ELECTRICAL INSTALLATION ENGINEER NEWS LETTER

TAMILNADU ELECTRICAL INSTALLATION ENGINEERS' ASSOCIATION 'A' GRADE (Regn. No. 211/1992)
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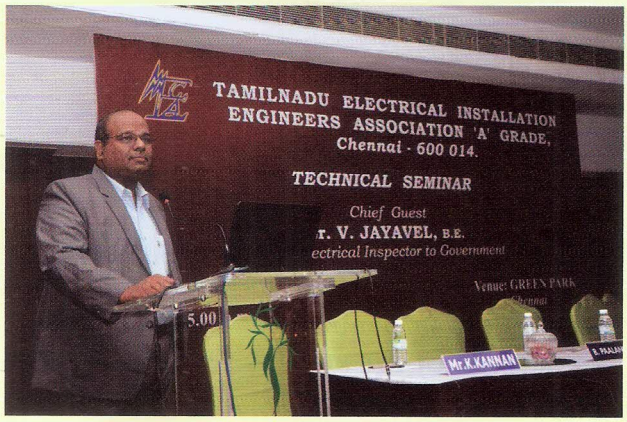
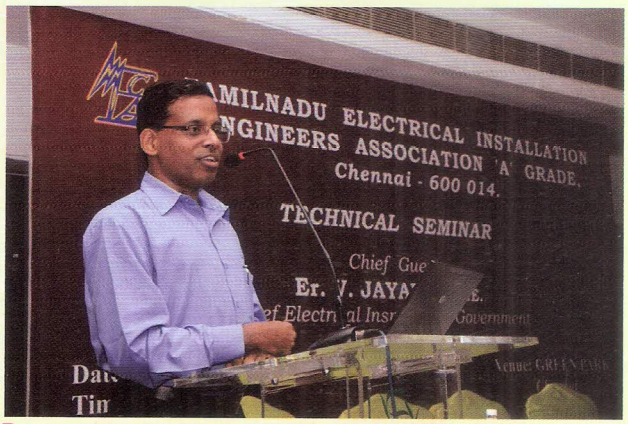
TECHNICAL SEMINAR - 27.02.2016

From left to right: **Mr. K. KANNAN**, *Secretary, TNEIEA*;
Mr. B. PAALANI KUMAR, *Vice President - Chennai, TNEIEA*;
Mr. U. BASKARAN, *President, TNEIEA*; **Mr. S. RAVICHANDRAN**, *HAVELLS INDIA LTD,*;
Mr. VENKATRAMANA, *MAHINDRA & MAHINDRA LTD.*;
Mr. C. THAYABHARAN, *SOORYA ELECTROCOMPONENTS (P) LTD.*;
Mr. P. SUYAMBU, *Treasurer, TNEIEA*

Welcome address by **Mr. U. BASKARAN**, *President, TNEIEA*



Presenting the Technical Papers by **Mr. S. RAVICHANDRAN**, *HAVELLS INDIA LTD.*



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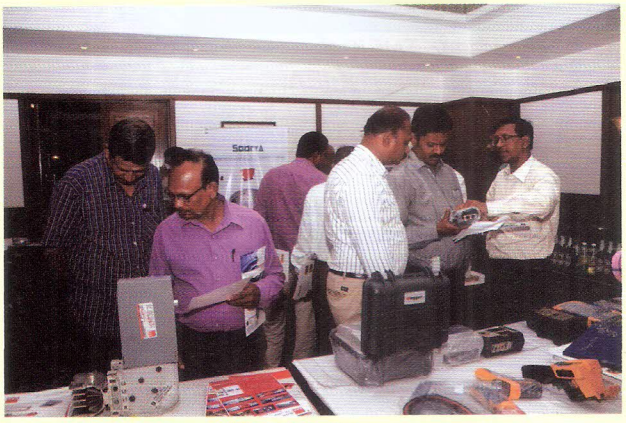

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Delegates at the seminar

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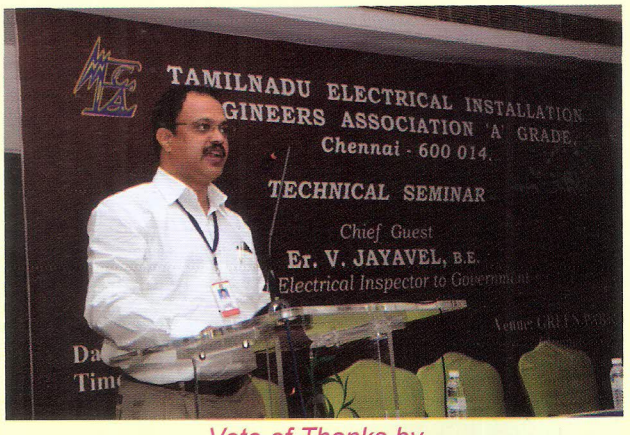

Vote of Thanks by
Mr. K. KANNAN, Secretary, TNEIEA

EDITORIAL

Dear Members, Fellow Professionals and Friends,

Seasons Greetings And Best Wishes!!

Let The New Financial Year Bring In More Business And Earnings!!!

On 27th February 2016, our association conducted Technical Seminar at Hotel Green Park, Vadapalani, Chennai. More than 200 delegates participated in the seminar. It was really heartening to see such a good participation, indicating bright future for our association. I thank all the members attended the seminar from my Editorial desk.

The Budget for 2016 – 17 has just been presented in the Parliament and there are mixed reactions about the same from the Political Parties and the Public. Looking at our Country and its Progress, we certainly realize, that in spite of so many problems periodically created by Nature and by our neighbouring Countries and by violent elements in our own country, there has been Good Progress since Independence. At one point of time, our Country was so badly placed with regard to Food Production that drove us to depend on Food Imports and the situation was conveyed then as 'Ship to Mouth'. With high growth of population, it was even predicted at one time that India will have famine deaths in large scale in the mid and late seventies, but due to implementation of "Green Revolution", we had our First Self Sufficient year in Food Production in the year 1979 and we have not looked back since then. Even in the Current Period we are expected to have Food Production with exportable surplus, added with good growth in Plantation Crops, Vegetables and Fruits as well. The White Revolution has also helped substantially. As our dear Dr. Abdul Kalam dreamt, it is time we work for a Second Green Revolution to meet the growing needs and to fully exploit our potentials. We are blessed with abundant Sun Light and fairly sufficient Rains, but what can help adequately towards this objective is, Government support and focus. This Budget is identified as Agriculture oriented Budget with large allocations for all activities of Agriculture, increasing cultivable area, helping more with Water Distribution and Management and Rural Development which can all help increase Agriculture Production and Distribution. As one Economist identified in a 'Nutshell', in our Country, on an average, we are able to do only one crop per year in all the cultivable area which can easily go up to two or three crops per year with adequate distribution of Water, improving Irrigation and working on Water Management. We are celebrating '**National Water Day**' very rightly on the 22nd of March. Production can go up further with development and adoption of suitable '**High brid**' varieties of all crops for our lands.

This Budget has also measures to improve Manufacturing and Services and Investments and more R & D and more '**Start Ups**' and encouragement and funding for Micro, Small and Medium Enterprises and so on giving hope for all round improvements of all activities which will all certainly percolate to Electrical Businesses and Activities. The Government's move to more of 'e' Governance and Welfare activities and allocations can help India's fast growth.

We Pledge to continue our Activities focused to Safety and Efficiency and Excellence.

We thank all those members who have helped us by participating in the advertisements appearing for the issue February 2016 – JL Seagull Power Products, Universal Earthing Systems Pvt. Ltd., Wilson Power and Distribution Technologies Pvt. Ltd., Power Links, OBO Bettermann India Pvt. Ltd., Sun Sine Solution Pvt. Ltd., Galaxy Earthing Electrodes Pvt. Ltd., Supreme Power Equipment Pvt. Ltd., Ashlok Safe Earthing Electrode Ltd., Abirami Electricals, FLIR Systems India Pvt. Ltd., Pentagon Switchgear Pvt. Ltd., Elektrotec 2016, Cape Electric Pvt. Ltd.

EDITOR

ELECTRICAL INSTALLATION ENGINEER

President : U. BASKARAN
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MEMBERS DETAILS

S.No.	Company Name	District	Contact No.	License No.
31.	Emaar Electricals	Chennai	044-23741902, 98409 36400	EA 1212
32.	Eskay Enterprises	Chennai	044-23661051, 94440 63691	EA 1764
33.	Ess Enn Power Controls P Ltd.	Chennai	044-26512296, 72999 09466	EA 2122
34.	Ess Yen Electricals P. Ltd.	Chennai	044-28141721, 98410 26136	EA 2095
35.	EA Facilities Services P. Ltd	Chennai	044-26645458, 98403 27419	EA 2983
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40.	The Ganga Consultants & Contractors	Chennai	044-23633849, 98410 68816	ESA 158
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42.	Guru Engineers	Chennai	044-22471252, 94447 82802	EA 2762
43.	Henry and Farad P. Ltd.	Chennai	96861 90888, 95662 84411	ESA 360
44.	Immanuel Electricals	Chennai	044-24986566, 94440 38369	EA 2568
45.	Inel Power System Engineers (P) Ltd.	Chennai	044-23712710, 98410 99221	ESA 263

EVENTS

L&T Training Programme

Selection of LV Switchgear and Applications	4th – 8th April 2016
Selection & Application of Drives	11th – 13th April 2016
Introduction to Industrial Electrical Systems	18th – 20th April 2016
Reactive Power & Harmonics Mitigation	21st – 22nd April 2016
Industrial Electrician Training Programme	25th – 26th April 2016
Industrial Protection with Numerical Relays	26th – 29th April 2016
Electrician Training Programme For Residential Buildings	27th April 2016

Venue: L&T Ltd., Switchgear Training Centre, Nilgiris
Contact Tel.: 0423-2517107 **Fax:** 0423-2517158
Email: stc_coonoor@lntebg.com

Events Profile: Intersolar is the world's leading exhibition series for the solar industry and its partners. The exhibition series focuses on the areas of photovoltaics, PV production technologies, energy storage and solar thermal technologies. Since its founding, it has become the most important industry platform for manufacturers, suppliers, wholesalers, service providers and partners of the solar industry.
Date: 6th April 2016
Venue: Istanbul, Turkey
Website: http://www.intersolarglobal.com/en/summits/turkey.html

Events Profile: The Global Algae Biodiesel World 2016 examines the vast global market potential of biofuel from algae. It explores the technology, new research, and knowledge for developing this next-generation biofuel. This is a programmed where you shall study & learn the ALGAE System in totality from the top Algae scientists, experts and technologists.
Date: 7th – 8th May 2016
Venue: Jaipur, India
Website: http://www.indiamart.com/advancedbiofuelcenter/biodiesel-training-course.html

Events Profile: The launch of three mega urban schemes in India, i.e., Smart Cities Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT), and Housing for All in urban areas, will set in motion the process of urban transformation to enable better living. The missions are new, innovative and focused on pressing needs to improve the quality of life for citizens today, and in the future.
Date: 11th – 13th May 2016
Venue: Pragati Maidan, New Delhi
Website: http://www.smartcitiesindia.com/

KNOW THY POWER NETWORK - 102

Let us proceed further. Before embarking on our journey, let us revisit some of the valid points that we have learnt so far.

We have studied that to handle an electrical equipment safely and to extract maximum service from it, *we must be familiar with the equipments' functional features, its main components or constituent parts, their characteristic features, their behaviour under various service conditions (both normal and abnormal service conditions), its operating environment and its vital inputs*. All these make it necessary to learn the required basics solidly in a comprehensive and simple way. With this in sight, this article has treated some of the characteristic features of the equipment insulation so far. That is to say that we have to see the inner part of the equipment by crossing various layers and finally reach its "core". Unveiling / removal of various separating elements form part of our approaches to reach our main goal. Viz. Determination of Happiness Index of the equipment. In our endeavour journey to reach this destination / goal post, we have crossed only a few "sign posts" thus far; we need to tread cover a long distance.

Among the areas so far covered are,

- Tan delta, insulation resistance and dissipation factor of insulation which reveal its characteristic performance status.
- Temperature and voltage withstand levels of equipment insulation which reflect its ageing / degradation characteristics.
- Partial discharges which portray or picturise whether the entry of "electrical termites" in the insulation has started or not.

Now let us see the finger prints / signature tests which provide us with a snap shot of its internal structure and also its visible / physical features which portray its operating status.

I. FINGER PRINT TESTS

(a) Transformer (SFRT) – (i) Sweep frequency response test is one of the signature tests generally performed on transformers. This non-destructive and non-intrusive test is helpful in identifying / detecting the mechanical changes and deformations that take place in a transformer. Winding deformations, displacements between windings, core movements and loosening of core bolts and nuts are cited an examples in this regard. By measuring the electrical transfer functions over a wide frequency range, the mechanical integrity and the changes that take place in the core, its clamping structures and windings can be found out. This kind of frequency response analysis of the main components of the transformer is generally treated as its "Finger Prints" or "Signatures". Faults, mechanical shocks and transportation movements / damages cause deviations or alterations in this "Frequency Response". By comparing the present frequency response measurements with that taken earlier during its manufacture / commissioning, the measurements made in different phases, the measurements obtained with similar sister units and with the recent finger prints taken on the same transformer the positional (mechanical) and electrical variations of the internal components of the transformer can be assessed.

(ii) HV Megger Tests – IR tests like Time vs Resistance Test, Step Voltage Test, Polarisation Index and Dielectric Discharge Test.

(iii) One more useful signature test is "Dissolved gas analysis test". This test is performed with the aid of "Gas chromatograph" which furnishes the quantum of various gases like Hydrogen, Acetylene, Co_2 and Co that dissolve in the oil. The assessed proportion / quantum of these dissolved gases will reveal

- Incipient faults
- Localised heating areas (hot spots)
- Core overheating, bad joints, loose bolts
- Arcing between contacts in the tap changer and arcing between turns
- Insulation break down and finally
- Partial discharges or low energy spark discharges or corona.

Another notable test is the one that is used to find out presence of moisture in the transformer oil and there by the condition of winding insulation. Also Dielectric Frequency Response test which helps to determined the moisture ingress in the installation we also be consider as a screening test in this regard.

(b) Rotating Machinery Like Generators and Motors – The condition of the operating part of these machineries are generally revealed by HV Megger tests like PI value and Dielectric Discharge tests. In addition, their output, noise, mechanical vibrations and temperature reflect its inner condition clearly. So further special "Signatures or Finger Prints" that reveal its inner core condition are generally found to be superfluous or unnecessary.

(c) HV Circuit Breakers – Among the finger prints provided by these breakers that reveal its conditions are,

- Its cumulative interrupted current and the number of operations performed by it.
- Its contact resistance
- Changes in its vibrations which in turn signify changes in its operating mechanism.
- Simultaneity of its contacts opening / closing.

(d) Current Transformers – Over heating (hot spots as seen by infra red thermograph) and increased tan delta value of its insulation are the key signatures of this equipment.

II. PHYSICAL / VISIBLE FEATURES

Several key aspects that relate to the outer part / enclosure of the rotating equipment also normally reveal its health status / operating condition. Among them are,

i. Its vibrations and the noise brought by it.

ii. Condition of its bearing and lubricating oil systems; condition of its power transmission systems like gears, pulleys, belts etc.

iii. Condition of its cooling medium-oil, air / hydrogen - Blockages if any of its circulating air system

iv. Its loading pattern

v. Presence of oil leaks, dust, dirt, chemical vapours

vi. Its operating temperature or temperature rise (over heating)

In addition to these, the appearance / visual inspection of the machinery concerned will provide useful information in a practical manner. These less time consuming data will help to get a "snapshot" of the inside and outside of rotating machineries.

Before turning our focus on the role played by ageing phenomenon on the health condition of an equipment. Let us classify various indicators (as shown in fig 1) that help to assess the Happiness Quotient or Index of the equipment. Upon adding the ratings or marks given to these indicators, we can assess Happiness Index of an equipment. The Happiness Indices of various equipment in a plant will help to arrive at the "overall comfort level" of the plant.

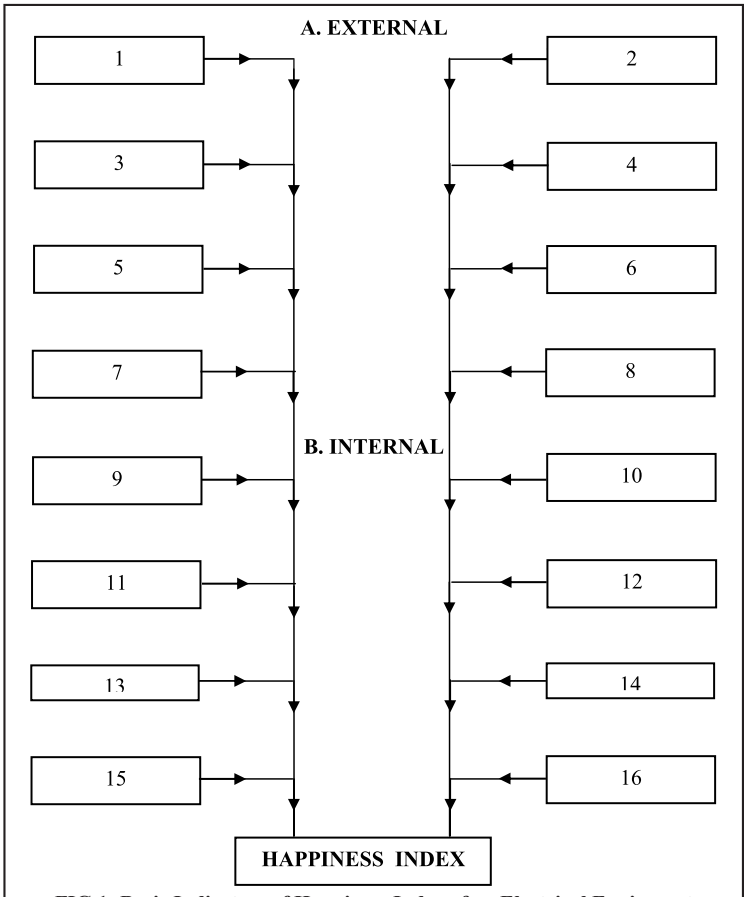

FIG 1: Basic Indicators of Happiness Index of an Electrical Equipment

LEGEND

A. External

1.	Adequacy of selection and installation	(All aspects of engineering design, handling, erection and commissioning). In addition poor quality of manufacturing as revealed by frequent failures and defects.
2.	Operating History	(Faults including close-up faults failures experienced; repairs carried out, retrofitting if any)
3.	Outer or working environment	Presence of dust, dirt, moisture, (water leaks), oil, corrosive fumes, chemical attacks, higher temperature and hot spots condition of foundation; tightness of foundation bolts and outer structure of the equipment, presence of metal fatigue, if any.

4.	Visual Inspection (condition of external parts of equipment / outer structure)	Presence of corrosion oil / water leaks (clogging of explosion vent and outer enclosure, adequacy of air circulation, condition of outer enclosure, effectiveness of cooling medium (air / water) presence of over heating (Hot spots), lubrication, levels of noise and vibrations.
5.	Quality of inputs	Quality of input power; condition of air receiver
6.	Presence of external threats	Presence of Arcs and Sparks, fire, chemical attacks, overvoltage surges like lightning, ferro resonance and over fluxing
7.	Severity of duty or loading condition	Details of loading pattern, whether frequent switching on and off take place.
8.	Condition of components like bearing brushes belt etc	Lubrication oil condition; tightness of bolts and brushes; presence of sparks if any noticed.

B. Internal

9.	Internal condition of key components like winding, its insulation and core stampings as revealed by various signature, diagnostic and condition monitoring tests. In addition inherent defects, if any revealed by these tests	(a) Transformer Winding Movement – (i) Sweep frequency response test (ii) DG A test (iii) Megger tests (b) Rotating Machines (Generators and Motors) HV Megger tests Vibration analysis Condition of lubrication oil and Infrared thermographic tests for over heating (c) Circuit Breakers Contact Resistance Changes in vibrations Contact travel Simultaneity of contacts closing and opening Oil / SF6 gas leaks (d) Current Transformers External hotspots (over heating) and tan delta value of its insulation
10.	Thermal and electrical withstand levels of insulation	Check whether the present level are within / beyond the permissible / tolerance
11.	Condition of insulating medium (oil / SF_6) as revealed by diagnostic tests	Various screening tests on transformer oil SF_6 gas - density pressure and moisture ingress level.
12.	Status and adequacy of protection	Presence of inadequacies weak spots or other missing links in the protective chain.
13.	Adequacy of maintenance	Adherence to the guidelines given by the manual of manufacturer or departmental / renowned standards
14.	Adherence to the operating procedures as given by the manufacturer	Adherence to the guidelines given by the operating manual of manufacturer or departmental / renowned standards
15.	Presence of various ageing factors and its impact on the life span of equipment	Presence of Thermal, Mechanical, Electrical, Physical and Environmental ageing as revealed by various tests, residual life determination
16.	Condition of monitoring Devices	Its present level, are they working properly

The forthcoming articles will deal with these indicators one by one
Till then, kindly stay tuned.

(To be continued...)

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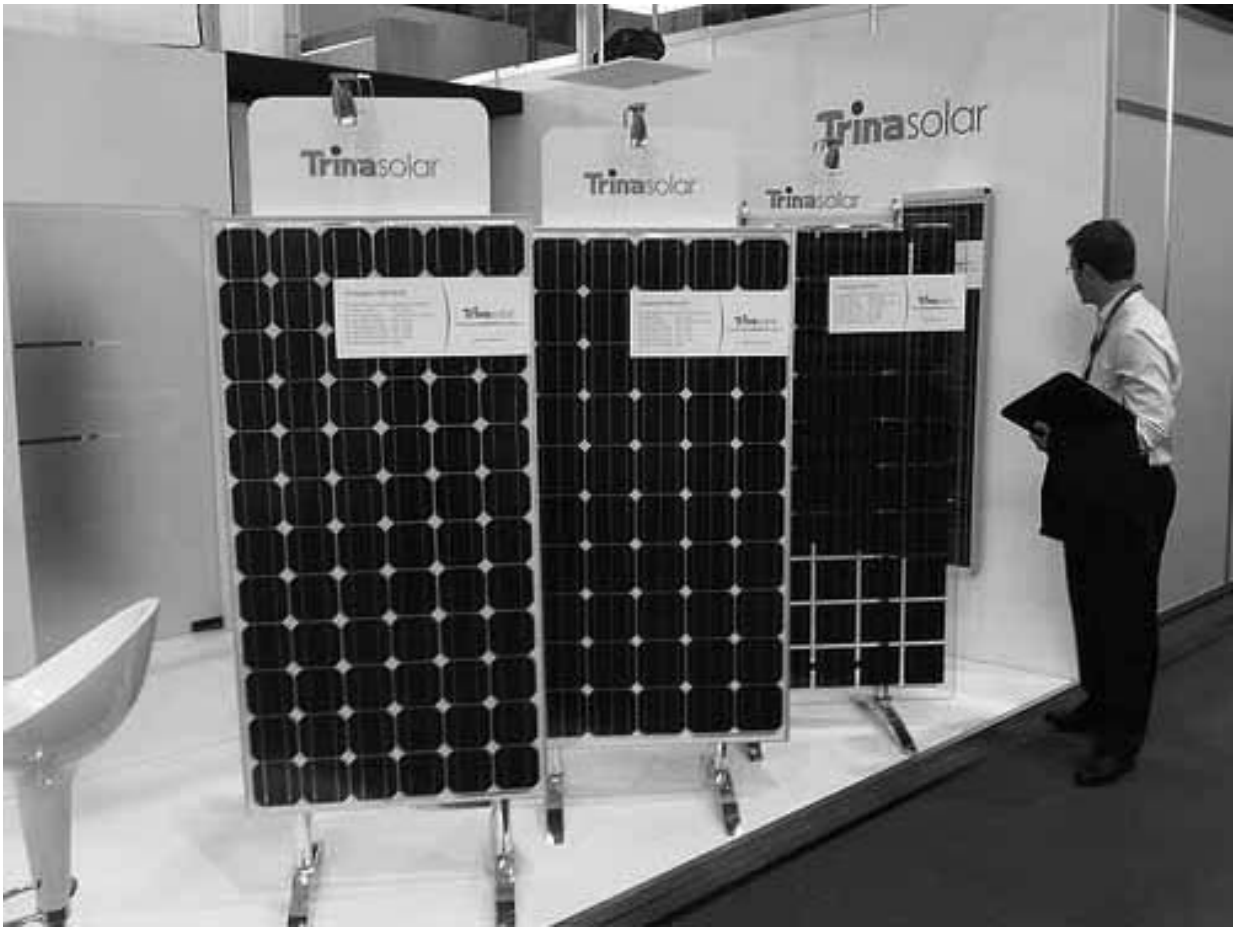
TRINA SOLAR TO OPEN SOLAR PV MODULE MANUFACTURING HUB IN INDIA

Chinese solar photovoltaic module manufacturers are facing anti-dumping investigations from almost all major solar power markets from Australia to the US. As a result, many manufacturers are looking for alternatives that would allow them to escape possible anti-dumping duties.



Encouraged by the "Make In India" campaign launched by Indian Prime Minister NarendraModi, Trina Solar has announced plans to set up solar PV module production facilities in India. CEO Zhiguo Zhu announced his company's plans at the World Economic Forum held in New Delhi recently.

With a clear aim to escape anti-dumping duties and shed its China-centric image, Zhu stated that the company wants to have at least 20–30% of the total module production coming from outside China. So what better market than India? The Indian government has announced plans to set up 100 GW of solar power capacity over the next five years, a target more than double the target set by China between 2011 and 2015.

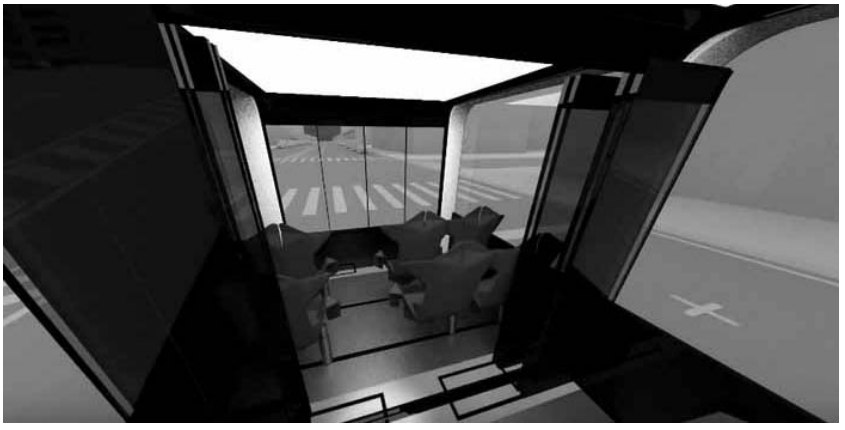
Zhu expressed cautious optimism about the "Make In India" campaign. He urged the Indian government to make regulations simpler and clearer so that more international companies can be attracted. If the company finds the business environment conducive, it would significantly increase its investment in India and even perhaps export modules manufactured in India.

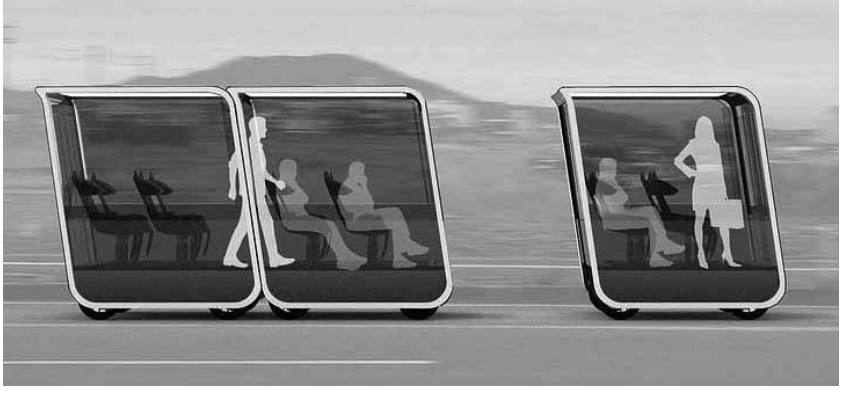
Trina Solar is already a fairly popular brand amongst India's solar PV project developers. Of the 2.7 GW of solar power capacity operational in India, the company has supplied modules for 280 MW capacity.

It is notable that only weeks ago the Indian government announced its decision not to implement anti-dumping duties on imported solar PV modules. It would instead promote the use of domestic solar PV modules by setting up large projects through government-owned companies.

Sometimes outer beauty, no matter how abundant, cannon mask the ugliness you try to hide inside. Get to know someone before you decide they truly are beautiful.
– ASH SWEENEY www.wisdomquotesandstories.com

NEXT FUTURE TRANSPORTATION SYSTEM





Part mass transit, part personal mobility, the Next Future Transportation system is designed to act as an efficient, coordinated network that shuttles folks from door to door. Still in the early concept stages, the design features a series of modular, self-driving electric pods that pick passengers up on demand and link together in bus-like form on the journey to get each of them from point A to B as efficiently as possible. Italian industrial designer and Next Future Transportation Inc. founder TommasoGecchelin imagines our transportation future combining the best attributes of current transportation methods while trimming some fat. He envisions a set of self-driving modules that operate on existing roadways. Unlike current public transportation systems, there are no defined routes, and users order up transportation at the touch of a mobile app. Each module measures 8.8 feet (2.7 m) in length and holds up to 10 people (six seats plus standing room for four). Because the Next Future system relies on existing roadways, it avoids the need for any added physical infrastructure, such as rails. Instead, its infrastructure is purely virtual, consisting of an advanced, cloud-based routing system that not only drives the autonomous pods to and fro but also coordinates all pods in the system, both private and public, linking swarms together wherever possible to cut traffic, optimize occupancy and ensure the most energy-efficient performance.

The modules attach and detach while in motion, and the automatic doors connect the interiors so that passengers can move freely between pods, much like they'd move from car to car on a train. Not only is this interior mobility useful for getting up and stretching or accessing amenities on other modules, but it's a necessary part of the ride – when it's time for you to split off from the greater train toward your destination, you exit to a separate module and go your separate way.

Unlike a bus or train, which runs the same route no matter how few people are on it, the Next system sends individual modules where they're needed and links them in high-traffic areas. Gecchelin even imagines passengers ordering up service pods, such as bathrooms, restaurants or shops, which would automatically locate and join the existing vehicle, allowing said passenger to access needed services without stopping.

In a hypothetical travel scenario, you order a Next module with your smartphone app. It picks you up at home and rolls through your neighbourhood to the main thoroughfare, where it links up with a multi-module train. If you're

going a long distance, you sit back and enjoy the ride, maybe order up a restaurant or bar module. If you have a relatively short journey, an empty pod joins up with the train and the app prompts you to move to this pod, which splits off and drops you at your destination.

Does all that sound a little out there? As we said from the get-go, it is still just an early concept. The design appears to be more than just one designer's wild flight of fancy, though; Gecchelin has incorporated Next Future in Silicon Valley and taken on a CEO and advisory board. The first Next design came out in 2012, and this year the company revealed version 3.0. It plans to work on prototypes with hopes of launching a viable system by 2020.

We won't be holding our breath waiting for Next systems to start revolutionizing cities within the decade, but the design does spark an interesting conversation about future mobility systems. It's a little hard to imagine boxy pods zipping and swarming in all directions around the city grid while fighting through existing car traffic, but we do like how the design combines elements of personalized, point-to-point transportation, car sharing, and efficient, gridlock-reducing mobility. That's all on paper, of course, but it's an interesting alternative compared to more established paradigms: self-driving personal automobiles, existing public transportation options, "last mile" personal mobility devices, etc.

Since this concept is still so young, we won't get into all the claimed advantages and statistics, but you can learn more about those projected benefits on Next's website. It has a few infographics showing how the system could benefit various user groups.

The video below provides a quick look at the Next v3.0 in action, offering a nice visualization of how the system would work from the user's perspective. Take a look and let us know what you think: intriguing vision for future mobility or problem-riddled non-starter?

Source: Next Future

NEW FRENCH SOLAR FARM, EUROPE'S BIGGEST, CHEAPER THAN NEW NUCLEAR

French energy group **Neoen** on Tuesday inaugurated a 300 megawatt (MW) solar farm, **Europe's biggest**, which will produce power at a price below that of new nuclear plants. Built on a 250-hectare site south of Bordeaux, the plant will provide power for 300,000 people and cost 360 million euros. It will sell power at 105 euros per megawatt-hour (MWh) for 20 years, well below the cost of power from new nuclear power reactors.

"We will deliver power at an extremely competitive price, similar to wind power, and at any rate cheaper than the cost of power from new nuclear plants," Neoen Chief Executive Xavier Barbaro told reporters on Tuesday.

French state-controlled utility EDF plans to build two nuclear reactors in Hinkley Point, Britain, which will produce power at a government-guaranteed price of 92.5 pounds per MWH, or about 130 euros. EDF's existing French nuclear reactors, mostly built in the 1970s and 1980s, produce power at a cost of around 55 euros per MWh. Barbaro said the facility's solar panels are not oriented toward the south, but on an east-west axis, which allows them to produce three to four times more power for the same surface area.

The east-west orientation also allows the panels to produce more power early in the morning and late in the afternoon, which corresponds more closely to French power demand patterns. The Neoen plant's 300 MW peak capacity is about one third of a nuclear plant, but a solar panel's "**capacity factor**" - the amount of time it actually produces power - is around 10 to 25 percent, compared to up to 90 percent for nuclear plants.

Barbaro said Neoen's Bordeaux solar plant shows that solar photovoltaic can be highly economical in terms of geographical footprint. He also said while the solar panels are Chinese made, they make up only a minority part of the investment and that the main costs are related to construction, engineering, cabling and electrical equipment, for which there are many competitive French suppliers.

Neoen has said it aims to install 1,000 MW of capacity by 2017, about half in France. ***Courtesy: REUTERS***

BYD OUTS WORLD'S LARGEST BATTERY ELECTRIC VEHICLE

When we think of electric vehicles, we generally think of conveyances down the lower on of the size spectrum, like cars, bikes and maybe even skateboards. But at this year's American Public Transportation Association (APTA) Expo in Houston, BYD Motors took things in the other direction with the premiere of what it claims is the world's largest battery electric vehicle – the Lancaster eBus.

Billed as America's first electric articulated bus, the Lancaster eBus is named after the California city where it was designed and built after over two years of development. From the outside, the 60-ft (18.2-m), articulated, battery-electric vehicle looks like any other bendy bus, but it hides some advanced electric drive technology. This includes in-wheel motors that can handle gradients of up to 21 percent and make it suitable for hilly urban areas, and give it a range of over 179 mi (288 km) with a load of 120 passengers.

Based in Pingshan, China, BYD specializes in batteries rather than buses, so the company's philosophy has been to build the bus around the battery rather than select the battery for the bus. The Lancaster eBus uses BYD's iron phosphate batteries also found in its cars and non-articulated buses. The company says these carry enough charge to complete a full day's work without needing a top up, meaning the bus can be charged exclusively at night, when rates are lower.

Besides strategic charging, BYD says that the Lancaster's battery can be recharged 10,000 times and still retain a 70 percent charge. This translates as a 25-year lifespan, which is greater than that of the buses that use it.

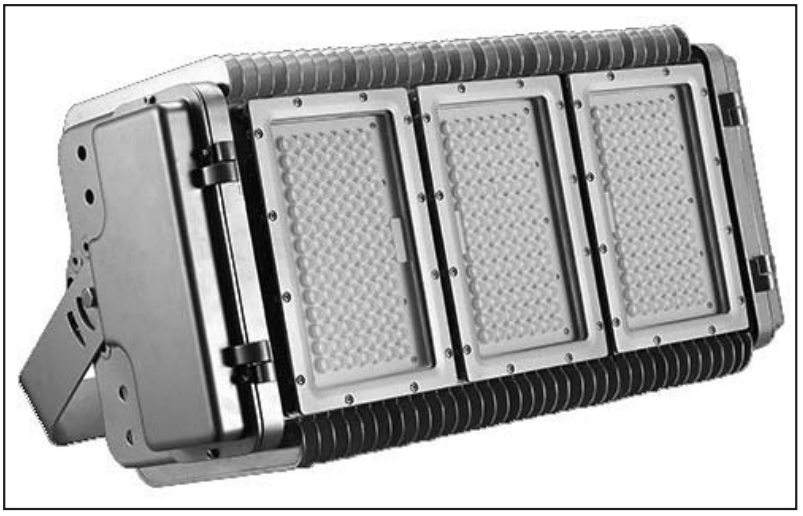
In addition, BYD claims that the Lancaster's batteries can withstand fire, impact, punctures, and crushing to a very high degree, and that the Lancaster is a good bus to have around in a disaster. This is because one bus can recharge another, and the Lancaster can also feed power to the grid or a building in an emergency.

"BYD's mission is to create safer and more environmentally-friendly battery technologies," says BYD Motors Fleet Sales Vice President, Brendan Riley. "This has resulted in the BYD iron-phosphate battery; a fire-safe, completely recyclable, and incredibly long-cycle technology – the foundation of BYD's electric buses. These buses run entirely off battery power lasting up to 24 hours on a single charge, with single off-peak charging time of two to four hours. No additional generation capacity is needed to be built to charge our buses at night since the grid is only 40 percent utilized."

BYD also took the opportunity to unveil its 40-ft (12.2-m), battery-electric Transit bus built for the Antelope Valley Transit Authority, which drove 1,500 mi (2,414 km) from Los Angeles to Houston with zero emissions at 250 mi (402 km) per charge, and covering 750 mi (1,207 km) in 24 hours for an electricity cost of US$200.

Source: BYD

SOGA 180-880W LED STADIUM LIGHT REPLACES UP TO 2000W HPS OR MH LAMPS



After long term assessment, research and development, SOGA has finally released its latest creative and powerful LED stadium light, which is named Multifunction Series LED flood light with 110 lm/W luminous efficiency. Engineers equipped it with imported LM-80 tested LEDs, a quality driver with 7 year warranty, finlike heatsink with copper pipes, and premium LED lens.

Various 180W, 210W, 320W, 440W, 650W and 880W system powers allow the LED stadium light to be used in different applications, such as sports field, outer wall of shopping mall, parks, plaza, intersection, airport, sea port, etc. As we know, normal LED flood lights emitting very short beams of light result in bad lighting uniformity on sports fields, but SOGA's LED stadium light uses a special LED lens and illuminates at very long distance.

Features:

- Optional rated power including 180W, 210W, 320W, 440W, 650W and 880W
- 110 lm/W with optional dimming solution including DALI, 0-10Vdc, PWM signal
- Imported LED, LM-80 tested (L70@85 deg. life expectancy = 100,000 hours)
- High quality driver with surge protection device, 7 years warranty
- Optional beam angle including 10, 30, 60, 85*135 degree
- Finlike heatsink with heat pipes improves heat dissipation and working life
- 50% to 60% energy saving than metal halide and high pressure sodium
- Anticorrosive finish, IP67, 5 years warranty

SOGA Electronics Limited was established in Shenzhen, China. SOGA has been dedicated to manufacturing and supplying excellent LED lighting products to its esteemed customers all over the world. In 2012, SOGA established a cooperative relationship with a professional engineering team, devoted to combining advanced design ideas and the preponderant production costs, offering a new LED business concept — Reliable quality but competitive price!

ENERGY STORAGE INCLUDED IN MAJOR INDIAN PV TENDER

Energy storage is to be included in India's state-run solar energy tenders for the first time under plans to help smoother integration of renewables into the grid.

The Solar Energy Corporation of India (SECI), a state-owned entity helping to drive the India's National Solar Mission (NSM), will float a tender for PV capacity within the 750MW Ananthapurama Solar Park in the Kadapa district of Andhra Pradesh including energy storage capacity, a SECI spokesman has confirmed to PV Tech.

The spokesman said the project is still in a "nascent state" so he was unable to provide detail on the capacity or duration of battery energy storage being tendered, and said it would not apply to all 750MW of solar within the park.

However, a report from Indian news outlet Economic Times said that every bidder for solar capacity in the park in this tender will have to include a small storage system beside its PV plant, coming to a combined total of 100MW storage capacity.

Many industry commentators see grid stability as a major potential bottleneck for Indian PV in the coming years. While energy storage can offer beneficial services such as grid-balancing, the installation of energy storage at this stage is likely to drive up the electricity tariffs.

Last month, one of India's largest solar developers ACME Cleantech Solutions said it believed that its strong track record in PV installations would set it in good stead to pioneer solar-plus-energy storage solutions across the country, in what it claims is an opportune moment to start pilot projects.

At the time, Samir Sharan, chief executive of the ACME group said combining solar and its lithium-ion energy storage systems would help his company to deliver significantly cheaper costs of electricity, however, the prices would vary from state to state within India.

However, Sharan said the Indian storage market is evolving and has a long way to go before it matures and can offer the right opportunities.

Also last month, a joint statement on economic and social cooperation between the governments of India and France has noted "the important role of energy storage to promote renewable energies", as part of French president Francois Hollande's three-day visit to India.

In related news, this week Indian energy minister Piyush Goyal announced that the Central government has completed electrification work in nearly one-third of India's 18,452 unelectrified villages since the NDA government came to power. The government aims to provide power to all 18,452 villages by 1 May 2018 as part of its plan to bring power to all.

Courtesy: Energy Storage News

LUMIR C

LED lighting has widespread appeal due to energy-efficient output and low cost of manufacturing. Companies are now adding features such as sensors, wireless connectivity, adjustable color, or even built-in speakers into the mix, but this LED lamp takes a different approach by *removing* a critical component.

The Lumir C is designed without any external power supply, instead operating off of a single candle. When severe weather knocks down power grids, it can serve as a reminder of how some developing countries still don't have the luxury of electricity. Candles and kerosene lamps are commonly used in such places, with the latter known to be hazardous and poor for human health. The Lumir C LED lamp joins the likes of Gravity Light and SALt lamp as an eco-friendly alternative, illuminating without the need of sun, batteries, or electricity. The Lumir C is designed to light up its LEDs through the heat energy of a small candle – an application of the thermoelectric effect we've seen in similar products such as the Power Pot and Lumen flashlight. The difference in temperature is what creates the electric voltage, which can be harnessed without any moving parts. A candle alone is capable of outputting about 15 lm. By covering it with a Lumir C, users can enjoy up to another 15 or 60 lm, depending on which lamp style is chosen.

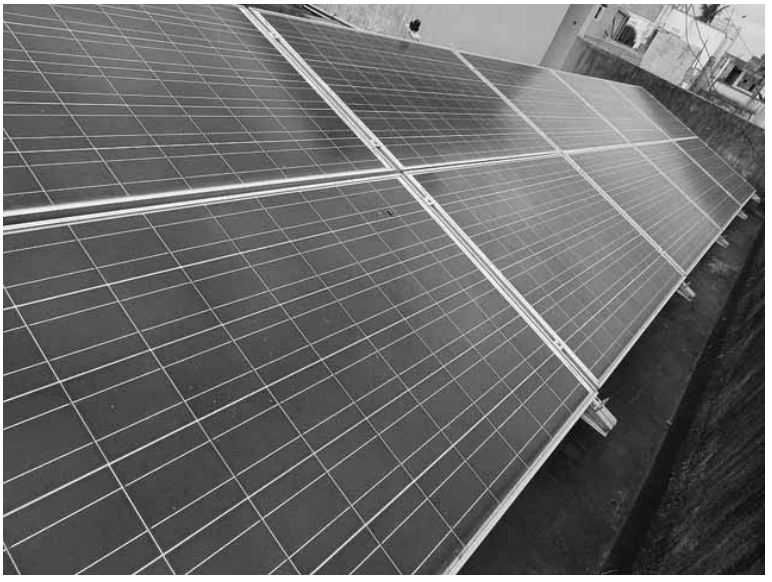
Sized like a water bottle that vaguely resembles a lighthouse, the Lumir C's design is simple, portable, and has a definite touch of style. Feet at the base of the lamp are spaced for proper air flow to support combustion. A transparent body shields flames from breezes while allowing light to pass through. Right above where the candle sits is a heatsink that captures radiated heat, which is then turned into power for the LEDs by the thermoelectric module.

There are two styles. The "mood" style lamp has a foursome of 0.2 W LEDs under a soft diffuser at the top that are capable of up to 15 lm of area lighting. The "spot" style lamp features a single, 1 W, direction-adjustable LED that can emit up to 60 lm of brightness. The Lumir C lamps light up shortly after having a candle placed underneath. Those looking to create more of a relaxing atmosphere can opt for scented tea lights, while the citronella kind can help keep areas a little more bug-free.

The company has successfully created working prototypes and attained KC, FCC, CE, and RoHS certificates for the Lumir C. If the product manufacturing goes according to the plan, backers can expect shipments to start sometime this July.

Source: Lumir Light

சென்னை துறைமுகத்தில் சூரிய சக்தி, காற்றாலை மூலம் மின்சாரம் தயாரிக்க திட்டம்: 100 கிலோவாட் சூரிய மின்னுற்பத்தி ஆலை தொடக்கம்



சென்னை துறைமுகத்தின் பயன் பாட்டுக்காக சூரிய சக்தி மற்றும் காற்றாலை மூலம் மின்சாரம் தயாரிக்க திட்டமிடப்பட்டுள்ளது. இதன் முதற்கட்டமாக 100 கிலோவாட் திறன் கொண்ட சூரிய மின்னுற்பத்தி ஆலை தொடங்கப்பட்டுள்ளது.

நாட்டில் உள்ள 12 பெரிய துறைமுகங்களில் மூன்றாவது பெரிய துறைமுகமாக சென்னை துறைமுகம் திகழ்கிறது. சென்னை கடற்கரைப் பகுதியில் 1639-ம் ஆண்டே கப்பல் போக்குவரத்து மூலம் வணிகம் தொடங்கியது. இதற்காக, 1861-ம் ஆண்டு சிறிய அளவிலான துறைமுகம் கட்டப்பட்டது. ஆனால், 1868 மற்றும் 1872-ம் ஆண்டுகளில் வீசிய கடும் புயல் காரணமாக இத்துறைமுகம் சேதம் அடைந்தது.

இதையடுத்து, 1881-ம் ஆண்டு செயற்கை துறைமுகம் அமைக்கப்பட்டது. படிப்படியாக வளர்ந்து இன்று இத்துறைமுகத்தில் 24 கப்பல்கள் நிறுத்தும் அளவுக்கு வளர்ச்சி அடைந்துள்ளது. ஆண்டொன்றுக்கு அதிகபட்சமாக 61 மில்லியன் டன் சரக்குகளை கையாண்டு சாதனைப் படைத்துள்ளது.

இத்தகைய பெருமை வாய்ந்த இத்துறைமுகத்தை பசுமை துறைமுகமாக மாற்ற துறைமுக நிர்வாகம் பல்வேறு நடவடிக்கைகளை எடுத்து வருகிறது. இதன்படி, சூரிய சக்தி மற்றும் காற்றாலை மூலம் மின்சாரம் தயாரிக்க திட்டமிடப் பட்டுள்ளது.

இதுகுறித்து, துறைமுக அதிகாரி ஒருவர் 'தி இந்து'விடம் கூறியதாவது.

நாட்டில் உள்ள 12 பெரிய துறைமுகங்களிலும் அவற்றுக்குத் தேவையான மின்சாரத்தை புதுப்பிக்கத்தக்க எரிசக்தி மூலம் தயாரிக்க முடிவு செய்யப்பட்டுள்ளது. அதன்படி சென்னை துறைமுகத்தில் சூரிய சக்தி மற்றும் காற்றாலை மூலம் மின்சாரம் தயாரிக்கப்பட உள்ளது. இதன் **முதற்கட்டமாக ஒரு கோடி ரூபாய் செலவில் 100 கிலோவாட் திறன் கொண்ட சூரிய ஒளி மின்னுற்பத்தி ஆலை தொடங்கப்பட்டுள்ளது.** இதற்காக துறைமுக மருத்துவமனை கட்டிடத்தின் மேற்கூரையில் சூரிய ஒளி மின் தகடுகள் பொருத்தப்பட்டுள்ளன. இதன் மூலம், கிழக்குக் கடற்கரை பிராந்தியத்தில் இத்திட்டத்தை செயல்படுத்தும் **முதல் துறைமுகம்** என்ற பெருமையை **சென்னை துறைமுகம்** பெற்றுள்ளது.

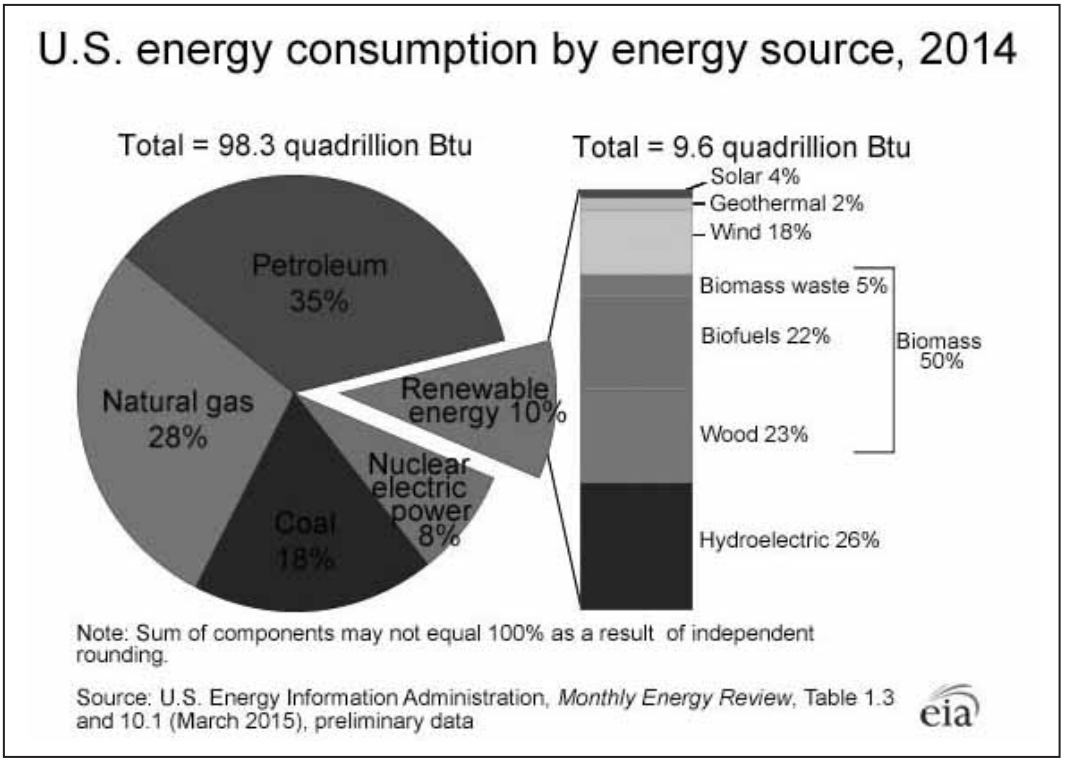
இரண்டாம் கட்டமாக ரூ. 4 கோடி செலவில் 400 கிலோவாட் திறன் கொண்ட சூரிய ஒளி மின்னுற்பத்தி ஆலை அமைக்கப்பட உள்ளது. இந்த ஆண்டு இறுதிக்குள் இந்த ஆலை பயன்பாட்டுக்கு வரும். மேலும், **காற்றாலை மூலமும் மின்சாரம் தயாரிக்க திட்டமிடப்பட்டுள்ளது.** இந்தத் திட்டத்துக்காக ரூ. 100 கோடி முதலீடு செய்யப்பட உள்ளது. **இதன் மூலம், சென்னை துறைமுகம் மாசற்ற பசுமைத் துறைமுகமாக மாறும்.**

இவ்வாறு அந்த அதிகாரி கூறினார்.

Courtesy: தி இந்து, 08.02.2016

நாம் இன்று இப்படி இருப்பதற்கு நாமே பொறுப்பு. இனி எப்படி இருக்க வேண்டும் என்று விரும்புகிறோமோ, அப்படி நம்மை செய்து கொள்வதற்கான ஆற்றலும் நம்மிடம் உள்ளது. - சுவாமி விவேகானந்தர்

US ELECTRICITY COULD BE POWERED MOSTLY BY THE SUN AND WIND BY 2030



The United States could slash greenhouse gas emissions from power production by up to 78 percent below 1990 levels within 15 years while meeting increased demand, according to a new study by NOAA and University of Colorado Boulder researchers.

The study used a sophisticated mathematical model to evaluate future cost, demand, generation and transmission scenarios. It found that with improvements in transmission infrastructure, weather-driven renewable resources could supply most of the nation's electricity at costs similar to today's. "Our research shows a transition to a reliable, low-carbon, electrical generation and transmission system can be accomplished with commercially available technology and within 15 years," said Alexander MacDonald, co-lead author and recently retired director of NOAA's Earth System Research Laboratory (ESRL) in Boulder.

The paper is published online today in the journal *Nature Climate Change*.

Although improvements in wind and solar generation have continued to ratchet down the cost of producing renewable energy, these energy resources are inherently intermittent. As a result, utilities have invested in surplus generation capacity to back up renewable energy generation with natural gas-fired generators and other reserves."In the future, they may not need to," said co-lead author Christopher Clack, a physicist and mathematician with the Cooperative Institute for Research in Environmental Sciences at the University of Colorado Boulder.

Since the sun is shining or winds are blowing somewhere across the United States all of the time, MacDonald theorized that the key to resolving the dilemma of intermittent renewable generation might be to scale up the renewable energy generation system to match the scale of weather systems. So MacDonald, who has studied weather and worked to improve forecasts for more than 40 years, assembled a team of four other NOAA scientists to explore the idea. Using NOAA's high-resolution meteorological data, they built a model to evaluate the cost of integrating different sources of electricity into a national energy system. The model estimates renewable resource potential, energy demand, emissions of carbon dioxide (CO_2) and the costs of expanding and operating electricity generation and transmission systems to meet future needs. The model allowed researchers to evaluate the affordability, reliability, and greenhouse gas emissions of various energy mixes, including coal. It showed that low-cost and low-emissions are not mutually exclusive. "The model relentlessly seeks the lowest-cost energy, whatever constraints are applied," Clack said. "And it always installs more renewable energy on the grid than exists today."

Even in a scenario where renewable energy costs more than experts predict, the model produced a system that cuts CO_2 emissions 33 percent below 1990 levels by 2030, and delivered electricity at about 8.6 cents per kilowatt hour. By comparison, electricity cost 9.4 cents per kWh in 2012.

If renewable energy costs were lower and natural gas costs higher, as is expected in the future, the modeled system sliced CO_2 emissions by 78 percent from 1990 levels and delivered electricity at 10 cents per kWh. The

year 1990 is a standard scientific benchmark for greenhouse gas analysis. A scenario that included coal yielded lower cost (8.5 cents per kWh), but the highest emissions.

At the recent Paris climate summit, the United States pledged to cut greenhouse emissions from all sectors up to 28 percent below 2005 levels by 2025. The new paper suggests the United States could cut total CO_2 emissions 31 percent below 2005 levels by 2030 by making changes only within the electric sector, even though the electrical sector represents just 38 percent of the national CO_2 budget. These changes would include rapidly expanding renewable energy generation and improving transmission infrastructure.

In identifying low-cost solutions, researchers enabled the model to build and pay for transmission infrastructure improvements—specifically a new, high-voltage direct-current transmission grid (HVDC) to supplement the current electrical grid. HVDC lines, which are in use around the world, reduce energy losses during long-distance transmission. The model did choose to use those lines extensively, and the study found that investing in efficient, long-distance transmission was key to keeping costs low.

MacDonald compared the idea of a HVDC grid with the interstate highway system which transformed the U.S. economy in the 1950s. "With an 'interstate for electrons', renewable energy could be delivered anywhere in the country while emissions plummet," he said. "An HVDC grid would create a national electricity market in which all types of generation, including low-carbon sources, compete on a cost basis. The surprise was how dominant wind and solar could be."

The new model is drawing interest from other experts in the field.

WORLD'S FIRST SOLAR CYCLE LANE OPENING IN THE NETHERLANDS

The bike path that connects the Amsterdam suburbs of Krommenie and Wormerveer is popular with both school children and commuters: around 2,000 cyclists ride its two lanes on an average day. But next week Krommenie's cycle path promises to become even more useful: on 12 November a 70-metre stretch will become the world's first public road with embedded solar panels.

Costing around €3m (£2.4m) and funded mostly by the local authority, the road is made up of rows of crystalline silicon solar cells, encased within concrete and covered with a translucent layer of tempered glass. A non-adhesive finish and a slight tilt are meant to help the rain wash off dirt and thus keep the surface clean, guaranteeing maximum exposure to sunlight.

Since the path cannot be adjusted to the position of the sun, the panels produce roughly 30% less energy than those fixed on to roofs. Nonetheless, when the path is extended to 100 metres in 2016, its creators hope that it will produce enough energy to power three households. The Netherlands' TNO research institute, which developed the concept behind the solar bicycle path, think the potential of their idea doesn't stop there. Sten de Wit of the institute told the Guardian that up to 20% of the Netherlands' 140,000km of road could potentially be adapted, helping to power anything from traffic lights to electric cars. Tests have seen the solar panel units successfully carry the weight of heavy vehicles such as tractors.

While Krommenie will become the first community in the world with a publicly accessible stretch of solar road, the idea of using existing road infrastructure to harvest solar energy is gaining momentum across the globe. Two US engineers, Idaho couple Julie and Scott Brusaw, have been developing solar panelling units for road use since 2006. In 2009, their company Solar Roadways received a contract from America's Federal Highway Administration to build a prototype.

In March this year, the Brusaws replaced their own parking lot with solar-panelled units, and thanks to a popular viral video, they have raised $2.2m (£1.4m) to put their design into production. If all the roads in the US were converted to solar roadways, the Solar Roadways website claims, the country would generate three times as much energy as it currently uses and cut greenhouse gases by 75%.

ELECRAMA 2016

The World's largest Transmission and Distribution Exhibition was a power packed event which was held at BIEC, Bengaluru from 13th - 17th February 2016.

The 5 days International Exhibition was inaugurated by ***Shri PIYUSH GOYAL,*** *Hon'ble Union Minister of State (IC) for Power, Coal, New & Renewable Energy, Govt. of India.*

Key quotes from the speech of Minister Shri PIYUSH GOYAL

I must place on record that the entire industry has come up here in ELECRAMA to support Hon'ble Prime Minister Modi's vision of providing 24X7 electricity to all and I must say that this dream cannot be fulfilled without the support of all of you.

I have attended many conferences but have never seen the level of enthusiasm that the members, officials and the participants have displayed here. This is truly amazing. I compliment each one of you who has come from all over the world.

Our government's vision is to Make in India and make the best of class products which will benefit the world. We want ELECRAMA to be the front runner in mapping the growth of the industry. I urge all of you to make products and aspire to become best in the world. If India as a whole decides to become best in the world, I assure you that within 24 months every electrical component of the electrical equipment industry will be made in India.

The world is at a challenging position as growth is not happening. Many countries have great technology but they do not have the capacity to execute it so they are moving towards China. This is the time to show the world that this is the place to do business. India is making rapid strides to becoming an investor friendly country. We have been ranked 12th in the world in terms of ease of doing business. We have asked all the states to draw a framework to ensure that electricity should be available anywhere and everywhere in the country. We have a target of selling 10 crore LED bulbs till 31st march 2016.

The message of our government is very clear
WE WILL NOT COMPROMISE ON QUALITY.

On 15th August our PM promised to electrify the remaining villages within 1000 days
BUT MY OFFICIALS HAVE PROMISED TO MAKE THIS POSSIBLE WITHIN 730 DAYS.

Shri SUNIL MISRA, Shri SANJEEV SARDANA, Shri BABU BABEL, Shri PIYUSH GOYAL, Shri D K SHIVAKUMAR, Shri AADITYA DHOOT

Shri PIYUSH GOYAL,
Hon'ble Union Minister of State (IC) for Power, Coal, New & Renewable Energy, Govt. of India.

Shri PIYUSH GOYAL,
Hon'ble Union Minister of State (IC) for Power, Coal, New & Renewable Energy, Govt. of India
and others
LIGHTING THE KUTHUVILAKKU

PRODUCT OF THE MONTH

FLIR CM174

Imaging 600A AC/DC Clamp Meter with IGM™

The FLIR CM174 Imaging 600A AC/DC Clamp Meter with IGM is the first clamp meter equipped with a built-in thermal imager that can quickly lead you to problems you can't see with a standard clamp meter. Featuring Infrared Guided Measurement (IGM) technology, the CM174 visually guides you to the precise location of a potential electrical problem, identifying dangerous and unknown problem areas safely. Confirm your findings with accurate amperage and voltage measurements, and center-point temperature readings. The narrow jaw enables greater accessibility, and its compact form-factor fits easily into your back pocket – so you can have thermal imaging at your fingertips everywhere you go. The FLIR CM174 will quickly become your primary electrical troubleshooting tool.

Find problems faster with IGM.

Visually identify electrical issues with the first thermal imaging clamp meter

- Conquer cluttered wires and cables – IGM can quickly guide you in the right direction
- All-in-one tool – carry just one device and always have access to thermal imaging
- Work safely – scan a panel or cabinet for hazards using IGM without direct contact

Confirm your findings.

Verify problems, check load, and validate hot spots

- Center-point temperature to confirm hot spot
- Amperage and voltage measurements to check the load
- Laser and crosshair pinpoint the location of the problem found in thermal image

Solve complex electrical issues.

Design and functionality vital to professionals

- Narrow jaw and built-in worklights help you access difficult locations with lighting issues
- Advanced electrical features: True RMS, LoZ, VFD Mode, Inrush, Smart Diode with Disable
- Expandable to 3000 Amps AC with FLIR flex accessories

Specifications

FLIR CM174: Imaging Clamp Meter	
Imaging Detector	FLIR Lepton® microbolometer
Thermal Image Resolution	4800 pixels (60 × 80)
Field of View (V x H)	38.6° x 50.0°
Color Palettes	Iron, Rainbow, Grayscale
Image Frame Rate	9Hz
Temperature Measurement	Center point of thermal image
Temperature Range	-25°C to 150°C (-13°F to 302°F)
Temperature Distance to Spot Ratio	30:1
Temperature Accuracy	± 3°C (5.4°F) or ±3% of rdg
Spectral Response	8 to 14µm
Temperature Targeting	Class 1 Laser Pointer and Crosshair on display
Emissivity Settings	4 Presets with Custom Adjustment

Electrical Measurements	Range	Basic Accuracy
AC/DC Voltage	1000V	±1.0%
VFD AC Voltage	1000V	±1.0%
LoZ Mode AC Voltage	1000V	±1.0%
LoZ Mode DC Voltage	1000V	±1.0%
DC Current	600.0A	±2.0%
AC Current	600.0A	±2.0%
VFD AC Current	600.0A	±2.0%
Inrush AC Current	600.0A	±3.0%
Inrush AC Current Threshold	Min 0.5AIntegration Time 100ms	
Frequency	60.00kHz	±0.1%
Resistance	6000Ω	±1.0%
Continuity	600.0Ω	±1.0%
Capacitance	1000µF	±1.0%
Diode	1.5V	±1.5%
General information		
Display	6000 Count 2.0" (50mm) Color TFT	
Jaw Opening	1.38" (35mm), 1250MCM	
Category Rating	CAT IV-600V, CAT III-1000V	
Certifications	UL, CE	
Battery Type	4 x AAA	
Warranty	10 Years on Product and Detector*	
Includes	Clamp Meter, 4 x AAA Batteries, Premium Silicone Test Leads, Quick Start, User Manual (CD), Extended Warranty Registration Card	

For more informations contact Flir Systems India Ltd., Website: www.flir.com/CM174

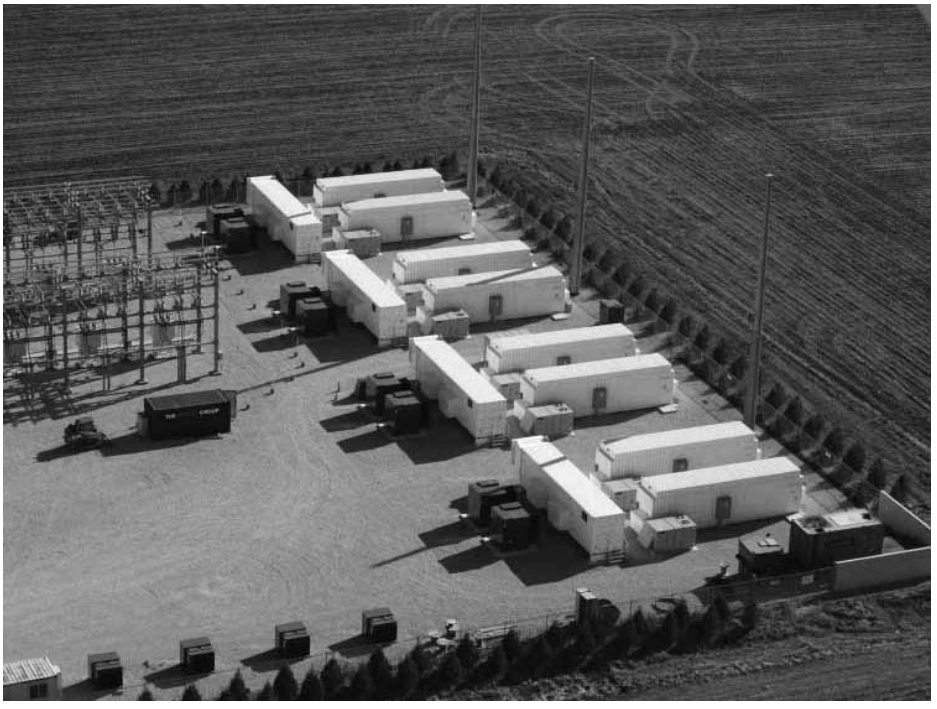
TERI'S SOLAR LIGHTING LABORATORY WORKS TOWARDS FINDING HIGH QUALITY, RELIABLE, AND COST EFFECTIVE SOLUTIONS FOR SOLAR LIGHTING

TERI's Solar Lighting Laboratory is supported (SLL) by the Ministry of New and Renewable Energy (MNRE) Government of India and currently following all the quality procedures which are compiled to National Accreditation Board for Laboratories (NABL).The sophisticated equipment and test setup that is used for testing lighting products in the laboratory are calibrated by National Physical Laboratory (NPL) or NABL accredited calibration laboratories. TERI's Solar Lighting Laboratory is also one of the unique laboratories in India to adhere to the International Electrotechnical Commission (IEC) standards for the testing of solar lighting systems (SLS) and the first laboratory in India which has got the recognition under the Lighting Global programme of International Finance Corporation (IFC).

SLL has tested more than 120 models of solar lighting systems including solar lanterns, solar home lighting systems, solar task lights and multi-purpose solar lights. SLL has also collaboration with more than 10 industry partners and research organizations for developing cost effective solar lighting systems.

Currently, TERI's Solar Lighting Laboratory is located in the TERI University campus in VasantKunj, New Delhi. The lab therefore also caters to the student community and has a regular inflow of undergraduate and postgraduate students who are pursuing research on solar lighting technologies.

53MWH OF STORAGE IN ONTARIO TO GET LECLANCHE BATTERY SYSTEMS



Swiss manufacturer Leclanché will supply battery storage systems to a 13MW capacity storage project with 53MWh of storage duration in Ontario to be used for voltage control and in providing reactive power support to the grid.

Greensmith, a complete storage system provider which has specialised in software and integration services, will provide software to the project through its GEMS control platform software. Investors in Greensmith include German utility E.On.

A new company, Hecate Canada Storage II is acting as project developer and selected Leclanché for the 53MWh, which LeClanche said would be spread across several locations. The battery system provider will work with Deltro Energy, which is acting as procurer, designer and constructor on the project, including overseeing connection to high voltage grids, while Deltro selected Greensmith during that process. The ancillary services project is part of a procurement by Ontario's Independent Electricity System Operator (IESO), which reached its target of awarding contracts to 50MW of energy storage systems in November last year. The 50MW was awarded in two phases.

The storage systems deployed by IESO will have several purposes. In the instance of the Leclanché/Deltro facilities, they will cover six ancillary services agreements with the IESO, to provide fast-acting response to voltage control and reactive power. Ontario's rising levels of renewable energy contributing variable sources to the high voltage grid is driving this forward, Leclanché said.

Other storage systems in the region are being expected to allow the cost of transmission and distribution upgrades to be deferred, others still will provide reliable backup power and provide arbitrage services, shifting electricity loads to maximize favourable economic conditions to counter peaks.

In November 2014, when awarding a tranche of contracts, Ontario's minister for energy Bob Chiarelli described storage technology as "one of the most innovative and exciting aspects of our energy policy."

"It will help strengthen our system and improve service to electricity consumers," the minister said.

The project has seen a variety of technologies deployed, including batteries, compressed air storage and flow batteries.

ரூ.420 கோடி மதிப்பில் 20 ஆயிரம் சூரியஒளி மின்சக்தியுடன் கூடிய கான்கிரீட் வீடுகள்

ரூ.420 கோடி மதிப்பில் 20,000 சூரியஒளி மின்சக்தியுடன் கூடிய கான்கிரீட் வீடுகள் கட்டுவதற்கான பணி ஆணையினை பயனாளிகளுக்கு முதலமைச்சர் வழங்கினார்.

பேரூராட்சிகளில் ரூ.420 கோடி மதிப்பீட்டில் சூரியஒளி மின்சக்தியுடன் கூடிய கான்கிரீட் வீடுகள் கட்டும் திட்டத்தின் கீழ் முதற்கட்டமாக குடிசை மற்றும் மண் வீடுகளில் வசிக்கும் 20 ஆயிரம் குடும்பங்களுக்கு தலா ரூ.2 லட்சத்து 10 ஆயிரம் நிதியுதவியுடன் சூரியஒளி மின்சக்தியுடன் கூடிய கான்கிரீட் வீடுகள் கட்டுவதற்கு பணி ஆணைகளை வழங்குவதை துவக்கி வைக்கும் அடையாளமாக முதலமைச்சர் 2 பயனாளிகளுக்கு பணி ஆணைகளை வழங்கினார்.

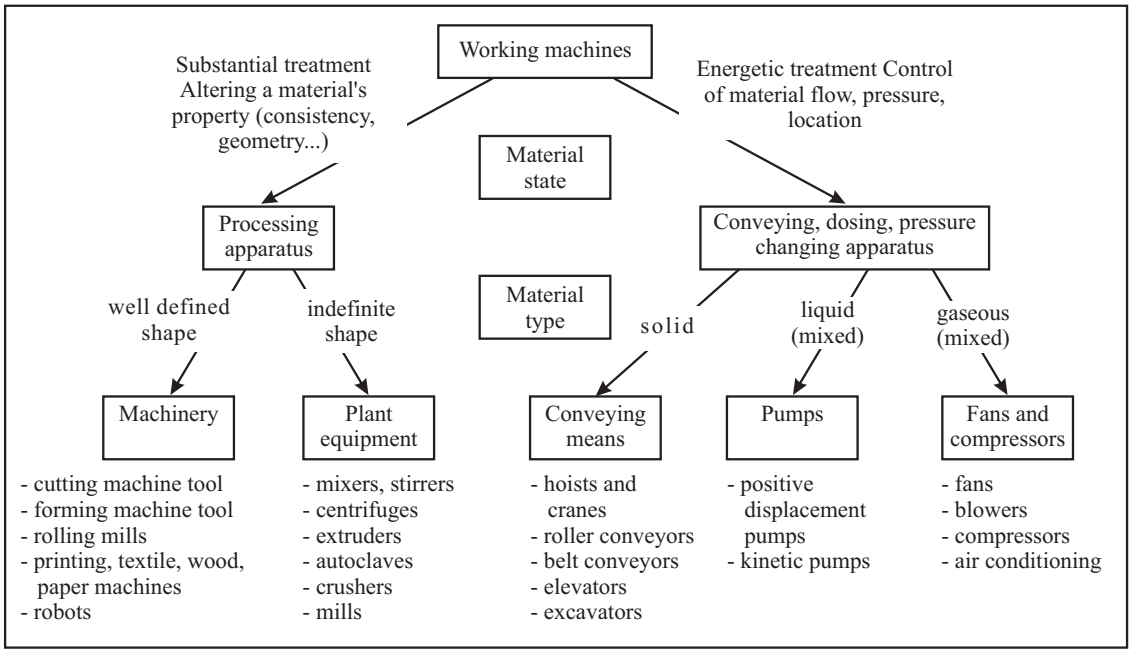
Courtesy: தி இந்து, 02.02.2016

ENERGY CONSERVATION THROUGH ENERGY EFFICIENCY – 12

Electrical Losses - Magnetization Losses

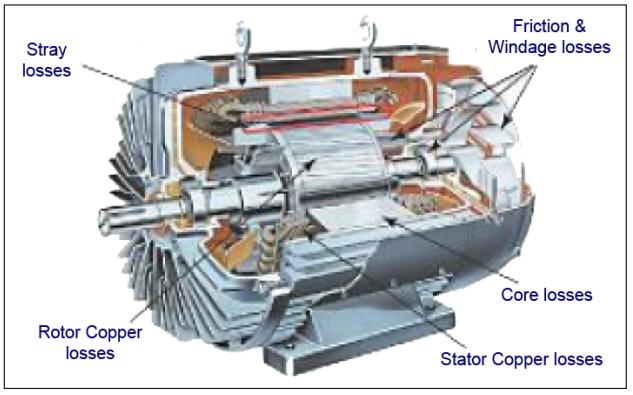
Magnetic losses (also known as iron losses or core losses) are an area of growing interest in fields such as advanced electric machines and transformers. Traditionally, losses have been specified and calculated using empirical loss curves provided by manufacturers, which specify the power loss per unit mass at a given frequency as a function of the maximum magnetic flux density. There are also other factors which determine the quantum of total Magnetization Losses which will all be discussed with regard to AC Motors in this part.

After the Electrical Energy is transmitted and distributed and as it reaches the final use point, AC Induction Motors form a bulk of Electrical Energy use. Electricity can be put to 'Productive Use', be it Industrial Production, Agricultural Irrigation and Processes or Commercial and Domestic Comforts, only through conversion of Electrical Energy to Mechanical Energy by Electric Motors.



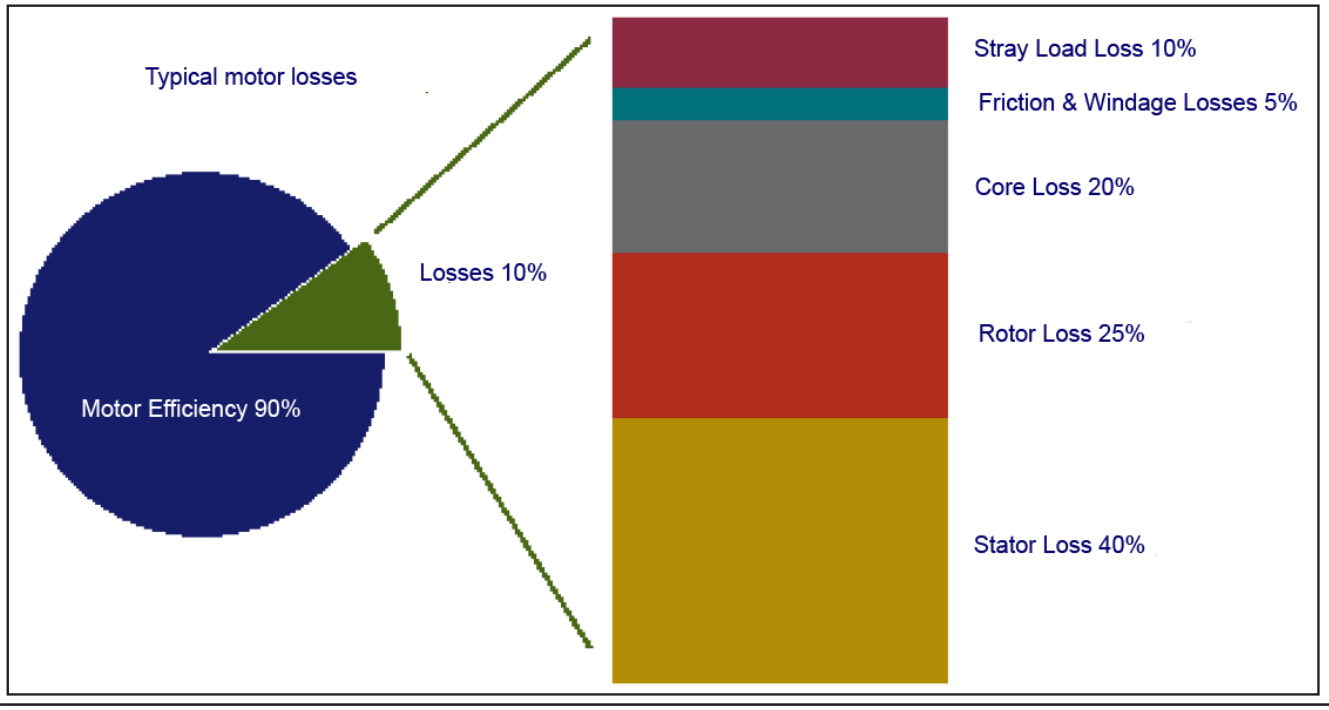
Examples of Uses of Motors in all places and uses

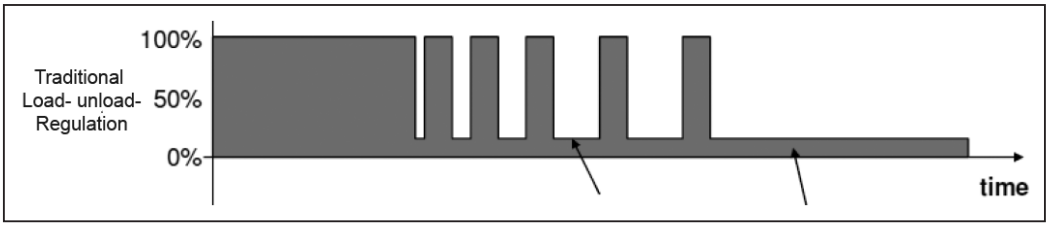
A broad analysis of quantum and role of Magnetization Losses, based on Indian 'End Use' consumption of about 700 Billion Units of Electricity (based on provisional 2015 figures), are worked out below. Almost 80% of the total Electricity can be assumed to be consumed through Electric Motors, out of which almost 98% of the Motors are AC Squirrel Cage Induction Motors. In the process of conversion of Electrical Energy to Mechanical Energy, the AC Motors incur various losses including Iron or Core Losses and an approximate Break Up of Losses are given in the Diagram that follows.



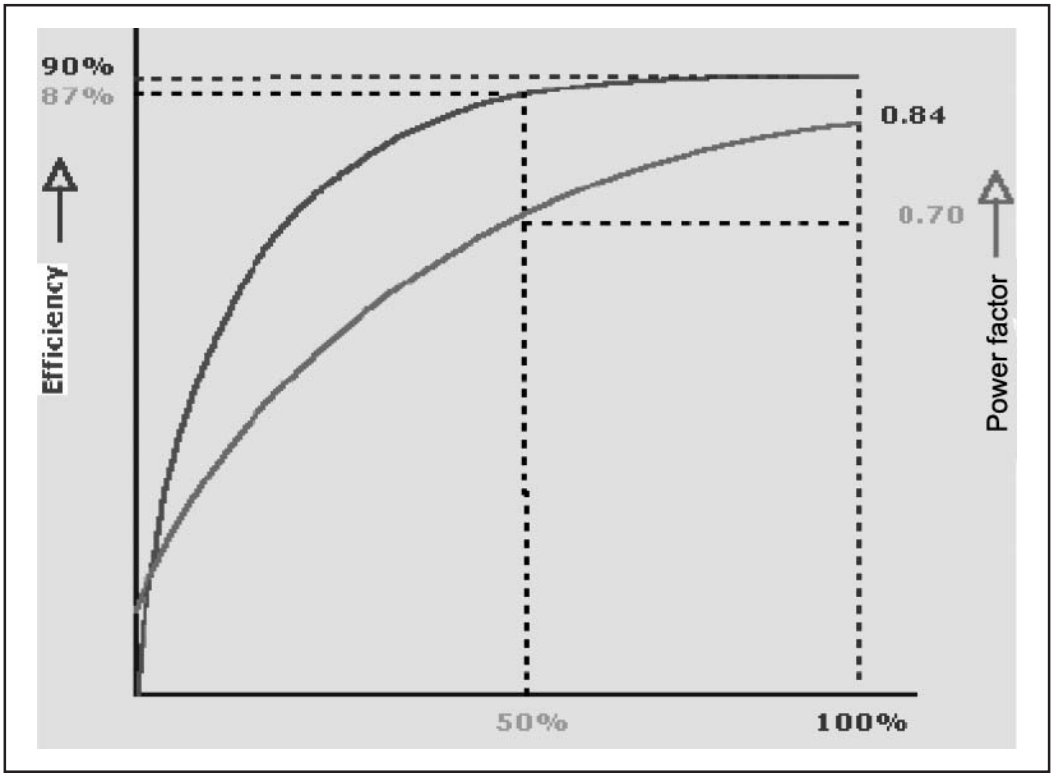
It is to be noted that the Break Up given represent Values and Percentages pertaining to "Full Load" running of Motors. The Motors are generally selected in such a way that they will be working in the LOAD range of about 60 to 80% which is ideal. A study in the actual Industrial working conditions, the Loads could range from about 50% to 100% and there could also be applications like Compressors etc, where the Motors will have Loading and Un Loading Cycles with loading period ranges of about 30 to 60%.

A Typical Compressor Motor Loading Un Loading Cycle is shown below:





It is also interesting to note that at present times, Induction Motors are manufactured with the IMPORTANT FEATURE of CONSTANT EFFICIENCY in the Load Range of 50 to 100%, as shown in a representative diagram below.



Taking into consideration the various Factors and Dimensions discussed above, for the purpose of a broad estimate of quantum and role of Magnetization losses in the whole scene of Electrical losses, it may be alright to assume that the Motors work at about 50% Load on an overall average. Before entering into the exercise of estimation, it may also be interesting to review the actual "Name Plate" Details and actual "No Load" test details of an actual (37.0 KW) Motor.

Details from Name Plate:

Voltage	- 415V
Full Load Current	- 66A
Full Load power factor	- 0.87
Speed	- 1465rpm
Rated power	- 50HP / 37kW
Name Plate Efficiency	= 90%
Delta Connected	

No-load Test

Voltage – 414 V ; Current – 23A

No Load Power – 1984W

Stator resistance at 29 Deg C= 0.39 ohms

It is important to know that the 'No Load Power' measured, which almost represents the Energy spent for the Magnetization process, includes 'Friction and Windage Losses' which is also a part of the 'Constant' Losses, as also 'No Load' I^2R *losses.*

From the details above, Constant Losses can be calculated as below.

Stator copper loss NL = $3 \times (23 / 1.732)^2 \times 0.39 = 206.31$W

1984 – 206.31 = 1777.69 W = (Iron + F&W Losses).

Input Power for an output of 37 KW = 37/0.9 = 41.1 KW

(Name Plate KW/ HP Rating actually indicates the Design Output)

Hence Total Losses = 4110 W out of which 1777 W Constant Loss

Input Power for 50% output (Eff same = 90% for this Motor) 18.5/0.9 = 20.55 KW

Total Losses at 50% Load = 2050 W

Constant Losses = 1777 W As a % of total losses = 1777/ 2050 = 86%

Calculations with regard to Magnetisation Losses – All India level

National Per capita consumption 1,010 Units (Provisional 2014-15)

Note: Per Capita Consumption (Gross Electricity Generation + Net Import) / Mid Year Population.

The Generation Estimate for the year 2014 – 15 is about 1200 Billion Units

Assuming a overall T & D Losses as 40%, about 700 Billion Units reach for 'Final Use'

As discussed earlier, about 500 Billion Units can be estimated as Power input to Motors of all uses in Agriculture, Industries, Commercial Establishments and Homes.

Assuming Motor Efficiencies as per calculation shown earlier as 90% (which can be considered as on the higher side as most of the Population of Motors in all Sectors of Economy are of much lower ratings than 37 KW with lower Efficiency levels) about 50 Billion Units are the Total Losses in Motors, in the process of conversion to Mechanical Power. As we saw earlier, as the Motors are assumed to be operating at about 50% Loads on a National average, the percentage 'Fixed' losses could be about 80%, that is about 40 Billion Units.

(To be continued)

S. Mahadevan, B.E., F.I.E., M.B.A.,
Consultant,
Energy and Energy Efficiency,
Mobile: 98401 55209

SUZLON UNVEILS WORLD'S TALLEST HYBRID TURBINE IN INDIA

Suzlon Group recently surpassed yet another milestone by expanding the capacity of Asia's largest wind farm at Kutch, Gujarat to 1100 MW. With this expansion, Suzlon now generates 1800 MW in Gujarat thus accounting for 20% of Suzlon's total pan-India capacity of over 8250 MW. Commemorating this landmark occasion, the company unveiled its S97 120m wind turbine.

The S97 120m is the world's tallest hybrid tower model, designed indigenously to harness the wind energy across low wind sites. It is installed at Jamanwada, Kutch in Gujarat, India, and has successfully generated 1500-plus kWh in its pilot stage of three months. Speaking on the occasion, Hon. Chief Minister, State of Gujarat, Smt. Anandiben Patel said, "The challenge of global warming has given an opportunity, whereby the world is now looking at clean and renewable sources of energy to combat climate change. While the 20th century belonged to Information Technology (IT), the 21st century will be that of Environment Technology (ET). Gujarat has championed the cause of generating power through renewable sources and has adopted pioneering technologies in wind, solar and other renewable resources. Suzlon has played an integral part in enhancing Gujarat's renewable energy portfolio. Suzlon took up the challenge put forth by Shri NarendraModi of establishing 2,000 MW wind energy in Gujarat and Suzlon has already delivered 1080 MW in Kutch. We will continue to forge alliances with private players to harness the full potential of renewable energy in Gujarat."

Tulsi Tanti, CMD, Suzlon Energy, said, "The S97 120 m hybrid tower, a potential game changer, is the result of our continued focus to invest in next generation technologies that will provide energy efficient solutions thus ensuring higher yields to our customers. As the world is waking up and implementing measures to combat climate change, the contribution of wind energy in the energy architecture mix across the world has increased manifold. Governments are now pivoting their attention on renewables to provide the much needed energy security for their respective countries." Sidebar

Suzlon group's leadership in offshore wind turbine is a testament of the organizations technological prowess. It continues to drive innovation by focusing the R&D efforts to develop cost efficient and reliable wind turbine technology. The group has a wide range of on-shore and off-shore energy solutions ranging from sub-megawatt onshore turbines at 600 kilowatts to 6.15 MW offshore turbine. The group is catering to over 2,500 customers across Asia, Australia, Europe, Africa, and North and South America. The S97 120M hub height hybrid tower is part of Suzlon's S9X turbine suite.

Source: Suzlon Group

TAMILNADU ELECTRICAL INSTALLATION ENGINEERS ASSOCIATION 'A' GRADE

OUR PUBLICATIONS

Sl. No.	Title-Description of the Books	Your contribution (Rs.)
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2	Guidelines On Electrical Installations For Practicing Contractors (Revised Edition)	300
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4	(1) Installation of Captive generator (2) Electricity H.V. & M.V. Installation Proposals (3) Precautionary Measures to be taken in Design & Installation of building services including Electrical Services (4) The Indian Standard Specification	110
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MAHENDRA MOHAN GUPTA | DAINIK JAGRAN GROUP | ENTREPRENEUR

MAHENDRA MOHAN GUPTA
Dainik Jagran Group

Dainik Jagran, hindi newspaper was declared by the world association of newspapers as having the highest readership in the world.

Founded in the year 1942 - a time when the freedom struggle of India reached its crescendo and found expression in the Quit India movement - Dainik Jagran was launched with the vision of its founder, Puran Chandra Gupta, to **"Create a newspaper that would reflect the free voice of the people"**. This vision was as much a reflection of the times when it was propounded as it is today - when Dainik Jagran markets control the political destiny of the largest democracy in the world.

Mahendra Mohan Gupta is the Chairman and Managing Director of the Company and also holds the position of Managing Editor of Dainik Jagran. Sanjay Gupta is a whole-time Director and also holds the position of Editor of Dainik Jagran and CEO of the Company. What began as a small step during the freedom struggle, today translates into one of India's largest media conglomerates. The Group has interests spanning across Newspapers, Magazines, Outdoors, BTL Activation, Mobile, Internet, Radio and Education besides other businesses, all being independently managed by different family members. The flagship brand Dainik Jagran is published in 37 editions spread across 11 states covering 50% of India.

It is one of the finest examples of entrepreneurship in India and more so when the Guptas' extended family consists of 40 family members - of six brothers - under one roof. There are 10 brothers (they don't call themselves cousins) in the third generation. Managing a family business is far more difficult than managing a professional company. It is just "music to the ears" when the Guptas are doing so well financially and socially. They exercise enormous influence over the Hindi hinterland through **Dainik Jagran, India's most popular newspaper with 16.37 million readers (Indian Readership Survey 2012 Q4)** and have acquired Midday and the widely read Nai Duniya. Their ever expanding Group JagranPrakashan now operates 12 newspapers and magazines in 5 languages and has a total readership of 68.01 million. In India Today's Power List 2013 High & Mighty, Guptas are No.31

20 MOST PEACEFUL COUNTRIES IN THE WORLD - 16

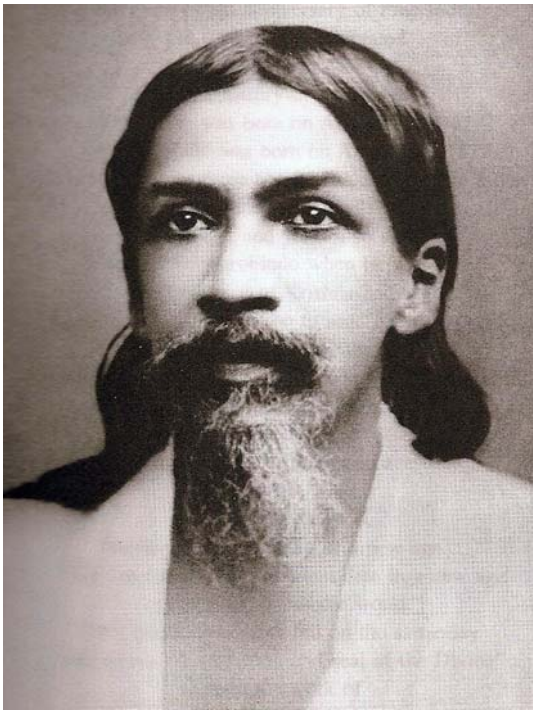
BHUTAN

According to the 2013 Global Peace Index (GPI), **Bhutan** is also among the 20 most peaceful countries on Earth. The point is, Bhutan has remained unchanged in international and domestic conflict in the last 6 years with a GPI score of 1.6 out of 5, 1 being really low. The report uses 22 indicators to measure internal peace, including number of police per 100,000 people, levels of perceived criminality, level of organized crime, and external peace indicators that include military expenditure as a percentage of gross domestic product and nuclear and heavy weapons capabilities. I personally think Bhutanese people are peace loving and they are well cultured. Plus, Bhutan boasts plenty of spectacular attractions for everyone.

(To be continued)
Courtesy: Amerikanki

SRI AUROBINDO - 1

Aurobindo, known as **Sri Aurobindo**, (15 August 1872 – 5 December 1950), born **Aurobindo Ghose**, was an Indian nationalist, philosopher, yogi, guru, and poet. He joined the Indian movement for independence from British rule, for a while became one of its influential leaders and then became a spiritual reformer, introducing his visions on human progress and spiritual evolution.



Aurobindo studied for the Indian Civil Service at King's College, Cambridge, England. After returning to India he took up various civil service works under the maharaja of the princely state of Baroda and began to involve himself in politics. He was imprisoned by the British for writing articles against British rule in India. He was released when no evidence was provided. During his stay in the jail he had mystical and spiritual experiences, after which he moved to Pondicherry, leaving politics for spiritual work.

During his stay in Pondicherry, Aurobindo developed a method of spiritual practice he called Integral Yoga. The central theme of his vision was the evolution of human life into a life divine. He believed in a spiritual realisation that not only liberated man but transformed his nature, enabling a divine life on earth. In 1926, with the help of his spiritual collaborator, Mirra Alfassa (referred to as "The Mother"), he founded the Sri Aurobindo Ashram. He died on 5 December 1950 in Pondicherry.

His main literary works are *The Life Divine*, which deals with theoretical aspects of Integral Yoga; *Synthesis of Yoga*, which deals with practical guidance to Integral Yoga; and *Savitri: A Legend and a Symbol*, an epic poem which refers to a passage in the *Mahabharata*, where its characters actualise Integral Yoga in their lives. His works also include philosophy, poetry, translations and commentaries on the *Vedas*, *Upanishads* and the *Bhagavad Gita*. He was nominated for the **NOBEL PRIZE** in Literature in 1943 and for the **NOBEL PEACE PRIZE** in 1950.

Aurobindo Acroyd Ghose was born in Calcutta (now Kolkata), Bengal Presidency, India on 15 August 1872. His father, Krishna Dhun Ghose, was then Assistant Surgeon of Rangapur in Bengal, and a former member of the Brahmo Samaj religious reform movement who had become enamoured with the then-new idea of evolution while pursuing medical studies in Britain. His mother was Swarnalotta Devi, whose father was Rajnarain Bose, a leading figure in the Samaj. She had been sent to the more salubrious surroundings of Calcutta for Aurobindo's birth. Aurobindo had two elder siblings, Benoybhusan and Manmohan, and both a younger sister, Sarojini, and a younger brother, Barindrakumar (also referred to as Barin, born Emmanuel Matthew).

Young Aurobindo was brought up speaking English but used Hindustani to communicate with servants. Although his family were Bengali, his father believed British culture to be superior to that of his countrymen. He and his two elder siblings were sent to the English-speaking Loreto House boarding school in Darjeeling, in part to improve their language skills and in part to distance them from their mother, who had developed a mental illness soon after the birth of her first child. Darjeeling was a centre of British life in India and the school was run by Irish nuns, through which the boys would have been exposed to Christian religious teachings and symbolism.

England (1879–1893)

Krishna Dhun Ghose wanted his sons to enter the Indian Civil Service (ICS), an elite organisation comprising around 1000 people. To achieve this it was necessary that they study in England and so it was there that the entire family moved in 1879. The three brothers were placed in the care of the Reverend W. H. Drewett in Manchester. Drewett was a minister of the Congregational Church whom Krishna Dhun Ghose knew through his British friends at Rangapur.

The boys were taught Latin by Drewett and his wife. This was a prerequisite for admission to good English schools and, after two years, in 1881, the elder two siblings were enrolled at Manchester Grammar School. Aurobindo was considered too young for enrolment and

he continued his studies with the Drewetts, learning history, Latin, French, geography and arithmetic. Although the Drewetts were told not to teach religion, the boys inevitably were exposed to Christian teachings and events, which generally bored Aurobindo and sometimes repulsed him. There was little contact with his father, who wrote only a few letters to his sons while they were in England, but what communication there was indicated that he was becoming less endeared to the British in India than he had been, on one occasion describing the British Raj as a "heartless government".

Drewett emigrated to Australia in 1884, causing the boys to be uprooted as they went to live with Drewett's mother in London. In September of that year, Aurobindo and Manmohan joined St Paul's School there. He learned Greek and spent the last three years reading literature and English poetry. He also acquired some familiarity with the German and Italian languages and, exposed to the evangelical strictures of Drewett's mother, a distaste for religion. He considered himself at one point to be an atheist but later determined that he was agnostic. A blue plaque unveiled in 2007 commemorates Aurobindo's residence at 49 St Stephen's Avenue in Shepherd's Bush, London, from 1884 to 1887. The three brothers began living in spartan circumstances at the Liberal Club in South Kensington during 1887, their father having experienced some financial difficulties. The Club's secretary was James Cotton, brother of their father's friend in the Bengal ICS, Henry Cotton.

By 1889, Manmohan had determined to pursue a literary career and Benoybhusan had proved himself unequal to the standards necessary for ICS entrance. This meant that only Aurobindo might fulfil his father's aspirations but to do so when his father lacked money required that he studied hard for a scholarship. To become an ICS official, students were required to pass the competitive examination, as well as to study at an English university for two years under probation. Aurobindo secured a scholarship at King's College, Cambridge, under recommendation of Oscar Browning. He passed the written ICS examination after a few months, being ranked 11th out of 250 competitors. He spent the next two years at King's College. Sri Aurobindo had no interest in the ICS and came late to the horse-riding practical exam purposefully to get himself disqualified for the service.

At this time, the Maharaja of Baroda, Sayajirao Gaekwad III, was travelling in England. Cotton secured for him a place in Baroda State Service and arranged for him to meet the prince. He left England for India, arriving there in February 1893. In India, Krishna Dhun Ghose, who was waiting to receive his son, was misinformed by his agents from Bombay (now Mumbai) that the ship on which Aurobindo had been travelling had sunk off the coast of Portugal. His father died upon hearing this news.

(To be continued...)

HUMOUR

Innocent Question...

Son: Daddy, I got punished in school today.

Dad: Why?

Son: My teacher pointed the scale towards me saying, "At the end of this scale there is an idiot.".

I just asked "Which end?".

How Were People Born...

A child asked his father, "How were people born?"

So his father said, "Adam and Eve made babies, then their babies became adults and made babies, and so on."

The child then went to his mother, asked her the same question and she told him, "We were monkeys then we evolved to become like we are now."

The child ran back to his father and said, "You lied to me!"

His father replied, "No, your mom was talking about her side of the family."

POWER YOUR MIND - WANTED REAL CITIZENS

You are born as an individual
Now grow into a person
For an individual loves himself
A person loves his family

Don't remain only a person
But grow into a citizen
For a citizen loves his country

Don't remain only a citizen
But be an enlightened citizen
For an enlightened citizen
Serves his country

Courtesy: Swami Srikantananda

Don't remain only
An enlightened citizen
But be a spiritual citizen

For spirituality will expand
Your heart opening the
Doors to peace and freedom

Expansion is life
Contraction is death.
Love is life
And hatred is death.
– *Swami Vivekananda*

Dharma doesn't necessarily mean following a mundane and boring life.
It means a life of high adventure, not a life of endless, boring repetition.

கல்லீரல் ஆரோக்கியமாக இருக்க மேற்கொள்ள வேண்டிய உணவு முறைகள்

உடலின் பல்வேறு செயல்பாடுகளுக்கு மிகவும் முக்கியமான ஒரு உறுப்புதான் கல்லீரல். கல்லீரல்தான் உடலில் உள்ள நச்சுக்களை பிரித்து உடலில் இருந்து வெளியேற்றும். கல்லீரலானது சரியாக செயல்படாமல், டாக்ஸின்கள் உடலில் இருந்து வெளியேறாமல், இருந்தால், பின் அதனால் மிகவும் மோசமான பிரச்சனைகளை சந்திக்கக்கூடும். எனவே கல்லீரலின் ஆரோக்கியமான செயல்பாட்டிற்கும், கல்லீரலில் நோய்கள் வராமல் இருக்கவும், சரியான டயட்டை மேற்கொள்ள வேண்டும். மேலும் ஒரு சில பழக்கவழக்கங்களை கைவிட வேண்டும். இங்கு கல்லீரல் ஆரோக்கியமாக இருக்க மேற்கொள்ள வேண்டிய டயட் கொடுக்கப் பட்டுள்ளது. அதுமட்டுமின்றி தவிர்க்க வேண்டியவையும் பட்டியலிடப்பட்டள்ளது.

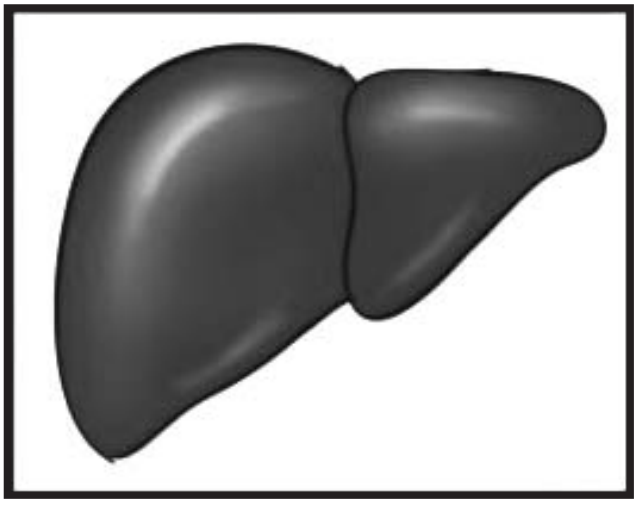
கல்லீரல் ஆரோக்கியமாக செயல்பட சாப்பிட வேண்டியவைகள்

வெங்காயம் மற்றும் பூண்டு: இந்த உணவுப் பொருட்களில் சல்பர் அதிகம் உள்ளது. இவை கல்லீரல் நன்கு செயல்பட உதவி புரிவதோடு, கல்லீரலில் எவ்வித பாதிப்புகளும் ஏற்படாமல் தடுக்கும்.

பீட்ரூட்: பீட்ரூட்டில் உள்ள பெக்டின் என்னும் பொருள் கல்லீரலில் இருந்து டாக்ஸின்களை முற்றிலும் வெளியேற்ற உதவும், மேலும் பீட்ரூட் உடலில் இரத்த சிவப்பணுக்களின் எண்ணிக்கையை அதிகரிக்க உதவும்.

முட்டைக்கோஸ்: முட்டைக்கோஸிலும் சோடியம் அதிகம் உள்ளது. இதுவும் கல்லீரலில் இருந்து டாக்ஸின்களை வெளியேற்றவும், கல்லீரல் ஆரோக்கியமாக செயல்படவும் உதவும்.

கேரட்: கேரட்டில் உள்ள நியாசின் மற்றும் பீட்டா கரோட்டீன் கண்கள் மற்றும் கல்லீரலுக்கு நல்லது. முக்கியமாக இதில் உள்ள நியாசின், டாக்ஸின்கள் வெளியேற உதவுவதோடு, கல்லீரல் கெட்ட நச்சுக்களை உறிஞ்சாமல் தடுக்கும்.



தவிர்க்க வேண்டியவை

பதப்படுத்தப்பட்ட உணவுகள்: பதப்படுத்தப்பட்ட உணவுகள் உட்கொள்வதை அறவே தவிர்க்க வேண்டும். ஏனெனில் அதில் சேர்க்கப்பட்டுள்ள கெமிக்கல்களால் கல்லீரலின் செயல்பாடு பாதிக்கப்படும்.

செயற்கை சுவையூட்டிகள்: செயற்கை சுவையூட்டிகள் மற்றும் ∴புருக்டோஸ் அதிகம் உள்ள உணவுப் பொருட்கள் சாப்பிடுவதை தவிர்க்க வேண்டும்.

ஆல்கஹால்: ஆல்கஹாலை அளவுக்கு அதிகமாக குடித்தால், கல்லீரலின் செயல்பாடு மற்றும் ஆரோக்கியம் பாதிக்கப்படும். எனவே ஆல்கஹால் பருகுவதை முற்றிலும் தவிர்க்க வேண்டும்.

Courtesy: Pesod, November 2015

கொழுப்பைக் குறைக்கும் பீட்ரூட்

பீட்ரூட்டின் சிவப்பு நிறம், அதில் நிரம்பியுள்ள சத்துகளின் அடையாளம். மண்ணுக்கு அடியில் விளையும் இந்தக் காய் தரும் பலன்கள் என்ன? பார்ப்போம்:

- பீட்ரூட் சிவப்பாக இருப்பதற்கும், அது கையில் ஒட்டிக்கொண்டால் போகாமல் இருப்பதற்கும் காரணம் பீட்டா சயனின் என்ற வேதிப்பொருள், இது மிக நல்ல ஆன்ட்டி ஆக்சிடண்ட்.
- பீட்ரூட்டில் நைட்ரேட் சத்து அதிகம். எனவே, தொடர்ச்சியாகப் பீட்ரூட் சாப்பிட்டுவந்தால் மூளைத்தாக்கு (ஸ்டிரோக்), ரத்த அழுத்தத்தைத் தள்ளி வைக்கலாம்.
- மூளைக்கு ரத்தம் செல்வதைப் பீட்ரூட் மேம்படுத்துகிறது. அதனால், மூப்புமறதி (டிமென்ஷியா) பாதிப்பு குறையும்.
- அதேபோல பீட்ரூட்டைத் தொடர்ந்து சாப்பிட்டுவந்தால் உடலில் கெட்ட கொழுப்பு சேரும் விகிதத்தைக் குறைக்கலாம்.
- எந்த ஒரு உடல் உழைப்பு சார்ந்த செயல்பாட்டைச் செய்வதற்கு முன்னதாகவும் ஒரு குவளை பீட்ரூட் ஜூஸைக் குடித்தால், உற்சாகமாக வேலை செய்வதற்கான சக்தியை அது கொடுத்துவிடும்.

Courtesy: The Hindu, 26.09.2015

SATYENDRA NATH BOSE

Satyendra Nath Bose, FRS (1 January 1894 – 4 February 1974) was an Indian physicist specialising in mathematical physics. He is best known for his work on quantum mechanics in the early 1920s, providing the foundation for Bose–Einstein statistics and the theory of the Bose–Einstein condensate. A Fellow of the Royal Society, he was awarded India's second highest civilian award, the Padma Vibhushan in 1954 by the Government of India.

The class of particles that obey Bose–Einstein statistics, bosons, was named after Bose by Paul Dirac.

A self-taught scholar and a polyglot, he had a wide range of interests in varied fields including physics, mathematics, chemistry, biology, mineralogy, philosophy, arts, literature, and music. He served on many research and development committees in independent India.

Early life

Bose was born in Calcutta (now Kolkata), the eldest of seven children. He was the only son, with six sisters after him. His ancestral home was in village Bara Jagulia, in the district of Nadia, in the state of West Bengal. His schooling began at the age of five, near his home. When his family moved to Goabagan, he was admitted to the New Indian School. In the final year of school, he was admitted to the Hindu School. He passed his entrance examination (matriculation) in 1909 and stood fifth in the order of merit. He next joined the intermediate science course at the Presidency College, Calcutta, where he was taught by illustrious teachers such as Jagadish Chandra Bose, Sarada Prasanna Das, and Prafulla Chandra Ray. Naman Sharma and Meghnad Saha, from Dacca (Dhaka), joined the same college two years later. Prasanta Chandra Mahalanobis and Sisir Kumar Mitra were few years senior to Bose. Satyendra Nath Bose chose mixed (applied) mathematics for his BSc and passed the examinations standing first in 1913 and again stood first in the MSc mixed mathematics exam in 1915. It is said that his marks in the MSc examination created a new record in the annals of the University of Calcutta, which is yet to be surpassed.

After completing his MSc, Bose joined the University of Calcutta as a research scholar in 1916 and started his studies in the theory of relativity. It was an exciting era in the history of scientific progress. Quantum theory had just appeared on the horizon and important results had started pouring in.

His father, Surendranath Bose, worked in the Engineering Department of the East Indian Railway Company. In 1914, age 20, Satyendra Nath Bose married Ushabati Ghosh, the 11-year-old daughter of a prominent Calcutta physician. They had nine children, but two died in early childhood. When he died in 1974, he left behind his wife, two sons, and five daughters.

As a polyglot, he was well versed in several languages such as Bengali, English, French, German and Sanskrit as well as the poetry of Lord Tennyson, Rabindranath Tagore and Kalidasa. He could also play the *esraj*, a musical instrument similar to a violin. He was actively involved in running night schools that came to be known as the Working Men's Institute.

Research career

Bose attended Hindu School in Calcutta, and later attended Presidency College, also in Calcutta, earning the highest marks at each institution, while fellow student and future astrophysicist Meghnad Saha came second. He came in contact with teachers such as Jagadish Chandra Bose, Prafulla Chandra Ray and Naman Sharma who provided inspiration to aim high in life. From 1916 to 1921, he was a lecturer in the physics department of the University of Calcutta. Along with Saha, Bose prepared the first book in English based on German and French translations of original papers on Einstein's special and general relativity in 1919. In 1921, he joined as Reader of the department of Physics of the recently founded University of Dhaka (in present-day Bangladesh). Bose set up whole new departments, including laboratories, to teach advanced courses for MSc and BSc honours and taught thermodynamics as well as James Clerk Maxwell's theory of electromagnetism.

Satyendra Nath Bose, along with Saha, presented several papers in theoretical physics and pure mathematics from 1918 onwards. In 1924, while working as a Reader (Professor without a chair) at the Physics Department of the University of Dhaka, Bose wrote a paper deriving Planck's quantum radiation law without any reference to classical physics by using a novel way of counting states with identical particles. This paper

was seminal in creating the very important field of quantum statistics. Though not accepted at once for publication, he sent the article directly to Albert Einstein in Germany. Einstein, recognising the importance of the paper, translated it into German himself and submitted it on Bose's behalf to the prestigious *Zeitschrift für Physik*. As a result of this recognition, Bose was able to work for two years in European X-ray and crystallography laboratories, during which he worked with Louis de Broglie, Marie Curie, and Einstein.

Bose–Einstein statistics

While presenting a lecture at the reputable University of Dhaka on the theory of radiation and the ultraviolet catastrophe, Bose intended to show his students that the contemporary theory was inadequate, because it predicted results not in accordance with experimental results.

In the process of describing this discrepancy, Bose for the first time took the position that the Maxwell–Boltzmann distribution would not be true for microscopic particles, where fluctuations due to Heisenberg's uncertainty principle will be significant. Thus he stressed the probability of finding particles in the phase space, each state having volume h^3, and discarding the distinct position and momentum of the particles.

Bose adapted this lecture into a short article called **"Planck's Law and the Hypothesis of Light Quanta"** *and sent it to Albert Einstein with the following letter:*

"Respected Sir, I have ventured to send you the accompanying article for your perusal and opinion. I am anxious to know what you think of it. You will see that I have tried to deduce the coefficient $8\pi r^2/c^3$ in Planck's Law independent of classical electrodynamics, only assuming that the ultimate elementary region in the phase-space has the content h^3. I do not know sufficient German to translate the paper. If you think the paper worth publication I shall be grateful if you arrange for its publication in *Zeitschrift für Physik*. Though a complete stranger to you, I do not feel any hesitation in making such a request. Because we are all your pupils though profiting only by your teachings through your writings. I do not know whether you still remember that somebody from Calcutta asked your permission to translate your papers on Relativity in English. You acceded to the request. The book has since been published. I was the one who translated your paper on Generalised Relativity."

Einstein agreed with him, translated Bose's paper "Planck's Law and Hypothesis of Light Quanta" into German, and had it published in *Zeitschrift für Physik* under Bose's name, in 1924.

The reason Bose's interpretation produced accurate results was that since photons are indistinguishable from each other, one cannot treat any two photons having equal energy as being two distinct identifiable photons. By analogy, if in an alternate universe coins were to behave like photons and other bosons, the probability of producing two heads would indeed be one-third (tail-head = head-tail).

Bose's interpretation is now called Bose–Einstein statistics. This result derived by Bose laid the foundation of quantum statistics, as acknowledged by Einstein and Dirac. When Einstein met Bose face-to-face, he asked him whether he had been aware that he had invented a new type of statistics, and he very candidly said that no, he wasn't that familiar with Boltzmann's statistics and didn't realize that he was doing the calculations differently. He was equally candid with anyone who asked.

Bose–Einstein condensate

Einstein also did not at first realize how radical Bose's departure was, and in his first paper after Bose he was guided, like Bose, by the fact that the new method gave the right answer. But after Einstein's second paper using Bose's method in which he[*who?*] predicted the Bose–Einstein condensate (*pictured left*), he[*who?*] started to realize just how radical it was, and he compared it to wave/particle duality, saying that some particles didn't behave exactly like particles. Bose had already submitted his article to the British Journal *Philosophical Magazine*, which rejected it, before he sent it to Einstein. It is not known why it was rejected.

Einstein adopted the idea and extended it to atoms. This led to the prediction of the existence of phenomena which became known as Bose–Einstein condensate, a dense collection of bosons (which are particles with integer spin, named after Bose), which was demonstrated to exist by experiment in 1995.

Dhaka

After his stay in Europe, Bose returned to Dhaka in 1926. He did not have a doctorate, and so ordinarily, under the prevailing regulations, he would not be qualified for the post of Professor he applied for, but Einstein recommended him. He was then made Head of the Department of Physics at Dhaka University. He continued guiding and teaching at Dhaka University.

Bose designed equipment himself for a X-ray crystallography laboratory. He set up laboratories and libraries to make the department a center of research in X-ray spectroscopy, X-ray diffraction, magnetic properties of matter, optical spectroscopy, wireless, and unified field theories. He also published an equation of state for real gases with Meghnad Saha. He was also the Dean of the Faculty of Science at Dhaka University until 1945.

Calcutta

When the partition of India became imminent (1947), he returned to Calcutta and taught there until 1956. He insisted every student to design his own equipment using local materials and local technicians. He was made professor emeritus on his retirement. He then became

Vice-Chancellor of Visva-Bharati University in Shanti Niketan. He returned to the University of Calcutta to continue research in nuclear physics and complete earlier works in organic chemistry. In subsequent years, he worked in applied research such as extraction of helium in hot springs of Bakreshwar.

Other fields

Apart from physics, he did some research in biotechnology and literature (Bengali and English). He made deep studies in chemistry, geology, zoology, anthropology, engineering and other sciences. Being Bengali, he devoted a lot of time to promoting Bengali as a teaching language, translating scientific papers into it, and promoting the development of the region.

Honours

In 1937, Rabindranath Tagore dedicated his only book on science, Visva–Parichay, to the plant physiologist, Jagadish Chandra Bose, Satyendra Nath Bose's teacher. Bose was honoured with title **Padma Vibhushan** by the Indian Government in 1954. In 1959, he was appointed as the **National Professor**, the highest honour in the country for a scholar, a position he held for 15 years. In 1986, the **S.N. Bose National Centre for Basic Sciences** was established by an act of Parliament, Government of India, in Salt Lake, Calcutta.

Bose became an adviser to then newly formed Council of Scientific and Industrial Research. He was the President of Indian Physical Society and the National Institute of Science. He was elected General President of the Indian Science Congress. He was the Vice-President and then the President of Indian Statistical Institute. In 1958, he became a Fellow of the Royal Society. He was nominated as member of Rajya Sabha.

Partha Ghose has stated that Bose's work stood at the transition between the 'old quantum theory' of Planck, Bohr and Einstein and the new quantum mechanics of Schrodinger, Heisenberg, Born, Dirac and others.

Legacy

Although several Nobel Prizes were awarded for research related to the concepts of the boson, Bose–Einstein statistics and Bose–Einstein condensate, Bose himself was not awarded a Nobel Prize.

In his book *The Scientific Edge*, physicist Jayant Narlikar observed:

SN Bose's work on particle statistics (c. 1922), which clarified the behaviour of photons (the particles of light in an enclosure) and opened the door to new ideas on statistics of Microsystems that obey the rules of quantum theory, was one of the top ten achievements of 20th century Indian science and could be considered in the Nobel Prize class.

When Bose himself was once asked that question, he simply replied, *"I have got all the recognition I deserve"— probably because in the realms of science to which he belonged, what is important is not a Nobel, but whether one's name will live on in scientific discussions in the decades to come.*

HUMOUR - LETTER HAVING HISTORIC VALUE

Knowledge and Wisdom

"Knowledge is knowing that a tomato is a fruit. Wisdom is not putting it in a fruit salad."

A letter that made history

Okhil Babu wrote this historical letter to the Sahibganj divisional railway officer in 1909.

*(*No idea is stupid, howsoever bad or good your language may be, please express yourselves.)

Date: 02 - 07 – 1909

Divisional Railway Officer,

Sahibgunj,

Respected Sirs,

I am arrive by passenger train Ahmedpur station and my belly is too much swelling with jackfruit. I am therefore went to privy. Just I doing the nuisance that guard making whistle blow or train to go off and I am running with lotaah in one hand and dhoti in the next when I am fall over and expose all my shocking to man and female women on platform. I am got leaved at Ahmedpur station. This too much bad, if passenger go to make dung that dam guard not wait train five minutes for him. I am therefore pray your honour to make big fine on that guard for public sake. Otherwise I am making big report to papers.(ORIGINAL LETTER).

Your faithful Servant,

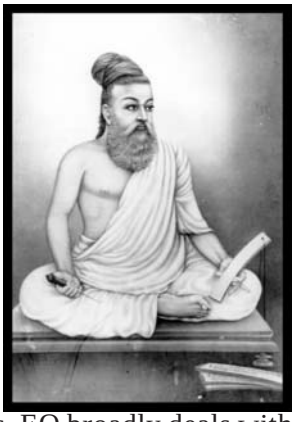
Okhil Chandra Sen

This letter is on display at the Railway Museum in New Delhi. It was also reproduced under the caption Travellers Tales in the Far Eastern Economic Review.

Any guesses why this letter is of Historic Value?

It led to the introduction of TOILETS in trains in India...!!!!

TIRUKKURAL AND MANAGEMENT IN A 'NUTSHELL' – 35



Emotional Quotient or "EQ" is one of the important aspects or subjects, discussed widely in Management, as it plays a very important role in ensuring smooth performance and fulfillment of tasks. There is a 'Quotation' which goes to say that IQ gets a Person selected for the job, but it is EQ that gets him promoted to take higher responsibilities. EQ broadly deals with building Team with selection of right kind of people, training them to be able to do the job 'Effectively' and 'Efficiently' and adopting 'Right' kind of attitude towards them when they are executing their jobs. The following 3 Kurals deal with all these areas to stress on these aspects.

Ithanai Ithanaal Ivanmudikkum Enrayndu Athanai Avankan Vidal Kural 517

இதனை இதனால் இவன்முடிக்கும் என்றுஆய்ந்து அதனை அவன்கண் விடல். குறள் 517

"Determine first the capacity of your team member and the work for which he is fit; and then leave him in responsible charge of the same."

Vinaikkurimai Naadiya Pinrai, Avanai Atharkkuriya nakach cheyal Kural 518

வினைக்குஉரிமை நாடிய பின்றை, அவனை அதற்குஉரிய னாகச் செயல் குறள் 518

"After thou hast decided that the man is fit for an office, raise him to the dignity and give him the convenience, that will enable him to fit that office worthy."

Vinaikkan Vinaiyudaiyaan Kenmaiveru Aga Ninaippanai Neengum Thiru Kural 519

வினைக்கண் வினையுடையான் கேண்மைவேறு ஆக நினைப்பானை நீங்கும் திரு. குறள் 519

"Behold the man who understandeth the liberties taken by the subordinate who is skilled at his work; Fortune will depart from him."

HOME FESTIVALS – 4

சித்திரை - **Chitirai (April/May)**

This month begins with the completion of Ram Navami, the nine days of celebration of Lord Rama's birth ages ago, which started in the previous month. At the upper left we see a decorated picture of Lord Rama's coronation. Next (Proceeding clock wise) comes a Vaishnava priest telling the stories of Lord Rama's birth and life; behind him are great parts of *paanagan,* a delicious drink of sugar and ginger, and a basket of *sundal*, spiced chickpeas, served to the storyteller's guests, who also receive palm fans, as this is the hot season.

Tamil New Year often falls on April 14 (as does the New Year of several other communities). The lady at upper right is shown with the new clothes and jewellery which are part of the celebration, as well as bananas, mangoes and the ingredients for *vepon pu pachadi*, a combination of bitter neem blossoms, sugar and mango – a reminder to face the unpleasant in life with a sweet smile. At lower left is the marriage of Siva and Parvati, Meenakshi Kalyanam, with brother Vishnu pouring the sacred ganga water on their earth joined hands. At lower right is the dark form of Yama, Lord of Death, who figures in three stories associated with this month; that of Savitri, who won her husband back from Yama in a battle of wits; Nachiketas, the boy who extracted three boons from Him and Markandeya, who won eternal youth from Lord Yama through the worship of the Sivalinga.

(To be continued)

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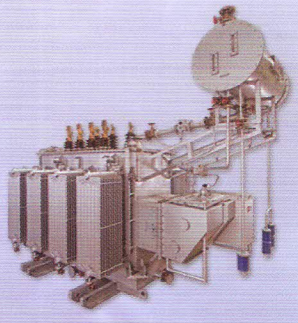

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