group. Hogan is a graduate of Geneva College and holds an MBA from Robert Morris, both located in Western Pennsylvania.

**Former CEOs:**

| | | | | |
|---|---|---|---|---|
| September 2008 | - | present | : | Joe Hogan |
| February 2008 | - | September 2008 | : | Michel Demaré - ad interim |
| January 2005 | - | February 2008 | : | Fred Kindle |
| September 2002 | - | December 2004 | : | Jürgen Dormann |
| January 2001 | - | September 2002 | : | Jörgen Centerman |
| January 1997 | - | December 2000 | : | Göran Lindahl |
| 1987 | - | 1996 | : | Percy Barnevik |

**Chairman of the Board**

The Board of Directors is chaired by Hubertus von Grünberg. He took over the position in May 2007, following the retirement of Jürgen Dormann, who had chaired the board since 2002.

**Former Board Members:**

Peter Sutherland
Donald Rumsfeld (1990–2001)

# SMALL HYDROPOWER DEVELOPMENT IN INDIA

**B.Kumarasamy (120201)**

**ME/PSE – I Year**

In India, hydropower projects with installed capacity of up to 25 mw are classified as small hydropower (SHP) projects and their responsibility is vested with the Union ministry of new & renewable energy (MNRE). There is a sub-classification of SHP projects as pico, mini, micro, etc (see table). The estimated potential for power generation in the country from SHP projects is 15,380 mw from 5,718 identified sites. Out of this, about half lies in Himachal Pradesh, Uttarakhand, Jammu & Kashmir and Arunachal Pradesh. The plain regions in Maharashtra, Chhattisgarh, Karnataka and Kerala also have sizeable potential. MNRE has been providing Central Financial Assistance to state governments and private sector to set up SHP plants. The ministry is also giving support towards survey and investigation (S&I), preparation of DPRs, project monitoring, and also training through Alternate Hydro Energy Center (AHEC), IIT Roorkee etc.

MNRE is also giving special emphasis to promote use of new and efficient designs of water mills for mechanical as well as electricity generation and setting up of micro hydro projects for remote village electrification. These projects are taken up with the involvement of local organizations such as the Water Mills Associations, cooperative societies, registered NGOs, village energy cooperatives, and state nodal agencies.

**SHP POTENTIAL & DEVELOPMENT IN INDIA**

| State | Gross Potential (MW) | Installed Capacity | Under Execution | Untapped Potential (per cent) |
|---|---|---|---|---|
| Karnataka | 747.59 | 871.75 | 126.18 | --- |
| Himachal Pradesh | 2,267.81 | 466.37 | 106.85 | 74.7 |
| Maharashtra | 732.63 | 281.33 | 7.00 | 60.6 |
| Andhra Pradesh | 560.18 | 192.63 | 62.05 | 54.5 |
| Punjab | 393.23 | 154.50 | 21.15 | 55.3 |
| Uttarakhand | 1,577.44 | 146.82 | 217.25 | 76.9 |
| Kerala | 704.10 | 141.67 | 60.75 | 71.3 |
| Jammu & Kashmir | 1,417.80 | 130.59 | 6.65 | 90.3 |
| Tamil Nadu | 659.51 | 111.69 | 18.00 | 80.3 |
| West Bengal | 396.11 | 98.40 | 84.25 | 53.9 |
| Total - top 10 states | 9,456.40 | 2,595.75 | 710.13 | 65.0 |
| Rest of India | 5,927.75 | 656.40 | 287.67 | 84.1 |
| Total | 15,384.15 | 3,252.15 | 997.80 | 72.4 |

The total installed capacity of SHP projects, as of March 31, 2007 (end of X Plan) was 1,975 mw. This was achieved by adding a capacity of 537 mw during the Plan period. The XI Plan target was 1,400 mw with financial allocation of Rs.700 crore. The target for the first four years of the XI Plan was 1,050 mw, against which 1,066 mw was achieved. The target for FY12 was 350 mw against which achievement up to December 31, 2011 was 209.50 mw. As of December 31, 2011, a total of 864 SHP projects aggregating 3,252 mw were set up, of which 313 projects aggregating 1,586 mw were in the private sector. In addition, 340 projects of about 997 mw were in various stages of implementation.

In the XII Plan (FY13 to FY17), MNRE expects 2,100 MW of new installed capacity to come from SHP projects. MNRE has also suggested practices to improve the pace of implementation of SHP projects.

| **CLASSIFICATION OF HYDROPOWER** | |
|---|---|
| **Plant Capacity** | **Type** |
| Up to 10 KW | Pico |
| 10 KW to 100 KW | Micro |
| 100 KW to 2 MW | Mini |
| 2 MW to 25 MW | Small |
| Above 25 MW | Large |
| Note: 1,000 KW = 1 MW | |

# CHAPTER 6

# Innovative Research

# GESTURE GLOVE CONTROLLER – INNOVATING FUTURE

**S.RAGHUNANDHAN (102308)**
**B.E/EEE - III Year – B Section**

**Innovation is the whim of elite before it becomes a need of the public.**

-Ludwig von Mises

With this quote in mind, I invented "The Gesture Glove Controller".

In Industries, Conventional control mechanisms that are in use today have no interaction with the user. As an investigation into this idea, I've decided to capture simple hand gestures from the user and use that input to control various equipment and devices. I have invented an innovative control mechanism that uses the user's hand gesture data to control various industrial equipment and devices. This, I call the Gesture-Glove, aims to bridge the gap between the user and the industrial devices and equipment.

Gesture-Glove will provide a tangible interface that relies on nothing but some basic and simple hand gestures to wirelessly control any device or software. By merging the user and the traditional hardware devices, my goal is to make the Gesture-Glove to feel more like just an extension to our physical self rather than an external machine.

The device consists of a special glove fitted with buttons beneath all the fingers except thumb. These buttons, when pressed, invokes the microcontroller to obtain the raw orientation axis data of the hand with the help of an accelerometer attached to the user's glove. This data is then processed by the microcontroller to obtain the position and gesture of the hand. Once the orientation is found out after processing, the data is encrypted into special characters. This encrypted data is then wirelessly sent to the microcontroller on the receiver end through RF transceivers. The receiver side has an RF receiver which detects the incoming RF waves from the transmitter and sent to the receiver side microcontroller which decodes the information back into raw data.

Here encrypted data is sent through RF receiver to microcontroller so that data cannot be hijacked by other receivers. This microcontroller decides what to do depending upon the input obtained from the gesture-glove controller. The advantage of using raw data is that a single controller is needful to control multiple equipment and devices over a range of different frequencies for different devices.

Another key fact to note is that user can interact with the environment in a natural way, which makes even the new labours/learners to catch on to the control technique faster.

Gesture glove also completely isolates the user from the device which helps the user to control devices from remote places. The user is also not harmed in case of accidents happening due to the malfunction of the device owning to its operating voltage, making this a natural selection for the future industries.

# EYEBALL MOVEMENT BASED WHEELCHAIR CONTROL SYSTEM

**R.M.SANJANA (102108)**
**B.E/EEE - III Year – B Section**

**It is ability that matters, not disability.**
- Farhan Saaed

Though there are many technological advances for physically sound people there are not many technological improvements for lame people. Hence I have proposed a revolutionary system that lame people can use to operate their wheel chairs with simple eyeball movements.

I have used the orientation of the eyeball of the user for the movement of the wheelchair. If the eyeballs are placed slightly above the normal level then the wheelchair moves forward, if the eyeballs are placed below the normal eyeball resting level then the wheelchair moves backwards, if they are placed at the normal level then the wheelchair comes to rest.

I've done this by capturing the eyeball position of the user and process the data with the help of pixel by pixel analysis and then send it to the wheelchair to control it accordingly.

In this system, the user sits on the wheelchair and wears an eye-wear similar to a monocle. This monocle is embedded with a micro-camera in such a way that it keeps track of the user's eyeball. This micro-camera captures the eyeball images and sends it to the micro-controller at a fixed frame rate where the image is processed to keep track of the user's eyeball position.

The images obtained from the camera are processed sequentially with the help of pixel analysis. This analysis helps us to determine the accurate position and orientation of the eyeball. This information is then encoded and sent to the wheelchair side microcontroller with the help of an RF transmitter. The receiver side microcontroller uses an RF receiver to obtain the transmitted signal and decodes it into the required signal. Two push buttons are used along with the wheelchair mechanism. One button enables/turns on the whole wheelchair eyeball control mechanism. The other button is for emergency stopping, which when pressed stops the wheelchair allowing the user to interact with the outside environment. Once this button is pushed, the first button has to be pressed in order to turn on the devices once again.

This wheelchair is a mobility-aided device for persons with moderate or severe physical disabilities or chronic diseases as well as the elderly. Though these people are physically challenged, their mental abilities are nonetheless sound. Thus, to make these people independent of others help as much as possible, I have developed this system.

# VOICE CONTROLLED ROBOT

**S.RAGHUNANDHAN (102308)** **M.SHANMUGA VEL RAJAN (102020)**
**B.E/EEE - III Year – B Section**

There are two ways of communication available one is verbal and the other is non-verbal. Though non-verbal communication is widely used at all times, people would indeed prefer verbal communication at many situations. Just think of typing a whole document rather than dictating the same. Tragic isn't it?

We have built a robotic system that could be controlled using voice commands.Generally these kinds of systems are known as Speech Controlled Automation Systems (SCAS). Our system will be a prototype of the same. What we are aiming at is to control the robot using following voice commands. Voice enabled devices basically use the principal of speech recognition. It is the process of electronically converting a speech waveform (as the realization of a linguistic expression) into words (as a best-decoded sequence of linguistic units).

Our system uses a microphone which picks up the signal of the speech to be recognized and converts it into an electrical signal. This speech signal is then analysed to produce a representation consisting of salient features of the speech. The most prevalent feature of speech is derived from its short-time spectrum, measured successively over short-time windows of length 20–30 milliseconds overlapping at intervals of 10–20 ms.

The speech pattern is then compared to a store of phoneme patterns or models through a dynamic programming process in order to generate a hypothesis (or a number of hypotheses) of the phonemic unit sequence. (A phoneme is a basic unit of speech and a phoneme model is a succinct representation of the signal that corresponds to a phoneme, usually embedded in an utterance.) A speech signal inherently has substantial variations along many dimensions.

The different types of problems that we faced in our project have been enumerated below:

**DIFFERENCES IN THE VOICES OF DIFFERENT PEOPLE**

The difference is in frequency. Women and babies tend to speak at higher frequencies from that of men.

**DIFFERENCES IN THE LOUDNESS OF SPOKEN WORDS**

The problem of difference is reflected in the amplitude of the generated digital signal.

**DIFFERENCE IN THE TIME**

There is a problem of difference in time which has a direct control over the processing time and the voice frequency.

**OTHER PROBLEMS**

We have to make sure that robot does not go out of reach of our voice.

Though there are many technological problems faced in this manner, it can be easily overcome by refining the technology and using them to suit our needs.

Overcoming all these problems, we'd be able to build a robot that follows user's voice command successfully.

# CHAPTER 7

# General Contents

## BACKDOOR – THE UNKNOWN SECRET OF WINDOWS 7/8

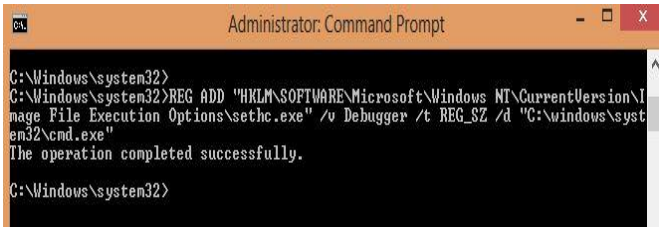
**M.Prabhakaran (102316)**

**B.E/EEE – III Year – B Section**

This backdoor allows you to run command prompt (cmd.exe) with system privilege from the Windows 7 login screen. So with a system privilege command prompt in your hands, you can actually do a lot of stuff including creating new accounts to resetting administrator password to gain access to the password protected Windows. Check out the step-by-step instructions:

1. First, make sure you are logged in as an administrator. Click on the start button, type cmd in the Search programs and files bar, right click on the cmd.exe that is displayed on the list and select "Run as administrator".

2. Copy the command below and paste it to the command prompt.




**REG ADD "HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Image File Execution Options\sethc.exe" /v Debugger /t REG_SZ /d "C:\windows\system32\cmd.exe"**

If you see the message that says "The operation completed successfully", that means you have installed the backdoor. If not, make sure you are logged in to a user account with administrator privilege and also run the cmd as administrator.

3. When you are at the login screen, you can either press the SHIFT key continuously for 5 times or Alt+Shift+PrintScreen which will open a command prompt with system privilege. You can now do whatever you want with it such as typing:

If you need to check the files and folders on the sytem, use the **dir** command instead in cmd.

**net user user_name new_password** – This command allows you to set a new password to any username without knowing the current password.

**net user user_name password /add** – This command allows you to add a new user to the system so you can login to Windows without touching the existing user accounts.

This proof of concept has been around for a very long time and is not really an exploit which is why Microsoft does not intend to patch and block it. To remove or uninstall the backdoor, simply delete the registry value that you have added or paste the command below to an elevated command prompt followed by pressing the Y key to confirm the deletion.

**REG DELETE "HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Image File Execution Options\sethc.exe"**

Here is a simple explanation on how this backdoor works. In the Windows login screen, press shift button five times.

# CAG- Controller and Auditor General

(India's Powerful Authority)

**V.Yuvaraj (112047), II Year, B.E/EEE – C Section**
**P.S.Dinesh kumar, II Year, B.E/EEE – A Section**

"We have not assembled here to enjoy you as cheer girls. We are struggling to achieve sincerity of each department in India"- Vinoth Rai agitated in an accounts related conference.

**Who is this Vinoth Rai?**

Vinoth Rai is the present controller and auditor general of India, who audits all the receipts and expenditure of the Government of India and the State Governments including those of bodies and authorities substantially financed by the government. It was he who brought the cat out of the bag in the mega corruption like 2G spectrum, coal mining scam, commonwealth games. Also CAG is the external auditor of Government-owned companies.

**The CAG:-**

The reports given by CAG are taken into consideration by the Public accounts committee in the Parliament of India. The CAG is the head of the Indian audit and accounts department, which has over 58,000 employees across the country. To say locally the 58,000 employees are the cashiers of India!

The CAG is mentioned in the constitution of India under article 148-151. The CAG is ranked 9$^{th}$ position and enjoys the same status as a judge of Supreme Court of India in Indian order of precedence.

"If 2G spectrum is allocated in a common tender, India might have saved 1 lakh and 79 thousand crore, but they have allocated as "First come, first deserved"- when Vinoth Rai reported this, the whole India was stumbled. Consequently CBI arrested A.Raja (minister), Kanimozhi.

**Power of CAG:-**

The main power of CAG is, CAG does not come under the control of Government of India. It is a self-powered authority. In fact CAG has the equivalent power of Supreme Court judge. CAG is nominated directly by President of India, recommended by the Prime minister. Once the CAG has been selected, he/she cannot be plugged from the power until he/she reaches the age of 65 or before 6 years. Only Supreme Court is having the power!

When Vinoth Rai was nominated in 2008, he toiled for the betterment of auditing of India. Coming May-2013 he gets his retirement!

**Some reports posed by CAG:-**

- In 2009-10 the transport department did not collected the fine amount which worth 7.79 crores.
- When the secretariat was built up, it was domed tentatively which wasted 3.28 crores.
- According to the survey taken in 2011 March, the count of ration cards are more than the population of Tamil Nadu!!

# MENDELEY

*"It's time to change the way we do research"*

**T.S.MANIPRIYA (120222)**
**M.E/PSE – I Year**

## INTRODUCTION:

**Mendeley** is academic papers management tool used for the purpose of information sharing. Mendeley Desktop requires a free Mendeley account that enables users to share and sync data across multiple computers and mobile devices. Like other social networking tools, you can use Mendeley to invite colleagues as well as meet new ones and relocate old ones.

## ABOUT MENDELEY TOOL:

Mendeley is a research management tool for desktop and Web. Organize your own research library. *Share* with other researchers. *Discover* new research and trends. Mendeley Desktop is academic software that indexes and organizes all of your PDF documents and research papers into your own personal digital bibliography. It gathers document details from your PDFs allowing you to effortlessly search, organize and cite. It also looks up PubMed, CrossRef, DOIs *(Digital Object Identifiers),* and other related document details automatically. Drag and drop functionality makes populating the library quick and easy. The Web Importer allows you to quickly and easily import papers from resources such as Google Scholar, ACM, IEEE and many more at the click of a button. Collaborate with fellow researchers and share information, resources and experiences with shared and public collections. Your research team will have easy access to each other's papers. Just create a group, invite your colleagues and drag and drop documents in there. This way you can keep on top of what they're reading and discover more about what interests you. Through the Mendeley research network you can connect with other researchers in your field. This opens up a whole new avenue for knowledge discovery. You can view the most read authors, journals and research papers in your field. You can explore by using tags associated with your research area. By navigating the Web of knowledge available to you, you make some useful contacts along the way too. In addition to that, you can also view interesting statistics about your own digital library.

## Creating a Mendeley account

- To use Mendeley, the first steps are you need to complete are (1) create an account and (2) download the software.
- Go to www.mendeley.com and simply sign-up for an account:
- The sign-up process is quite streamlined and similar to other social networking sites. You initially provide your contact details

- Once you've created an account. You are ready to use Mendeley!
- The free option gives you 500MB of personal storage and another 500MB of shared space, plus the ability to create five private groups with up to 10 users in each.
- Beyond that, there are a couple of tiers of subscription plans that, for a few dollars a month, give you much more Web space and allow you more groups with more users. As a result of this subscription model, both the desktop and iOS apps are free downloads.

**BENEFIT:**

- As more researchers join the group, your data sets will become richer, enabling you to draw more conclusions from it and to facilitate more connections with it.
- It is the reference manager for research.
- Mendeley now peaceful co-exists with Track Changes in MS-Word.
- It can be used in online as well as offline also.
- We can highlight the important point with the marker, make note in the same page itself and view in full screen, and so on.
- It is user friendly software.

**CONCLUSION:**

Mendeley will automatically generate ***bibliographies***, with the help of that we can collaborate easily with other researches online. Read papers on the go, with our new ***iPhone applications*** also.

***"If you want to succeed you should strike out on new paths, rather than travel the worn paths of accepted success"***

# AKIO MORITA BIOGRAPHY -THE MAN BEHIND SONY

**A.Nachammai (120220)** **P.Pon Ragothama Priya (120207)**

**M.E/PSE – I Year**

Akio Morita was born January 26, 1921 in the industrial city of Nagoya, Japan. He was born into a family of sake brewers who have been in the business for 14 generations. His father, Kyuzaemon, groomed Akio from an early age to take over the family business.

His education took him from sitting in on his father's business meetings during high school to graduating as physicist from Osaka Imperial University. At the time of his graduation, Japan was involved in the Pacific war and Akio joined the Navy in 1944.

After the war, Akio was packing his bags to join the Tokyo Institute of Technology when he read an article by Ibuka in a newspaper column. He went to talk to him and they ended up founding Tokyo Tsushin Kogyo (TTK). They financed the business with a 190000 yen ($530) loan and had approximately 20 employees in their bombed out department store.

While Ibuka was responsible for product development and -research, Morita was responsible for their marketing, globalisation, finance and human resources.

Akio wasn't afraid to stick his neck out when it came to challenging 'acceptable' business practices. This was evident in that several of their early products were licensed from American companies and even the visionary name change to Sony (from sonus in Latin meaning sound and the American slang "sonny") was frowned upon at the time by his Japanese contemporaries.

In 1960, Sony Corporation of America was established and in 1961 Sony became the first Japanese company on the New York Stock Exchange through the issuance of their American Depository Receipts. Morita went so far as to move his whole family to America in 1963 in order to learn about their culture and traditions.

Sony introduced various innovative products to America and the world. The famous 'Walkman' has even become part of the standard lexicon (language) of the English world. One of a ton of other products that Sony also introduced that stands out is the VCR, or video cassette recorder.

Akio Morita is remembered in the contribution of Sony. Yet, he contributed in many more ways. He was also chairman of the Japan-U.S. Economic relations Group (or Wise Men's Group) and was up to accept appointment as chairman of the Keidanren (Japan Federation of Economic Organizations) on the day he had a stroke. His stroke prompted him to resign as active chairman of Sony in 1994.

Akio Morita died on Sunday, October 3, 1999 at the age of 78. His wife Yoshiko, his sons Hideo and Masao and his daughter Naoko survive him. He was fiercely strong Japanese businessman who recognized that Sony had to be, and indeed was, made in America.

# KNOW YOUR INSTRUMENTS

**M.A.Arul Flawrence (122904)**
**B.E/EEE - II Year – A Section**

* **Calorimeter** measures the quantity of heat.
* **Electroscope** is an instrument for detecting the presence of electric charge.
* **Hydroscope** is an optical instrument used for seeing objects under water.
* **Hydrophone** is used for measuring the sound under water.
* **Lactometer** is an instrument used for measuring the relative density of milk.
* **Manometer** is used to measure the pressure of gases.
* **Magnetometer** is an instrument for carrying sound to long distance.
* **Megaphone** carries sound to long distance.
* **Photometer** compares the luminous intensity of the sources to light.
* **Radio Micrometer** is an instrument used for measuring heat radiations.
* **Rain Gauge** measures rainfall.
* **Seismometer** is used for recording the intensity and origin of earth quake shocks.
* **Thermometer** is an instrument used to measure temperature.
* **Viscometer** measures the viscosity of a fluid.

# VISION

TO SET A BENCHMARK FOR PRODUCING ENGINEERS WITH DIVERSE SET OF SKILLS, AND ABILITIES TO HELP FIND A SUSTAINED SOLUTION TO MEET THE NATION'S POWER DEMANDS WITH OPTIMUM UTILIZATION OF GREEN ENERGY

# MISSION

To provide our students with a strong theoretical & practical foundation in Electrical and Electronics Engineering, experience in interpersonal communication, teamwork, professional & ethical conduct and critical thinking

Volume 1 - Issue 1 - April 2013