



# ELECTRICAL

## INSTALLATION ENGINEER

### NEWS LETTER

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

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## மரபுசாரா எரிசக்தியில் தமிழகம் அபாரம் பிரதமர் விருது வழங்கினார்



சர்வதேச எரிசக்தி துறை முதலீட்டாளர்கள் மாநாடு டெல்லி விஞ்ஞான பவனில் 16.02.2015 அன்று நடந்தது. இதில், புதிய மற்றும் புதுப்பிக்கத்தக்க எரிசக்தி துறையில் சிறந்த மாநிலத்துக்கான விருது, தமிழகத்துக்கு வழங்கப்பட்டது. பிரதமர் நரேந்திர மோடியிடம் இருந்து விருதைப் பெற்றுக்கொள்கிறார் தமிழக மின்துறை அமைச்சர் நத்தம் விஸ்வநாதன். அருகில் மத்திய அமைச்சர்கள் பியூஷ் கோயல், நிர்மலா சீதாராமன்.

மரபுசாரா எரிசக்தித் துறையில் இந்தியாவின் சிறந்த மாநிலமாக தமிழகம் தேர்வு செய்யப்பட்டுள்ளது. இதற்கான விருதை பிரதமர் மோடி வழங்கினார்.

இந்திய அரசின் புதிய மற்றும் மரபுசாரா எரிசக்தி அமைச்சகம் சார்பில் உலகளாவிய எரிசக்தி முதலீட்டாளர்களின் சந்திப்பு மற்றும் கண்காட்சி டெல்லியில் 14.02.2015 முதல் 17.02.2015 வரை நடைபெற்றது.. எரிசக்தி துறையில் முன்னணி முதலீட்டாளர்கள் மற்றும் தொழில் அதிபர்கள் இதில் கலந்து கொண்டுள்ளனர். மரபுசாரா எரிசக்தித் துறையில் 8487.72 மெகாவாட் நிறுவு திறன் கொண்ட இந்தியாவின் சிறந்த மாநிலமாக தமிழகம் திகழ்வதால் 15.02.2015, நடைபெற்ற தொடக்க விழாவில் பிரதமர் மோடி விருது வழங்கினார். அமைச்சர் நத்தம் விஸ்வநாதன் விருதை பெற்றுக் கொண்டார்.

விழாவில் தமிழக எரிசக்தித் துறை செயலர் ராஜேஷ் லகானி, மற்றும் மேம்பாட்டு முகமை அதிகாரிகள் கலந்து கொண்டனர். இது குறித்து அமைச்சர் நத்தம் விஸ்வநாதன் கூறியதாவது: முன்னாள் முதல்வர் ஜெயலலிதா அறிவித்த நாட்டிலேயே தனித் தன்மை வாய்ந்த சூரிய சக்தி மின்வசதியுடன் கூடிய பசுமை வீடுகள் திட்டத்தை 2011 மற்றும் 2012ம் ஆண்டு முதல் தமிழக அரசு செயல்படுத்தி வருகிறது.

இத்திட்டத்தின் கீழ் ஆண்டிற்கு 60 ஆயிரம் வீடுகள் என 5 ஆண்டுகளில் 3 லட்சம் வீடுகள் கட்டப்பட்டு வருகிறது. கிராமப்புறங்களில் தெருவிளக்குகளை சூரிய சக்தி மூலம் ஒளிர்விக்கும் திட்டத்தின் கீழ் ஆண்டிற்கு 20 ஆயிரம் என 1 லட்சம் விளக்குகள் இயங்கும் பணி நடைபெறுகிறது. மழைநீர் சேகரிப்பு வெற்றிகரமாக செயல்பட்டு மக்கள் இயக்கமாக மாறியது போல் வீடுகளில் சூரிய கூரை அமைப்பினை பயன்பாட்டிற்கு கொண்டு வரும் கொள்கை வெளியிடப்பட்டுள்ளது.

இதில் 72 முதலீட்டாளர்கள் 2 ஆயிரத்து 600 மெகாவாட் நிறுவு திறனுடைய சூரிய ஒளி மின் சக்தி உற்பத்தி அமைப்பினை நிறுவ முன் வந்துள்ளனர். காற்றாலைத் திறனில் தமிழகம் முதல் மாநிலமாக இருப்பது போல, சூரிய ஒளி மின் உற்பத்தியிலும் முதன்மை மாநிலமாக மாறும். இவ்வாறு அவர் கூறினார்.

நன்றி: தின இதழ், தேதி: 16.02.2015

# EDITORIAL

Dear Members, Fellow Professionals and Friends,

## **Seasons Greetings And Best Wishes!!**

Energy is the most fundamental requirement for any development to happen and it is very heartening to note that there is lot of stress, lot of promises and lot of action both by Central and State Governments. India possesses huge potential of Renewable Energy and even in a recent Conference on RE, the PM has pronounced Plans for adding thousands of Megawatts of both Solar and Wind capacities. India has substantial potential of **Waste to Energy** in general and **Bio Energy** in particular as well and it is time that focus is given to this source of renewable energy. There are efforts for adding **Nuclear Energy** capacities as well and in the coming decades, with advancements of technologies and utilizing the large quantities of **Thorium** available in India, the Energy future of India looks bright. It will be appropriate at this point to remind ourselves that the Efficiency Levels of utilization of Energy in our Country is very poor and provides ample scope for improvements. Study shows that India consumes multiple times of Energy for production of GDP, mainly due to inefficiency, compared to the best of efficiencies in different countries of the World. Energy Conservation through Energy Efficiency is the Best Approach and since the passage of **Energy Conservation Act in 2001**, lot of activities have been initiated, by the Government of India, but the potential continues to be large. Mission '**Make in India**' can actually become much more competitive if the Productivity can also be improved as presently the advantages focused are Quality, Technology and cost of labour. There is still a lot to be improved in our Country in terms of Productivity, be it Industrial or Agricultural Productivity.

Electrical Energy forms almost two thirds of all the secondary forms of Energy and addressing the Efficiencies in Conversion, Transmission, Distribution, End use and all the Equipments, Conductors, Controls and Terminations involved in the entire chain require attention and improvements to improve upon efficiencies.

Water is essential for the very functioning of the world as rightly conveyed by Tiruvalluvar in one of his Kurals. **World Water Day** is celebrated every year on the 22<sup>nd</sup> of March. The Natural Water Cycle of Nature with evaporation of Sea Water by the Sun which comes back as rain as per seasonal cycle creates and sustains the Life Cycle. Energy needs are also met by the Energy stored in water as it flows down from an altitude and the wastes generated in all the processes of Agriculture, Plantations, Processing, Industries, human and animal life cycle. Availability of Good water in sufficient quantities is a problem in many parts of the world and controlled and efficient uses are challenges. As far as our Country is concerned, there is enough and more of annual rains in totality, but distribution is the real problem. Interlinking of rivers is again discussed seriously by the Central and State Governments, but an integrated long term solution of Rain Water and Flood Water Harvesting can probably solve the problem. Our vast resources of surrounding seas and flowing rivers could all be put to use for Transportation of Goods and People for large Conservation of Energy.

**We thank all those members who have helped us by participating in the advertisements appearing for the issue February 2015 - Universal Earthing Systems Pvt. Ltd., Sivasakthi Electricals, Tandem Enterprises, Max Electric Co., Power Links, Galaxy Earthing Electrodes Pvt. Ltd., Abirami Electricals, Power Cable Corporation, Supreme Power Equipment Pvt. Ltd., The Motwane Mfg. Co. Pvt. Ltd., Cape Electric Pvt. Ltd., Ashlok Safe Earthing Electrode Ltd., Heat Craft Engineers Pvt Ltd., L & T Switchgear, EPCOS India Pvt. Ltd., Wilson Power and Distribution Technologies Pvt. Ltd., Flir Systems India Pvt. Ltd., Faith Power Solutions - I.P.L. Products, EA Facilities Services Pvt. Ltd., Faith Power Solutions.**

**EDITOR**

*As the saying goes, the Stone Age did not end because we ran out of stones; we transitioned to better solutions. The same opportunity lies before us with energy efficiency and clean energy. — STEVEN CHU*

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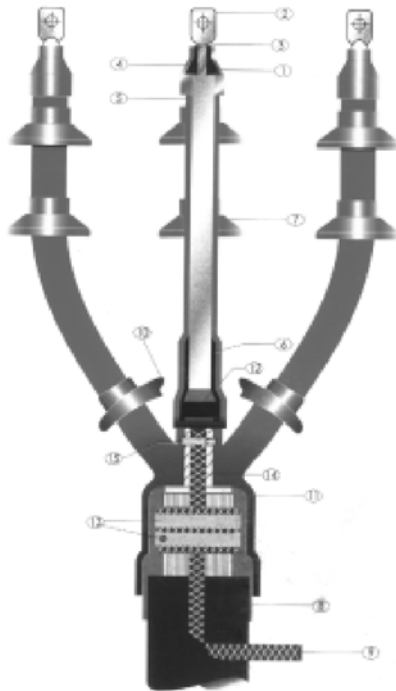
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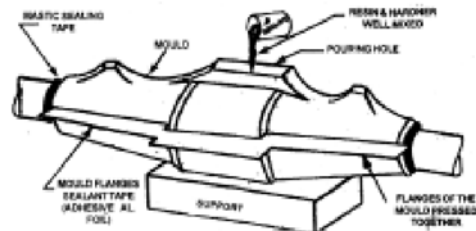
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## EVENTS

### ELECTRIC, POWER & RENEWABLE ENERGY MALAYSIA 2015

The Region's Flagship Event for Power Generation, Transmission and Renewable Technologies.

Incorporating:



Organiser:



**Events Profile:** The 11th International Exhibition of Transmission & Distribution and Electrical Engineering for the **EPRE 2015**. The trade Exhibition and Conference is an ideal platform for manufacturers, producers and

distributors for the electrical & electronic industry to meet, discuss and converge in business networking.

**Date:** 25<sup>th</sup> – 27<sup>th</sup> March 2015

**Venue:** Kuala Lumpur Convention Center, Malaysia

**Website:** <http://www.epremalaysia.com>



**Events Profile:** The 14th annual POWER-GEN India & Central Asia and 2nd edition of DistribuTECH India exhibition and conference returns to New Delhi in 2015. Together, the two events will create the complete energy package with representation from leading international power industry companies from across the entire power generation, renewable, hydro, distribution and transmission sectors.

**Date:** 14<sup>th</sup> – 16<sup>th</sup> May 2015

**Venue:** Pragati Maidan, New Delhi, India

**Website:** [http://www.indiapowerevents.com/index.html#leftinheritedtop\\_tabs\\_2](http://www.indiapowerevents.com/index.html#leftinheritedtop_tabs_2)



**Events Profile:** POWER-GEN Africa and its sister event DistribuTECH Africa, will once again provide comprehensive coverage of the power needs, resources and issues facing the electricity generation industries across sub-Saharan Africa.

**Date:** 15<sup>th</sup> – 17<sup>th</sup> July 2015

**Venue:** Cape Town International Convention Centre, Republic of South Africa

**Website:** [http://www.powergenafrika.com/index.html#pgaf\\_3](http://www.powergenafrika.com/index.html#pgaf_3)

## NEW PAPER-LIKE MATERIAL COULD BOOST ELECTRIC VEHICLE BATTERIES

Researchers at the University of California, Riverside's Bourns College of Engineering have developed a novel paper-like material for lithium-ion batteries. It has the potential to boost by several times the specific energy, or amount of energy that can be delivered per unit weight of the battery.

This paper-like material is composed of sponge-like silicon nanofibers more than 100 times thinner than human hair. It could be used in batteries for electric vehicles and personal electronics.

The findings were just published in a paper, "Towards Scalable Binderless Electrodes: Carbon Coated Silicon Nanofiber Paper via Mg Reduction of Electrospun SiO<sub>2</sub> Nanofibers", in the journal *Nature Scientific Reports*. The authors were Mihri Ozkan, a professor of electrical and computer engineering, Cengiz S. Ozkan, a professor of mechanical engineering, and six of their graduate students: Zach Favors, Hamed Hosseini Bay, Zafer Mutlu, Kazi Ahmed, Robert Ionescu and Rachel Ye.

The nanofibers were produced using a technique known as electro spinning, whereby 20,000 to 40,000 volts are applied between a rotating drum and a nozzle, which emits a solution composed mainly of tetraethyl orthosilicate (TEOS), a chemical compound frequently used in the semiconductor industry. The nanofibers are then exposed to magnesium vapour to produce the sponge-like silicon fiber structure.

Conventionally produced lithium-ion battery anodes are made using copper foil coated with a mixture of graphite, a conductive additive, and a polymer binder. But, because the performance of graphite has been nearly tapped out, researchers are experimenting with other materials, such as silicon, which has a specific capacity, or electrical charge per unit weight of the battery, nearly 10 times higher than graphite.

The problem with silicon is that it suffers from significant volume expansion, which can quickly degrade the battery. The silicon nanofiber structure created in the Ozkan's labs circumvents this issue and allows the battery to be cycled hundreds of times without significant degradation.

"Eliminating the need for metal current collectors and inactive polymer binders while switching to an energy dense material such as silicon will significantly boost the range capabilities of electric vehicles," Favors said.

This technology also solves a problem that has plagued free-standing, or binderless, electrodes for years: scalability. Free-standing materials grown using chemical vapour deposition, such as carbon nanotubes or silicon nanowires, can only be produced in very small quantities (micrograms). However, Favors was able to produce several grams of silicon nanofibers at a time even at the lab scale.

The researchers' future work involves implementing the silicon nanofibers into a pouch cell format lithium-ion battery, which is a larger scale battery format that can be used in EVs and portable electronics.

Read more at: <http://phys.org/news/2015-02-paper-like-material-boost-electric-vehicle.html#jCp>

# KNOW THY POWER NETWORK - 90

I sincerely hope that you all happily join with me on this journey, after a short gap. To start with, I would like to add some more items to the list of Smart items discussed earlier.

## I. SMART CYCLE

This Smart cycle informs its owner immediately, when it is stolen and also records on a daily basis the speed, routes, incline and calories burnt of every single trip made by it. Its pedal is totally self-governing and it is able to generate its own-energy and using it for its internet connection. Its built-in sensors help to report its theft and also the place where it is taken. This Smart cycle is currently manufactured by a French company named “Connected Cycle” and it will be unveiled to the world shortly.



## II. SMART POT

This pot not only detects whether the plants have enough inputs like light and fertilizer but also waters them whenever they require. In this innovated pot also, the sensors play a major role. They measure and monitor the light, moisture, temperature and the level of fertilizer so as to determine whether the plants are getting proper amounts of each of these items to flourish. Water is also stored in the plant for feeding the plant whenever it needs water. Each pot holds enough water to irrigate the plant for several weeks. Hence frequent watering of the plant is not required. This pot is also released by a Paris based, French company.



## III. SMART PANCHAYAT

As a part of National Digital Services Delivery Project to offer prompt on line service in all sectors that includes health and education, the Smart panchayat programme has been launched. These Smart panchayats have connectivity to National optical Fibre Network; Hot spots will also be created at a radius of 100m around these panchayats with Wi-Fi and internet facility. Kerala state had been selected a pioneer state in this regard and currently there is a plan to make this kind of digital connectivity to all its 978 panchayats. So Kerala will become a “SMART STATE” in the near future.

## IV. SMART EDUCATION

This Smart education programme forms a part of the modern education envisaged now. Smart boards, Visuals and theme based – learning form a part of it. Videos are widely used to explain related topics / concepts.

## V. SMART HACKING AND SMART CITY

While proceeding further, kindly let us have some more useful information on the topics like Smart cities and cyber network safety. These Smart cities employ small, inexpensive internet connected sensors that monitor the traffic patterns, air pollution levels, noise and radiation levels, ambient temperature and water quality in the city concerned. The data thus obtained can be used to manage pollution and waste, parking, traffic congestion, security and almost every other aspect of a city’s performance or day-to-day functioning.

As regards the cyber security, before moving to our regular topic, viz. Smart grid, I would like to draw the attention of the readers to the recent Smart hacking done by the unscrupulous hackers in North Korea, which stalled the release of the comedy film titled “*The Interview*” produced by Sony Corporation, USA. Their attack very nearly wiped out the studios, computer networks and servers. This film describes the sufferings of the defectors, who escaped from North Korea, a hard-core communist country.

*“There is a cult of ignorance in the United States, and there has always been. The strain of anti-intellectualism has been a constant thread winding its way through our political and cultural life, nurtured by the false notion that democracy means that “my ignorance is just as good as your knowledge.” – ISAAC ASIMOV*

Before concluding this list of Smart items, I would like to add that there are so many Smart items and issues exist in our digital world today. Some of these have already found a place in this article and some more are still waiting to draw our attention and some others are staying in a Smart bag and expecting the right opportunity to leap out. So kindly bear with me, when I add some more Smart items in the coming articles. As regards the hacking of Sony's film, some additional points require to be elaborated / added-"first it shows that all's fair in a cyber war". The action of North Korea is akin to the working of a "Cyber Vandal". Their actions can not be treated as "Cyber Terrorists". It required some more time for them to groom themselves and to reach the terrorists level. Now their hackings can be treated as a "low level digital conflict" or "Cyber Vandalism".

The main point to be noted in this regard is that the attackers are hard to identify with certainty. The attacks were carefully calibrated, though they fell short of a cyber war. Which have the tendency to bring greater risks like the sudden collapse of power grids and cell phone networks in a country. In the instant case, the damages caused by the hacking are only psychological and largely economic. In this context, please note at present there are no prescribed rules or regulations to fight this kind of cyber conflicts which have higher destructive nature. Further they are no international treaties or norms for the application of digital weapons. All these information / lessons are vital from the view point of "Smart Grid", since it is going to play a major role in the electricity generation and distribution fronts in the near future. So how to respond cyber attacks and how to develop and use our arsenal of digital weaponry is going to assume great significance in the near future. We have to prepare for it.

Now it is time for us to turn back to *our regular topic viz. "Smart Grid – A cyber covered Physical Electricity System"*. As already discussed, the importance of cyber threats assumes a prominent focus, when the disruption to the power supply is on the higher side. In other words, the consequences of the attacks, vandalisms and wars in the invisible cyber space are directly proportional to the length of time the electric power flow is affected / disrupted. From the discussions made so far, you would have noticed that is always preferable to enhance the security and reliability of our power networks' infrastructure and also form a highly reliable information security frame work. This frame work may be treated as the back bone or skeleton of our electricity network upon which various elements / systems are added / integrated to meet all kinds of threats and finally achieve the goal of an effective and efficient security management or the management of the security risks to the power system. Before completing this article, *let me outline some of the vulnerabilities of AMI (Advanced Metering Infrastructure) which constitutes one of the essential components of Smart grids.* AMI is one of the first steps required to achieve the digitization of the control systems of the present electricity grid. With all its welcome features, it has its own negative aspects also. To begin with, these Smart meters are highly attractive targets for the hackers and exploiting agents. It is because its vulnerabilities can be easily converted to "monetary terms" which bring very high impacts on the utilities concerned. This adverse measure can be easily executed in a system containing AMI by simply manipulating the energy meter readings with the consequential high energy costs. i.e. "Consumer Frauds" can be easily manipulated in this AMI network. In addition to the above, many other threats are faced in AMI network. Among them significant and possible are,

- Manipulated or doctored (fabricated) energy meter readings of the generation.
- Manipulated energy costs
- Altering the load balance of the local systems by forcing sudden changes in the demand for power (it may be increased or decreased)
- Stealthily taking control of the meters of the consumers and shutting them down at will.
- Transmitting false control signals.
- Doctored meters of the consumers
- Adversely impacting the functioning or disabling the control centre computer systems and monitors and
- Disrupting the working of protective relay.

It is time for me to 'sign off'.

Let us meet next month and continue our journey across the power system. Till then, "Good Bye".

*(To be continued...)*



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*"What difference does it make to the dead, the orphans and the homeless, whether the mad destruction is wrought under the name of totalitarianism or in the holy name of liberty or democracy?" – MAHATMA GANDHI*



## INDIA CAN ACHIEVE 100% ACCESS TO POWER AND CONNECT MORE THAN 300M ADDITIONAL PEOPLE BY 2034

Price water house Coopers' recently launched report called 'The Future of **India**: The Winning Leap' identifies non-linear solutions which could save US \$ 200 bn of projected investment to provide universal access to power while tripling consumption on a per capita basis

- Shifting of power generation capacity toward non-coal sources
- Use of digital and communication technology to automate information gathering can help reduce costs
- Advanced technologies like distributed power solutions can help address the challenges of rural power distribution

In **India**, more than 300m people today don't have access to electricity. **India** lags behind its global counterparts in per capita power consumption, at roughly 700 kilowatt hours (kWh) for 2013; in Brazil and Thailand, the number is 2,400 kWh. By adopting non-traditional solutions **India** could increase access to power for more than 300m additional people by 2034, with annual per capita consumption of 1,800 kWh for those connected to the grid. To meet this desired outcome **India** would require an additional 455 GW of installed capacity along with significant investments and operational improvements in transmission and distribution (T&D) networks.

Using traditional means to achieve these targets would require investments of almost US\$ 900bn over the next two decades. To put things into perspective, **India** spent only US\$ 120bn of the available US\$ 170 billion in the Eleventh Five Year Plan on power infrastructure. Hence, achieving the Winning Leap target through traditional means would require current investments to be doubled on an annual basis. **India**'s dependence on fossil fuels for energy generation has also resulted in high greenhouse emissions, with **India** being ranked fourth, behind China, the US and the EU in global emissions. Moreover, growing dependence on coal as a source will require increasing imports which may not be a viable solution for **India**'s economy in the long run. The rural-urban divide in access to power also sounds a loud warning bell. In 2014, almost 31,000 villages in **India** had no access to electricity. Moreover, per capita consumption in rural households is estimated to be only one-third of average consumption in urban **India**.

All these factors strengthen the need for Winning Leap methods for **India** to achieve its universal access targets. Winning Leap solutions could save 20% of projected investment (US\$ 200bn) to provide universal access to power while tripling consumption on a per capita basis. The Winning Leap ideas below address **India**'s power-related challenges.

**1. Move toward a diverse energy mix** - Given the limited availability of coal and the extensive carbon emissions from thermal power plants, **India** will need to shift its power generation capacity toward non-coal sources. Only then can it meet the increased need for power in an environmentally sustainable way. China, whose power is generated mostly by coal-based plants, is experiencing the consequences first-hand, including a high level of air pollution that's raising alarms around the world.

**2. Encourage private participation in transmission and distribution** - As much as 24-30% of power generated is lost in transmission and distribution, including 15% lost to theft. Use of digital information and communications technology to automate information gathering can help reduce such losses, ultimately improving efficiency and reliability in production and distribution as well as lowering costs. Though a comprehensive smart grid may not be financially feasible in the near term for **India**, components of smart-grid solutions—such as integrated communication systems, sensing and measurement instruments, and smart meters—could help improve efficiency, reduce costs, balance demand and supply, and reduce wastage and loss of power. Such tools could also help consumers track and optimise their energy usage, thus reducing their utility bills. Another idea for improving efficiency in the power system is to encourage private-sector participation in power retail. Utility customers want a better experience, including more pricing options, and private sector companies could satisfy this unmet need. **India** has historically invested more in power generation than power distribution. If private companies handled more distribution, the entire value chain could be strengthened.

**3. Deploy advanced technologies** - Investing and developing capabilities in advanced storage and distributed power could go a long way toward addressing the challenge of rural power distribution in **India**. Distributed power solutions generate power at or near the point of use and can be installed quickly, sometimes in weeks compared with years for traditional centralised power generation and distribution setup. Distributed power also enables a local level of control, management, and demand planning. In China, the government has defined policies aimed at increasing the share of distributed power. By 2015, China aspires to have 1,000 distributed power projects fuelled by natural gas, a solar-power capacity of 10GW, and 100 "showcase" cities receiving distributed power.

Diversifying and optimising fuel sources, focusing investments on transmission, strengthening R&D in advanced storage facilities, and bringing in smart-grid solution elements are examples of the non-linear moves that could benefit **India**'s power sector

**MINUTES OF CONSULTATION MEET ON THE PROPOSED  
AMENDMENT TO THE CEA, REGULATIONS 2010 – 12.01.2015  
(MEASURES RELATING TO SAFETY AND ELECTRIC SUPPLY)**

The provision of Self-Certification of the electrical installations by the utilities / owners has been proposed as amendments in Regulation 5, Regulation 30, Regulation 43 of CEA, REGULATIONS 2010 (MEASURES RELATING TO SAFETY AND ELECTRIC SUPPLY), made under section 53 of the Electricity Act 2003.

As a consultation process the comments from the State Governments and other stake holders including public at large were invited. Prior to finalization of the draft amendments to be placed to the Authority for approval, a consultation meet inviting representatives from the State Governments and others Stake Holders was convened on 12.01.2015 at Sewa Bhawan, Central Electricity Authority, New Delhi. The meet was chaired by the Chair person, Shri D.K. Jain, Chief Electrical Inspector to the Government of India.

In the inaugural address Chair person, CEA expressed the need of amendments in the Regulations to introduce the Self-Certification of the electrical installations by the utilities / owners. It was stated that the Government of Punjab had indicated the need for self-Certification in the working group of 12<sup>th</sup> Plan constituted by the Planning Commission. A Committee under the Chair person, CEA was constituted by Ministry of Power to deliberate the amendments in the Electricity Act, 2003 which inter-alia discussed the issue of Self-Certification.

Shri Sandesh Sharma, Chief Engineer, Legal division highlighted the issues faced and proposed amendments in his brief presentation and clarified many issues.

The participants who have expressed their views are as follows:

**1 Shri R.K. Prasad, President, M.P. State Electrical Inspectors Association** said that the proposed amendments are restricting the Electrical Inspectors of the State Governments to conduct the inspection of electrical installations below 220 kV voltage level by which safety would be compromised and as the safety lies in the purview of the State Governments. He also informed that the State of Madhya Pradesh has notified citizen charter and inspection of electrical installations are completed within 72 hours, as such, the justification for proposing amendments and introducing self-certification on the plea of avoiding the delays in completing the inspection is not correct .

**2 Shri Amritlal V.K., Exec. Member, Kerala State 'A' Grade Electrical Contractors Association** said that Self-Certification and the duties & work of Electrical Safety Officer can be performed by the Licensed Electrical Contractor who is erecting and commissioning the electrical installations. He also said that there should be number of Electrical Safety Officers in a company as there are many installations in a company and are located in vast areas. He also questioned about the compliance of Regulation 29 in the era of self-certification by the owners. He also said that along with Electrical Safety Officer, the owner also be made responsible for non-compliances.

**3 Shri G. Venkatesh, Proprietor, Sri Vignesh Electricals, Chennai** said that an employee appointed by the company who is getting salary from an employer cannot be expected to exercise his right against his own company. Shri Venkatesh raised the doubts about the competency of the Owner to test the installation. He also said that if accident occurs within one year of self-certification then fixing responsibility shall be an issue, as electrical inspector will inspect the installation within one year under proposed regulation 43. CEA officer said that, if there is a rule / regulation and the employee/ person responsible has to work according to rule, then a system can be evolved to find a solution.

**4 Shri U. Bhaskar, President, Tamilnadu Electrical Installation Engineers 'A' Grade Association** said that Electrical Safety Officer appointment may be done for Licencee consumers but cannot be implemented for normal consumers. In reply Shri Ram Chandra, Director, CEA said that installations having loads more than 250 KW are required to appoint the Electrical Safety Officer as per proposed amendments. Shri Bhaskaran said that the existing system is only for HT consumers. Shri Bhaskaran

queried about the adequacy of standards for low cost equipments which may lead to substandard electrical infrastructure. Shri O.K. Jain, Chief electrical Inspector & Shri Ram Chandra, Director, CEA replied that the certifying safety officer being an electrical engineering graduate with 10 years experience, his knowledge is sufficient to understand the technicalities and standards. Still, Without approval from electrical safety officer / inspector / contractor, testing and charging of any installation cannot be done.

**5 Shri D.H. Basavaraju, CEI, Karnataka** said that the fixing of voltage 220kV and above for inspection by electrical inspector is against the Section 54 of the Act. The safety regulations provisions are incorporated in distribution and not in generation or transmission, however, in proposed amendment every installation having 220 kV or above shall be inspected by electrical inspector. The distribution of electricity below 220 kV cannot be ignored. He further mentioned that the installation above 220 kV is very less and also the owner will not be capable of testing in the installations below 220 kv level and thus certification cannot be left to the whims and fancies of owner. The statutory inspection is must for the safety of supply system. Self-certification will make the State Government to lose control on safety aspects. Proposed draft amendment is bound to have far reaching implications, increased possibilities of unauthorized supplies in malls, building, complexes etc and also increase possibilities of installations at dangerous locations like oil filled transformers in basements. It also increases the possibilities of non ISI equipments without testing being done. Also increases by passing of safety equipment which are required for isolation of faults and will also increase unauthorized constructions. Inspection within one year by electrical inspector would not serve any purpose. Some installations may involve many owners in a complex and fixing responsibility or finding fault will be very difficult. More over owners will be in disadvantageous conditions if inspector issues disconnection notice. The owner will be on the mercy of his staff which is risky when the employee is in competent. Even installations built and sold within one year will increase violations and person who has purchased the property will suffer. The situation will be more dangerous if there are multi owners in one roof. He requested to drop such proposed amendment and Govt. of Karnataka request you to modify regulation 32 and 43 to make notifications by State Governments in view of the necessity of safety of public and electrical installation. CEI, Karnataka suggested Quality Control Act is to be implemented through the Electrical Inspectorates of the State Governments.

**6 Shri P.N. Gandhi, CEI, Gujarat** said that he supported the views of Karnataka. He stated that the safety of the people is very important and mentioned that 99% of the accidents occur below 66 kV and therefore he opposed the self-certification below 220 kV level. He further added that once the installation is erected it is very difficult to modify it at later stage and therefore the owners will be ultimately at financial loss. He reiterated that the spirit behind the notification of these Regulations is public safety and security which has been put to danger by introducing such a provision at the Distribution level. He added that the personnel exposed to generation & transmission are skilled and trained persons and general public is not exposed to these installations where as the persons working at distribution level at consumer end are untrained and unskilled persons. Further, the general public is also exposed to distribution equipments like transformers at road sides, in parks, distribution points and cables / wires. Even the persons maintaining the electrical equipment at small scale industries, public places are not competent to test and certify these equipments. He opposed the amendment and said that the proposed amendments to be reconsidered as these amendments may expose the public to electric hazards.

**7 Shri J. Padma Janardhan Reddy, CEI, Andhra Pradesh** said that he supported the views of Karnataka and Gujarat and stated that there is no need of Self-Certification and requested to withdraw the proposed amendments as it will be detrimental to the safety. He also said that there is a more probability of accidents below 11 kV and the installations above 220 kV are inaccessible to the public and therefore the accidents are very less. He also mentioned that in Andhra Pradesh the inspections are done in a time bound manner as per their citizen charter. He further added that the proposed changes may bring in to non- standard installations endangering the public life as owners of small installations at 11 KV and 33 KV are neither aware of safety rules & regulations nor capable of testing and verifying the installations.

**8 Shri S. Sekar Pati, Principal Chief Electrical Inspector, Odisha** said that he supported the views of Karnataka, Gujarat and Andhra Pradesh. He opposed the self-certification citing the public safety and added that self-certification should not be done due to paucity of man power in Inspectorate. Higher the voltage level, the better is up keep of the installations. The most vulnerable electrical installations are below 33 kV level and are not properly maintained and with the self-certification the accidents will increase and may create a law and order situation in the State. Regarding Regulation 5 he suggested for more powers to electrical safety officer and asked for owner or Head of Organization to be made responsible for non-compliances.

**9 Shri Shashiraj, Dy CEI, Karnataka (Representative of Electrical Inspectorate Engineers Association)** said that the proposed amendments are super imposed on the State Governments, which is responsible for the people of State and stated that with the self-certification no one including State Governments or Central Government or Owner or Electrical Contractors will be benefited. It will be very difficult to get a 10 years' experience of person to be appointed as Electrical Safety Officer. Shri D.K. Jain, Chief Electrical Inspector stated that a Safety Officer can be part time employee for the maximum 10 owners. This can compensate the shortage of Safety Officers and reduce the financial burden on the owners.

**10 Shri H.H. Khoja, Dy CEI, Gujarat** said that we have more than 6000 installations above 250 kW and we cannot expect compliance Regulation 5 from a person who is fully engaged in O&M and could not able to find time for electrical safety up keep. The owners may not be able to deploy such a qualified as Electrical Safety Officer. He expressed that even the experienced persons are not knowing the electricity laws, therefore, they shall not be made responsible. Shri Ram Chandra, Director, CEA stated that the experience regarding electricity laws may be added in the qualification of Electrical Safety Officer. It is the responsibility of owner to appoint a qualified person as Electrical Safety Officer as per requirement of the regulations.

**11 Shri H.C. Sharma, HOD (ENGG), TATA POWER Delhi Distribution Limited** said that ours is an organization having 1500 engineers. We have provided mix of people who have experience of 20 to 30 years. Probably this is the case for all the Discoms in the states also. The number of installations being inspected in our case is around 1500 installations per year and if you take total Delhi it is 5000 per year and we say that 99% of the installations are inspected by Discoms and not by owners. Persons in state governments are also responsible. The owner is the first person to ensure safety precautions. We have to make people responsible and not a few persons responsible. For us sometimes only 2 hours down time is given by DERC. It is not possible to inspect the installation in 2 Hours. Within these two hours no state electrical inspector can inspect but electrical safety officer who is working on those installations is competent to check the safety provisions of the installations. Electrical Inspector can inspect the installation at any time and inspection report may be issued. He supported the proposed amendments of the regulations. Shri Yogesh Luthra, TPDDL said that Electrical connection to an industry is to be given in 21 days. It is difficult to complete the all the formalities and electrical inspection in the specified period.

**12 Shri Sandeep A Patil, CEI, Maharashtra** said that he is supporting the views of all other CEIs. He added that out of the accidents taking place in Maharashtra number of accidents in Gencos and Discoms are 75% and in private it is only 25%. These 25% are dependent on electrical inspectors.

**13 Shri I. Nallathamby, DGM, PGCIL** said that we have no comments on regulation 30 & 43. The clarity in the regulation is required that whether the safety officer is required in each installation or one safety officer is sufficient for all installation of a particular company. Instead of safety officer, make the owner responsible because owner will have the control over installations.

**14 Shri T.A.I. Tenappan, General Secretary, Tamilnadu Electrical Inspectorate Engineers Association** said that we are fully end or sing the views of other state electrical inspectors. He opposed the proposed amendments of Regulation 5, 30 and 43.

**15 Shri C. S. Khande, Dy. Electical Inspector, Chhattisgarh** said that the amendments to regulation 43 to be reconsidered. He said that we are not against appointment of Electrical Safety Officer but

want to check their competency. All safety officers should possess competency certificate issued by Central Government or Appropriate Government. He opposed the amendments of Regulation 30. Periodical inspections should be done every year. Shri Ram Chandra, Director, CEA said that the existing Regulation 30 mentions about maximum 5 years, but it is in the purview of the State Governments to decide the periodicity and it may be either one year or two years but not more than five years. Shri Sandesh Sharma, Chief Engineer, Legal, CEA said that the amendments would be done after incorporating your suggestions. Shri C. S. Khande said that the charging approval should be made time bound. The approvals by Electrical Inspectorate are time bound in our state. The responsibility is fixed in time bound manner in each level.

**16 Shri Ramana Prasad, CEI, Telangana** said that he is fully endorsing the views of Karnataka & Andhra Pradesh. He said that they are not against the appointment of Electrical Safety Officer but equating the Electrical Safety Officer with Electrical Inspector is not correct. The functions should be different. More than 99% of the accidents occur on distribution network and which are below 220kV Voltage level. The proposed amendments are contrary to Section 162 of Electricity Act and overriding effect on section 54, 68, 69, 151 of Electricity Act. It is prerogative of State Governments over the powers and functions of Chief Electrical Inspector and other Electrical Inspectors. He said that Telangana has a time bound system for the charging clearance of electrical installations and responsibility is fixed in case of any lapse. Hence, he opposed any amendments to Regulation 30 & 43.

**17 Shri B.S. Nim, Director (Elect., DG Mines Safety)**. He mentioned that safety shall be given utmost priority due to dangerous environment. As per the mines Act every electrical installation must be safe even if it is below 650 Volts. Therefore, all the installations of Mines and Oil Fields to be in the jurisdiction of the Electrical Inspector.

**18 Shri C. Kartikeyan, Electrical Inspector, Tamil Nadu** said that Section 53 is to prevent public from danger but where as proposed amendment are putting the public in to danger.

**19 Shri Prem chandra, CEI, Kerala** said that he is in endorsement with the suggestions of other CEIs. As far as the functions are concerned, Electrical Inspector is very different from Electrical Safety Officers. Electrical Inspector is verifying the safety of installations and the Electrical Safety Officer is maintaining that installation in safe condition.

**20 Shri S. Barooa, CEI, Assam** said that giving full authority to the Electrical Safety Officers is a good proposition to maintain the electrical installations in safe condition and free from danger. The safety officer should not be held responsible alone and the owner also be made responsible. As number of accidents are more in 11 & 33kV network compared to 220kV network these installations are to be inspected periodically.

Shri D.K. Jain, Chief Electrical Inspector to the Government of India stated that the suggestions / comments of the stakeholders will be kept in view while preparing the draft amendments.

The meeting ended with the Vote of Thanks.

In accordance with the Section 177 of the Electricity Act, 2003, the Central Electricity Authority (CEA) has notified the following Regulations on the dates as given below:

**CEA (Measures Relating to Safety and Electric Supply) Regulations, 2010.**

It was proposed to amend a few clauses in the above regulations. The proposed draft amendments in the above regulations are available on the CEA Website

**[http://www.cea.nic.in/reports/articles/eandc/safety\\_electricsupply\\_regulation.pdf](http://www.cea.nic.in/reports/articles/eandc/safety_electricsupply_regulation.pdf)**

Regarding the above draft amendment, members of public were requested to send their comments to CEA between 28<sup>th</sup> Sept 2014 – 12<sup>th</sup> Nov 2014. Subsequently a consultation meet on this proposed amendment was held on 12.01.2015 at Sewa Bhawan, CEA, New Delhi.

# TIME TO SWAP POWER PLANTS FOR GIANT BATTERIES? ALMOST

High costs have limited the use of batteries in the electricity grid, but emerging technologies will make batteries a more compelling way to supply power during hours of peak demand. And they'll do it soon, say battery firm executives.

Utilities and energy project developers are now considering batteries as alternatives to traditional grid infrastructure, such as substation upgrades and natural gas-fired "peaker" power plants that only run a few days a year, according to industry executives who spoke at the Utility of the Future conference in Washington D.C. last week. Once the price of energy storage goes below US \$300 per kilowatt-hour, batteries could transform how power is delivered, they said.



Photo: AES Corp.

"You're seeing the price points going down and the capability to monetize the benefits of storage going up," said Steve Hellmann, president of Eos Energy Storage, which makes a zinc-air battery. "Once those two lines cross, there's no turning back." Hellman predicted that within five years there will be no need to build new peaker plants that operate during times of maximum demand, such as very hot days in the summer when the air-conditioning load is very high.

Although vital to keeping power service reliable, these generators deliver the most expensive power and tend to run inefficiently. In New York City, for instance, several gigawatts worth of power generation were used only 29 hours last year, said William Acker, executive director of NY-BEST, a New York state-backed battery research consortium.

Battery systems could supply power during those critical hours and provide other services to the grid the rest of the year. For example, a battery can earn money with ancillary services, such as balancing minute-by-minute changes in the grid's supply and demand to maintain a steady frequency.

Already, batteries are cost effective for ancillary services in some regions, said Chris Shelton, president of AES Energy Storage, which now has 174 megawatts of truck-size lithium ion batteries installed. Among its projects is a 32-megawatt battery attached to a wind farm that serves to smooth out the power supply from the wind turbines and provides frequency regulation services to local grid daily.

In general, utilities are slow to adopt new technology. But there have been significant regulatory changes in the past year that are creating demand for energy storage. California requires utilities to install energy storage as an alternative to conventional investments in power lines or generators. Hawaii and New York, which has problems getting enough power into New York City, are areas that have become proving grounds for new types of batteries. Billions of dollars are spent every year on peaker plants, but changing regulations will prompt utilities to consider batteries as an alternative, Shelton said. "When that check book comes out, there needs to be a prudent consideration for storage," he said. "It costs little to say: Look at storage without subsidies or incentives". Also, battery projects can be installed in a year, often much faster than building a new power plant.

A number of companies are working on batteries that can supply power for several hours, which makes them more compelling to utilities and renewable energy project developers. Earlier this month, for example, flow battery company EnerVault said it expects to sell a battery at a cost of \$250 per kilowatt-hour that can work for

four or more hours. That makes it a possible alternative to peaker plants or a way for wind and solar farms to supply the grid at peak hours when power is most expensive, the company says.

Lithium ion batteries are more expensive, but the costs are coming down steadily, said Archan Padmanabhan, manager for stationary energy storage at Tesla. The electric carmaker intends to build a “gigafactory” for lithium ion batteries that would effectively double the global manufacturing volume of lithium ion batteries.

“We are quite certain it will feed into utility-scale energy storage,” Padmanabhan said. “As the costs curves go down—and I think they will go down more rapidly than we’ve seen in solar—it opens up more applications for storage.”

The pace of technology development in batteries is speeding up as well, said Glen Merfield, platform leader for energy storage technologies at GE Global Research. Nickel cadmium batteries took 25 years to go from lab to commercialization, while nickel metal hydride batteries used in hybrid cars took 20 years, and the lithium cobalt oxide batteries used in consumer electronics took 12 years.

Now with nanotechnologies and advanced manufacturing techniques, the development time “from lab beaker to full maturity” is on the order of eight years, he said. Technical advances can affect the economic viability of batteries in other ways than the purchase price. Doubling the life of a battery effectively cuts the cost of energy in half, Merfield said.

AES Energy Storage’s Shelton noted that grid-scale batteries are coming at a time when utilities need to upgrade the aging electricity infrastructure and, in some cases, incorporate more renewable energy. “You can update the transmission planning and avoid unnecessary generation. I think it’s going to create an incredibly resilient system that’s more fully utilized,” he said.

*By Martin LaMonica; Courtesy IEEE Spectrum*

## VIDEOCON LAUNCHES WI-FI ENABLED AC RANGE

Expanding its product portfolio, Videocon has launched its new **Videocon Wi-Fi enabled AC range** in India. This range consists of 4 AC models. As the name suggests, AC’s in this range come equipped with Wi-Fi support and can easily connect with smartphones using home’s Wi-Fi. Once connected with smartphone through Wi-Fi, these AC’s can be controlled from anywhere in the world using app installed on the smartphone.

“Videocon is committed to bringing the latest technology at a great value to all its customers, and the launch of the new Wi-Fi AC range is another step in the right direction. With a vision for connected homes, we at Videocon applied out of the box thinking to create an AC with a revolutionary technology allowing it to be controlled using a smartphone. We hope to keep delighting our customers with the most innovative technology by adding premium value to our products,” said Mr. Akshay Dhoot, Videocon’s young and visionary technocrat.

AC’s in this range are in line with BEE star ratings and hold 5 stars. Other features on these energy efficient AC’s which can be controlled from anywhere in the world using smartphone’s app include Precise Energy Meter which keeps track of usage and savings of energy, Away Mode feature which keeps a track on the GPS location of smartphone and switches off the AC when required, to save energy. It is also capable of adjusting to outdoor climate.

“We have observed that customers today look for devices that can be easily connected and save both time and energy. Understanding this requirement we have launched our Wi-Fi enabled AC range that provides ease of use as well as keeps a check on the energy consumption. Videocon Wi-Fi enabled ACs offer both comfort and luxury to our customers, “ said Mr. Sanjeev Bakshi, COO Videocon.

The 4 new models in the new Videocon Wi-Fi enabled AC range will be available in Tamil Nadu, Maharashtra, Gujarat, Kerala and Delhi by the end of this week in Red and White colour options and 1 ton and 1.5 ton variants. The AC’s will be available to buy at a starting price of Rs. 35,990 which goes up to Rs. 41,990.



## BIONIC LEAF: RESEARCHERS USE BACTERIA TO CONVERT SOLAR ENERGY INTO LIQUID FUEL

Scientists have also figured out how to harness solar energy, using electricity from photovoltaic cells to yield hydrogen that can be later used in fuel cells. But hydrogen has failed to catch on as a practical fuel for cars or for power generation in a world designed around liquid fuels.

Now scientists from a team spanning Harvard University's Faculty of Arts and Sciences, Harvard Medical School and the Wyss Institute for Biologically Inspired Engineering at Harvard University have created a system that uses bacteria to convert solar energy into a liquid fuel. Their work integrates an "artificial leaf," which uses a catalyst to make sunlight split water into hydrogen and oxygen, with a bacterium engineered to convert carbon dioxide plus hydrogen into the liquid fuel isopropanol.

The findings are published Feb. 9 in *PNAS*. The co-first authors are Joseph Torella, a recent PhD graduate from the HMS Department of Systems Biology, and Christopher Gagliardi, a postdoctoral fellow in the Harvard Department of Chemistry and Chemical Biology.

Pamela Silver, the Elliott T. and Onie H. Adams Professor of Biochemistry and Systems Biology at HMS and an author of the paper, calls the system a bionic leaf, a nod to the artificial leaf invented by the paper's senior author, Daniel Nocera, the Patterson Rockwood Professor of Energy at Harvard University.

"This is a proof of concept that you can have a way of harvesting solar energy and storing it in the form of a liquid fuel," said Silver, who is Core Faculty at the Wyss Institute. "Dan's formidable discovery of the catalyst really set this off, and we had a mission of wanting to interface some kinds of organisms with the harvesting of solar energy. It was a perfect match".

Silver and Nocera began collaborating two years ago, shortly after Nocera came to Harvard from MIT. They shared an interest in "personalized energy," or the concept of making energy locally, as opposed to the current system, which in the example of oil means production is centralized and then sent to gas stations. Local energy would be attractive in the developing world.

"It's not like we're trying to make some super-convoluted system," Silver said. "Instead, we are looking for simplicity and ease of use".

In a similar vein, Nocera's artificial leaf depends on catalysts made from materials that are inexpensive and readily accessible.

"The catalysts I made are extremely well adapted and compatible with the growth conditions you need for living organisms like a bacterium", Nocera said.

In their new system, once the artificial leaf produces oxygen and hydrogen, the hydrogen is fed to a bacterium called *Ralstonia eutropha*. An enzyme takes the hydrogen back to protons and electrons, then combines them with carbon dioxide to replicate—making more cells.

Next, based on discoveries made earlier by Anthony Sinskey, professor of microbiology and of health sciences and technology at MIT, new pathways in the bacterium are metabolically engineered to make isopropanol.

"The advantage of interfacing the inorganic catalyst with biology is you have an unprecedented platform for chemical synthesis that you don't have with inorganic catalysts alone", said Brendan Colón, a graduate student in systems biology in the Silver lab and a co-author of the paper. "Solar-to-chemical production is the heart of this paper, and so far we've been using plants for that, but we are using the unprecedented ability of biology to make lots of compounds".

The same principles could be employed to produce drugs such as vitamins in small amounts, Silver said. The team's immediate challenge is to increase the bionic leaf's ability to translate solar energy to biomass by optimizing the catalyst and the bacteria. Their goal is 5 percent efficiency, compared to nature's rate of 1 percent efficiency for photosynthesis to turn sunlight into biomass.

"We're almost at a 1 percent efficiency rate of converting sunlight into isopropanol", Nocera said. "There have been 2.6 billion years of evolution, and Pam and I working together a year and a half have already achieved the efficiency of photosynthesis".

*From Science Daily*

*"Anger is like flowing water; there's nothing wrong with it as long as you let it flow. Hate is like stagnant water; anger that you denied yourself the freedom to feel, the freedom to flow; water that you gathered in one place and left to forget. Stagnant water becomes dirty, stinky, disease-ridden, poisonous, deadly; that is your hate. On flowing water travels little paper boats; paper boats of forgiveness. Allow yourself to feel anger, allow your waters to flow, along with all the paper boats of forgiveness. Be human". – C. JOYBELL C.*



# POST-FUKUSHIMA, JAPANESE COMPANIES BUILD MICROGRIDS

Before the Fukushima earthquake and tsunami four years ago this month, Toyota's automotive plant in Miyagi Prefecture, north of Fukushima, had relied entirely on the Tohoku Electric Power Co. for energy. But when the disaster shut down power to its plant for two weeks, managers realized that the company needed a more secure source. The factory couldn't be independent of the electric grid, but it could manage that energy better—and supplement it.

“The earthquake was a big turning point,” says Atsuji Morita, a project manager for Toyota. “We had this big blackout and realized we needed a new system to increase our energy security”.

That's a common theme in Japan these days. After the disaster knocked out power to much of eastern Japan, smart microgrid projects from industrial to residential changed their approach. Initially focused primarily on energy efficiency, projects have shifted the emphasis to generating energy where it is consumed and to having a diversity of power sources.

“Our goal is to produce the energy on-site that we need to consume on-site. That is the new meaning of ‘smart’ in Japan” – Naohiro Maeda, Honda

In February 2013, Toyota formed a limited liability partnership called the Factory Grid, or F-Grid, to create a smart grid that manages and provides supplemental power to seven factories (most of them owned by Toyota) within the industrial park.

F-Grid has built its own natural-gas-fired cogeneration plant, which produces 7,800 kilowatts. That plant is supplemented by 740 kW from solar panels. And, in a creative twist, the factory uses an array of old Prius batteries capable of adding 90 kW of power from energy stored during slow periods at the industrial park. In an outage, even if all other power sources fail, the Prius batteries can supply enough power to keep satellite phones and computers running for three to four days.

The microgrid is operated by a community energy management system, which polls each facility about power needs and manages distribution of energy among them. In the event of an outage, F-Grid plans to also supply power to the local disaster response center, located in a village about a kilometer away.

The need for power diversity is reflected in small, residential projects as well. Honda, for example, is developing a smart-home system in cooperation with Toshiba and the biggest home builder in Japan, Sekisui House. Honda has so far built two demonstration homes in Saitama, a part of the metropolitan Tokyo area. Although plans for the project had already been in the making, after the earthquake the project developers' focus shifted to providing energy security during emergencies. “That is the new meaning of ‘smart’ in Japan,” says Naohiro Maeda, a manager in Honda's Smart Community Planning Office. “Our goal is to produce the energy on-site that we need to consume on-site”.

Each home's energy system consists of rooftop solar panels, a gas cogeneration unit, a home battery unit, a hot water tank, an electric car (a Honda Fit), and an energy management system called Smart-e Mix Manager. The home battery stores energy for times when solar power is not available. Ninety percent of Japanese households use both gas and electricity, and after the 2011 disaster, natural gas came back on in many areas sooner than the electricity, according to Maeda. The cogeneration system produces electricity to power homes and heat water. That's important, because 60 percent of household energy use in Japan is for heating, and half of that is specifically



Photo: Yoshikazu Tsuno/AFP/Getty Images Multiple Input, Multiple Output: The Kashiwanoha smart-city project uses energy from electric-vehicle batteries, biogas, storage batteries, solar panels, and the grid.

for heating water for baths and cooking, says Maeda. Daily bathing is so important in Japanese culture that the Japanese army made it a priority to set up a communal bath for evacuees after the 2011 disaster, he says. “We’ve all become more cognizant of our energy use since Fukushima”—Ryoji Iwasawa, Kashiwanoha resident

The shift to emergency energy also happened in a smart-city project, called Kashiwanoha, on the outskirts of Tokyo. The project is backed by the real estate developer Mitsui Fudosan, Hitachi, and Sharp, in cooperation with local government, the University of Tokyo, and Chiba University. This smart city has been in development for several years as a retail and business area. Last summer, the project started offering apartments and condos.

Kashiwanoha uses a wide variety of power sources, although it still draws most of its power—some 90 percent—from the electricity grid. The high-rise apartment buildings take advantage of natural hot springs beneath them to create a communal bathing area on the third floor. Water for the residences is heated using biogas generated from food waste. The town uses a bank of Hitachi lithium-ion batteries that can store up to 3,800 kilowatt-hours’ worth of energy, collected from the solar panels that are distributed on rooftops throughout the city and purchased from the grid at night, when rates are cheaper. There are a few small-scale wind turbines scattered throughout the development as well.

The facility has a gas cogeneration engine to provide power and heat in emergencies, and it keeps a supply of oil on hand in case the gas supply is interrupted, says Kiyoko Hama, a representative from Mitsui Fudosan and a member of the Kashiwanoha urban planning and development department. Communal electric vehicles can also be used to store electricity. All told, in an emergency there would be enough auxiliary energy to meet 60 percent of normal residential power requirements for three days.

The city optimizes energy use through an energy management system. Residents can monitor energy use through an app on their tablets or phones. The development even encourages residents, like 56-year-old Ryoji Iwasawa, to reduce usage by rewarding them with points they can use to shop at the mall across the street. It’s not like they need that much of a push to cut down on their usage, however. “We’ve all become more cognizant of our energy use since Fukushima,” says Iwasawa.

*This article originally appeared in print as “Microgrids for a Post-Fukushima Japan”.*

## E-WASTE MANAGEMENT NEEDS SUPPORT

The e-waste market in India is expected to grow at a compound annual growth rate (CAGR) of 26% during 2015-2019. Reports show India generates around 13 lakh tonne electronic waste every year. More than 95% of this goes to the informal sector, and end up in landfills or incineration centres.

This is a major concern. As pointed out by Subrata Barman, senior operations officer, International Finance Corporation, “The increase in the use of electrical and electronic equipments, with ever changing technology, has apparently led to a toxic waste stream known as the electronic waste today, which not just harms the environment, but also human health, if disposed mindlessly”.

Collection and disposal of e-waste is emerging as a key challenge, considering that even rural India is a generator of e-waste. There are just 138 formal collectors/dismantlers of e-waste in India, but there is only one end-to-end recycler of e-waste, Attero, registered with the Central Pollution Control Board and the ministry of environment and forests. The sector has ample room for many more players and extensive public-private partnerships. A nationwide programme to sensitise the masses about e-waste management is the need of the hour, along with stringent policies.

Many industry players and NGOs are fighting for the cause with their varied business models and campaigns, including training the last mile collectors (kabadiwallas) in managing e-waste. The e-waste management industry is certainly emerging as a viable business model for budding social entrepreneurs. The government has to supplement these green initiatives by allocating appropriate resources.

In the upcoming budget, the government should allocate at least Rs.500 crore to foster e-waste management initiatives across the country. The fund can be utilised in: collecting old/obsolete electronic products from the consumer, generating awareness among the masses; and building infrastructure for the efficient processing of e-waste.

**Rohan Gupta** – The author is chief operating officer, Attero.

*News Courtesy: Financial Express*

*“Eventually, all things merge into one, and a river runs through it. The river was cut by the world’s great flood and runs over rocks from the basement of time. On some of the rocks are timeless raindrops. Under the rocks are the words, and some of the words are theirs. I am haunted by waters”.*

**– Norman Maclean, A River Runs Through It and Other Stories**

# THE TOP 5 GREEN BUILDING STORIES IN 2014

**From an iconic 99-storey skyscraper powered by clean energy to the world's first integrative design platform, the green building sector saw exciting developments, particularly in Asia Pacific.**

## ***1. World's first clean energy skyscraper unveiled in Indonesia***

Indonesia's state-owned energy company Pertamina began construction on its new headquarters in January, an iconic 99-storey skyscraper located in Jakarta which aims to achieve zero net energy use, zero waste discharge, and reduced water demand. The building's construction will include a wind tunnel, rooftop solar panels, and a central energy plant within the building.

## ***2. Architects worldwide commit to phasing out emissions in the built environment by 2050***

The International Union of Architects in August unanimously adopted a declaration pledging to phase out carbon dioxide emissions in the built environment by 2050. Known as the 2050 Imperative, the declaration is signed by 15 architecture associations from all over the world, including the World Green Building Council and the Architects Regional Council Asia. Its signatories must plan and design cities and buildings to be carbon neutral, and advocate responsible architecture practices.

## ***3. Australia and New Zealand lead in real estate sustainability***

The 2014 Global Real Estate Sustainability Benchmark results released in September showed Australia and New Zealand remaining as leaders in overall performance, although Asian property companies are following closely behind.

Australia and New Zealand outperformed all other regions (North America, Europe and Asia) on all aspects measured, including on management, policy and disclosure, risks and opportunities, monitoring and EMS, among others.

Overall, sustainability reporting was improving in terms of coverage and quality, and sustainability performance was also on the rise. Regionally, the overall performance of property companies and funds in Asia increased most significantly, by 23 per cent to 46 points (out of 100), while Australia and New Zealand leads in overall sustainability performance, with a score of 61. In contrast, the average score is 44 in North America and 47 in Europe.

## ***4. World's first integrative design platform launched in Singapore***

Singapore's economic agency in September launched a new initiative called the 'Pre-Project Innovation Consortium' (PPIC), which will promote the concept of integrative design and enable building industry players to collaborate on cutting-edge sustainable buildings at the early design stage.

Announcing it at the International Green Building Conference, the Economic Development Board (EDB) said the PPIC initiative was the first of its kind in the world and follows Singapore's ambition to encourage inter-disciplinary innovations and integrative design in green buildings.

At the heart of the PPIC is the integrative design process, which EDB noted will enable Singapore to lead the commercialisation of green building technologies customised for the tropical climate. Integrative design is a holistic method for designing buildings which meet sustainable design objectives that are environmentally, socially, and financially responsible.

Separately, the city-state, known for its leadership in driving the adoption of green buildings, launched its third Green Building Masterplan which includes a new \$50 million incentive scheme for existing buildings to adopt sustainable initiatives. Another \$52 million will also go to supporting a Green Buildings Innovation Cluster, which will develop and test solutions developed specifically for tropical climates.

## ***5. New Zealand marks 100 Green Star commercial buildings***

The New Zealand Green Building Council (NZGBC) in March awarded three new pioneering buildings with the Green Star rating, bringing the number of commercial green buildings in the country to more than 100 since the scheme was launched in 2007. Green Star is New Zealand's ratings tool for sustainable commercial buildings. Ratings range from 4 to 6 Green Star, with 6-star as the highest certification that a building can achieve for environmental performance.

World Green Building Council chief executive Jane Henley said New Zealand's achievement sets an example that could inspire others to embrace sustainability. There are currently 100 countries and 27,000 companies worldwide driving the green buildings sector. "The Asia Pacific region is the world's largest growth market for green building products and services. As New Zealand companies become expert in green building design and constructions, the opportunities within the global green market will grow exponentially," Henley noted.

*This story is part of our Year in Review series, which looks at the top stories that shaped the business and sustainability scene in each of our 11 categories.*

**Read More in <http://www.eco-business.com/news/top-5-green-building-stories-2014/>**

## EU COMPANIES TO VISIT SINGAPORE, VIETNAM FOR CLEANTECH 2015

**The EU Business Avenues programme is planning a new business mission this year to Singapore and Vietnam called Clean Technologies 2015, which will focus on water, energy efficiency and environmental technologies.**

There is significant potential for renewable energy in Southeast Asia and adopting newer and cleaner technologies is a key way to sustain the region's growth. These were the findings of 38 clean technology (cleantech) companies from across the European Union (EU) who visited Singapore and Malaysia last October.

The European companies were participating in a week-long mission organised by EU Business Avenues - a European Commission-funded initiative that works to promote partnerships between European SMEs and companies based in Southeast Asia.

During the business mission, some of the EU's most innovative renewable energy and energy efficiency solutions from leading small and medium enterprises were on display in Singapore and Malaysia.

The participating companies covered a broad range of sectors and products, ranging from organic waste management solutions to advanced materials for construction and green building applications, PV modules, biomass and biomass facilities and cutting-edge power generation and co-generation technologies.

They showcased their wares at a two-day exhibition held alongside the Singapore International Energy Week at the Marina Bay Sands Expo and Convention Centre in October, which attracted 500 business leaders, industry professionals and stakeholders.

In Malaysia, these SMEs from 16 EU companies met with government officials from several key ministries, including the Ministry of Energy, Green Technology and Water (KeTTHA), the Malaysian Investment Development Authority (MIDA) and the Sustainable Energy Development Authority (SEDA).

Senior officials such as Dato' Dr. Nadzri Bin Yahaya of KeTTHA told the SMEs that there were untapped capacities and growth prospects for the cleantech sector in Malaysia. He explained how supportive government policies had led to the rapid deployment of renewable energy projects such as in solar photovoltaic (PV) and biogas.

Ministry officials also highlighted the important role of private sector investment in Malaysia's sustainable development, which would be crucial to the country's ability to manage its energy and resource usage, as well as to plan its urban expansions in a sustainable manner.

"Private sector participation is essential to improving energy efficiency and increasing the share of renewables in the energy mix in this region," said Dr. Michael Pulch, EU Ambassador to Singapore.

In Kuala Lumpur, the EU companies also met with Malaysian industry bodies, regulators such as the Energy Commission of Malaysia and local businesses that are active in the renewable energy sector.

This provided the European SMEs and local players with the opportunity to discuss the business environment, the heightened demand for renewable energy, and investment prospects.

"Malaysia is a very interesting market where things are moving at an incredible pace," said Mr Dan Cristea, senior export manager at Optimedia, a large manufacturer of joineries and aluminium profiles using energy-efficient thermal insulating glass.

Dr. Pulch added that by "actively exploring business opportunities and fostering the exchange of know-how and capabilities", future business missions will help to meet South east Asia's fast-rising energy requirements.

This will be achieved through introducing industry and government leaders a range of cleaner and more efficient alternatives that promote sustainable economic growth and improved well-being, he said.

On the back of the success of the first Southeast Asia trip, the EU Business Avenues programme is planning a new business mission this year called Clean Technologies 2015, which will focus on water, energy efficiency and environmental technologies.

It will bring another 40 SMEs from across the European Union to Southeast Asia. This business mission will take place in June 2015, with participating companies visiting Singapore and Vietnam (Ho Chi Minh City).

*Courtesy: Eco Business*

***Engineering, Medicine, Business, Architecture and Painting are concerned not with the necessary but with the contingent - not with how things are but with how they might be - in short, with design. - HERBERT SIMON***

# KOCHI INSTITUTE HAS FILED FOR A US PATENT OF BIOFUEL FROM COCONUT OIL

The SCMS Institute of Bioscience & Biotechnology Research & Development, Kochi, has successfully developed the process for standardising the production of coconut methyl ester (CME) from coconut oil, which can power diesel automobile engines. The functional property of CME was proved in a diesel vehicle by test-running it directly as bio-fuel without making modifications in the engine and in the fuel lines. The research comprised optimisation of the production of CME from coconut oil, study of its physicochemical properties and testing its efficacy as a fuel in a diesel engine.

Headed by Dr C. Mohan Kumar, the study lasted about 20 months and the centre has filed for a US patent. The Department of Scientific and Industrial Research of the Central government has offered to fund further research into it.

“The physicochemical properties of the coconut oil and its increased level of saturation with high percentage of lauric acid are the unique features that support the fuel quality of coconut oil compared to the bio-fuels developed from other vegetable oils,” Dr Mohan Kumar told DC. “Coconut oil has one of the least shares of free fatty acids, which qualifies it as a possible fuel. For a fuel, its value should ideally be below .5 per cent, but for coconut oil, it is 0.2 per cent”.

The comparative study of CME with diesel was conducted at the quality control lab of the BPCL Cochin refinery, which certified that the CME more than met the standards of diesel, and performed better on emission norms.

“The low carbon residue, sulphur content and the total contaminant obviously make the coconut bio-fuel eco-friendly”, Dr Mohan Kumar said.

The centre collaborated with the automobile engineering department of the SCMS Engineering College, Kochi, for the test run in a Matador diesel engine. The test run showed the technical specifications such as torque and power similar to the efficiency of diesel fuel. It offered a higher mileage of 22.5 Km/Lt than 16 Km/Lt of diesel.



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## GAMESA TO DELIVER ITS FIRST G97-2.0 MW CLASS 'S' TURBINES, PURPOSE-DESIGNED FOR THE INDIAN MARKET

➤ The company has signed a new agreement with Orange for the supply of 25 G97-2.0 MW Class S turbines at the Khanapur wind farm; this contract tops up the recently announced 50 MW supply agreement for this same project.

Gamesa, a global technology leader in wind energy, is set to supply its first G97-2.0 MW Class S turbines in India, a new model specifically designed for low wind speed sites in this market.

The company has signed a new agreement \* with Orange, one of the country's leading independent power producers (IPP), for the supply of 50 MW of its G97-2.0 MW Class S turbines at Khanapur site, located in Maharashtra, India. This is the second agreement secured by Gamesa from Orange, after having announced in October the delivery of another 50 MW at this same Khanapur facility.

As a result, the company is poised to supply, install and commission a total of 50 of its G97-2.0 MW Class S turbines at Khanapur wind farm. With a tower height of 104 metres, Gamesa has designed this variant -already certified by TÜV NORD- specifically for the Indian market, with a view to maximising turbine performance at low wind speed sites.

The company will also provide the facility's operation and maintenance services under a long-term arrangement. The first phase of 50 MW of the project commissioning is scheduled to be completed by March of this year, while the second phase of 50 MW is expected to be commissioned by June.



*Gamesa*

## ALL GREEN BUILDINGS WILL GET SPECIAL LOGO IN 2015

All green environment-friendly buildings - identified on the basis of use of water-energy conservation methods, recycled materials, solar power, natural lighting and energy self-sufficiency - across the country will get special logo in the New Year.

The environment ministry is working on a methodology by factoring in the existing norms to issue such logo which will be developed by inviting designs from general public and experts.

"The ministry is contemplating on crowd-sourcing the design after internal discussion and deliberations with all stakeholders," said an official.

Though several green buildings have come up in different parts of the country in the past few years, they do not carry specific sign which may put them in different league.

"This will not only help people to identify green buildings, but also give a sense of pride for the owners. This will also motivate others to go for green building concept, driving many co-benefits associated with it," said the official.

At present, buildings get star rating by a government agency - Bureau of Energy Efficiency (BEE) - for energy efficiency and other green ratings by two private bodies. The logo to be issued by the environment ministry for such buildings will factor in all such existing norms.

This is part of several other initiatives which are to be taken up by the environment ministry in 2015. Promotion of renewable energy - solar and wind - in a big way is an important component of the government's plan.

On law front, the government has decided to bring amendments in all five key environment laws in the budget session of the Parliament. Idea of bringing amendments is to make all the green laws in sync with the Narendra Modi government's development goals.

The laws which are to be amended include the Environment (Protection) Act, 1986; the Forest (Conservation) Act, 1980; the Wildlife (Protection) Act, 1972; the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981.

"The changes will be made in these laws on the basis of various recommendations of the TSR Subramanian panel which had submitted its report to the ministry in November, 2014," said an official.

The panel has suggested many changes in existing laws to ensure speedy green clearances and make the whole process more transparent. It also proposed setting up a national laboratory for air water quality within the environment ministry and instituting an All India Environment Service.

*Courtesy: Economic Times*

# SPOT LIGHT ON ELECTRIC LAMPS

Of late different opinions are raised about the efficacy of the electric lamps that are commonly in use. Some of the comments made in support of CFLs and LEDs are far from reality. In order to put this common issue in proper perspective for the benefit of all the end users, the required details are listed out as follows.

S.No	Description	Incandescent Lamp	Compact Fluorescent Lamp (CFL)	Light Emitting Diode (LEDs)
1	Construction / Operating Process	Current is passed through a tungsten filament enclosed inside a glass bulb. It may be carried out either in vacuum or filled with an inert gas. At certain temperature, light is produced – Gives both light and heat.	It is filled with Mercury that produces UV light rays which gives white light.	Charged electrodes produce photons when current passes through them. These photons bring the required light.
2	Lumen Efficacy (Light output / Watt input)	14 Lumens/W	60-70 Lumens/W	60-80 Lumens/W
3	Colour rendering	Excellent	Good	Adequate
4	Power factor (Percentage of revenue expected by the supplier for the energy supplied)	1.0 100%	0.5-0.6 Lag 50-60%	0.5-0.6 Lag 50-60%
5	Power Consumption	High	Low	Very low
6	Disposal	Easy	Very difficult – Because of its non-biodegradable nature	Easy
7	Merits	Best suited for hilly regions where heat and light are normally required; highly useful for drying out wet painted surfaces; best option for use in winter season.	Best suited for AC rooms, residences, offices and commercial establishments; preferable for use in summer season; operating hours are high.	Best suited for places where energy savings are essentially required – e.g. Street lights, residences, offices and commercial installations. Operating hours are very high. Can withstand higher voltage fluctuations.
8	Cost	Very cheap	Moderate	High
9	Demerits	Operating hours are less, energy consumption is very high because 90% of energy supplied is used for heating the filament only.	Mercury content is high- it is a poison and also highly toxic - therefore its handling is difficult; its disposal also required additional care- environmentally unfriendly; produces harmful harmonics and UV rays- Makes VAR compensation difficult in the grid.	Handling is easy when compared with CFL- produces harmful harmonics and UV rays - Makes VAR compensation difficult in the grid.

Among other possible and meaningful ways to achieve the energy savings are,

- Wide use of T5 or T28 fluorescent lamps.
- Wide use of very low consumption electronic chokes in the existing FT lamps.
- Wide application of shaded or focused lamps for reading purposes.
- Replacement of conventional zero watt bulbs (15 Watt) with 0.5-1.0 Watt LEDs – since these lamps are used for indication purposes only.
- Eliminating the practice of keeping one light burning in the houses to ward off thefts.
- Avoiding the wide use of “Remote” to delink television and air-conditioning units from electric supply; instead it is preferable to do the switching operations manually – it helps to save 80 – 120 Watts of electrical energy - further it helps to separate the equipment concerned both electrically and physically from the circuit.
- Switch off the computers, TVs, AC units, mobile charges, etc when they are not in use; don't put them in sleep mode. This step will help to save electrical energy to a mark able level.
- Optimum loading of washing machines and refrigerators has to be followed up.
- Wide use of electronic fan regulators.
- Purchase of energy star rated electrical appliances like TVs, fans, heaters, refrigerators, etc.

With the information furnished so far, it is expected that the common consumer will take appropriate decision to achieve the goal of energy saving in their premises.



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## RUNNING FUEL CELLS ON BACTERIA

Researchers in Norway have succeeded in getting bacteria to power a fuel cell. The “fuel” used is wastewater, and the products of the process are purified water droplets and electricity.

This is an environmentally-friendly process for the purification of water derived from industrial processes and suchlike. It also generates small amounts of electricity – in practice enough to drive a small fan, a sensor or a light-emitting diode.

In the future, the researchers hope to scale up this energy generation to enable the same energy to be used to power the water purification process, which commonly consists of many stages, often involving mechanical and energy-demanding decontamination steps at its outset.

### **Nature's own generator**

The biological fuel cell is powered by entirely natural processes – with the help of living microorganisms.

“In simple terms, this type of fuel cell works because the bacteria consume the waste materials found in the water”, explains SINTEF researcher Luis Cesar Colmenares, who is running the project together with his colleague Roman Netzer. “As they eat, the bacteria produce electrons and protons. The voltage that arises between these particles generates energy that we can exploit. Since the waste in the wastewater (organic material) is consumed and thus removed, the water itself becomes purified”, he says.

### **Searching for the best bacteria**

“Our challenge has been to find the mechanisms and bacteria that are best suited for use in this water purification method”, says Netzer. “To start with, we had to find a bacterium which was not only able to consume the waste products in the water, but which could also transfer electrons to a metal electrode”, he says.

The idea behind this water purification approach was born many years ago when the two scientists first met and began discussing how bacteria could be used to generate energy. Since then, they have both been working to put the idea into practice – each from their own respective fields of expertise. While Netzer is an expert in bacteria, Colmenares is an electrochemist with a knowledge of, and interest in, water purification.

Today, they have a small demonstration plant bubbling away in the lab – efficiently exploiting the bacterias' ability to purify dirty water and generate electricity. The waste water comes from the local Tine dairy and is rich in organic acids, which are ideal for this process. But this is not essential – other types of waste water work just as well.

“At the moment, we're not talking about producing large volumes of energy”, says Netzer. “But the process is very interesting because water purification processes are very energy-demanding using current technology. We're particularly pleased at being able to produce just as much energy using low-cost materials as others are achieving using much more expensive approaches”, he says.



# A LONDON BRIDGE GOES SOLAR

Built in 1886, Black friars Bridge spans the River Thames and carries trains across the river in central London. As part of a massive upgrade of the Black friars railway station, Network Rail and Solar century have created an iconic solar landmark.

On a clear day, the bridge and its solar roof are visible for miles, showcasing London's commitment to sustainability for tourists and commuters alike.

The new roof sports more than 4,400 photovoltaic panels, which are expected to generate 935,000 kilowatt-hours of electricity every year and keep more than 455,000 kilograms (1 million pounds) of carbon dioxide out of the atmosphere.

The 1.1-megawatt solar system provides 50% of the station's electricity.

Network Rail, First Capital Connect and Solar century surprised passengers arriving at Black friars station this morning with a free cuppa drawn from Britain's biggest tea cup to celebrate the launch of the world's largest solar bridge.

The 4,400 photovoltaic panels cover the roof of the station and produce enough energy to make almost 80,000 cups of tea a day.

In fact, London's longest array provides up to half of the station's energy, reducing its CO<sub>2</sub> emissions by an estimated 511 tonnes per year – equivalent approximately to 89,000 (average) car journeys.

The array crowns the revamped Black friars station, which now boasts a new entrance on the south bank of the Thames, four new platforms and a redeveloped Underground station, offering longer trains and a better interchange between First Capital Connect and London Underground services. It sits at the heart of the £6.5 billion Thameslink Programme, transforming the route through central London to provide longer, more frequent services.

Simon Kirby, managing director of Network Rail Infrastructure Projects, said: "The dramatic transformation of Black friars station from a small and cramped station to a modern landmark is typical of how we are enhancing one of Europe's busiest rail routes – using smart, sustainable technology to reduce the cost of running the railway at the same time as giving passengers the longer, more frequent trains that are so desperately needed".

David Statham, Managing Director of First Capital Connect which runs Black friars station, said: "Electric trains are already the greenest form of public transport – this roof gives our passengers an even more sustainable journey. The distinctive roof has also turned our station into an iconic landmark visible for miles along the River Thames".

The installation of the 6000m<sup>2</sup> of PV panels was carried out by Solar century. Frans van den Heuvel, CEO of Solar century, said: "Our work at Black friars demonstrates two key benefits of solar. First, it can be integrated into the architecture to create a stunning addition to London's skyline. Second, it can be integrated into the most complex of engineering projects; in this case being built above a construction site, over a rail track over a river. We are confident that future major infrastructure projects can and will benefit from solar".

The system is the largest array on a bridge in the world, and provides up to 50% of the stations energy.

- System size: 1.1 MWp
- No of panels: 4,400
- Area of Solar PV system: 6000m<sup>2</sup>
- Annual generation: 900,000 kWh
- Annual CO<sub>2</sub> savings: 513,000 kg



*"Water does not resist. Water flows. When you plunge your hand into it, all you feel is a caress. Water is not a solid wall, it will not stop you. But water always goes where it wants to go, and nothing in the end can stand against it. Water is patient. Dripping water wears away a stone. Remember that, my child. Remember you are half water. If you can't go through an obstacle, go around it. Water does". – MARGARET ATWOOD, The Penelopiad*

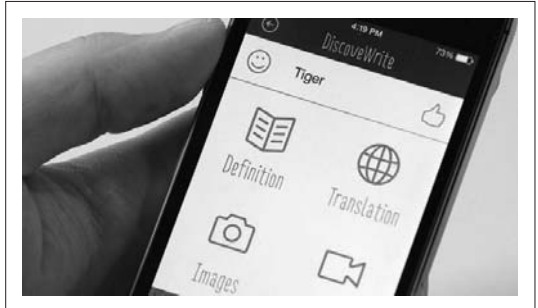
# NO MORE SPELLING MISTAKES

*The tiny computer inside the pen points out errors in penmanship as well as spelling mistakes*

Writing is now gradually becoming a lost art, especially with everybody using a computer to type out whatever they would have otherwise written down. Although computers make our lives easier, they come with the downside of taking away from our ability to understand grammar and spelling mistakes.

But, there is still place for some good penmanship and correct spelling. And this belief is shared by Falk Wolsky and Daniel Kaesmacher, the makers of VibeWrite. The duo has turned to Kickstarter, a website where entrepreneurs can raise money for creating unique and innovative products, to raise money for making VibeWrite, which vibrates when the user makes a mistake – either in grammar or in spelling.

The company revealed a prototype in February 2013, and thus started their journey of looking for investors. During the time, the idea received a large amount of media attention, and a number of individuals and corporate backers helped them raise the required capital.



## How it began

The idea for such a pen was unwittingly given by Wolsky's wife when, one day, while helping their son do his homework, she wished out loud about having a pen that would point out errors the moment their son made them. The idea latched on, and Wolsky set about making such a pen. The result – a pen that vibrates the moment it detects an error.

It looks like a bulky pen that is made for the hands of children. However, on the inside, it hides a tiny computer! The system uses embedded Linux, and the board contains a vibration module, a motion sensor, memory, processor, and a Wi – fi module. The pen works in two modes – the **Orthography mode**, and the **Calligraphy mode**. **The Calligraphy mode** vibrates when there is a mistake in either the form of writing or the legibility of the handwriting. In short, it points out the errors in penmanship. **The Orthography mode**, on the other hand, detects spelling mistakes, and lets the user know of the same. **VibeWrite vibrates once** to indicate spelling errors, and **twice** to indicate errors in grammar. With the help of the sensors, the pen can recognize anything written in the air!



## Who can use it

The pen has been created for children aged five to eight, but can be beneficial for anybody who wishes to improve their grammar and writing skills. As of now, the pen is able to **detect only two languages – English and German**, but more languages will be added soon. VibeWrite has an inbuilt Wi-fi that can help it connect to various devices connected via the internet. Thus, apps can play an important part in the whole experience, with the company's plans for coming up with software for individuals and schools.

This pen is a great way of understanding any mistake you make immediately, without the help of a computer.

Know more about the pen by visiting <http://vibewrite.com>

*Ayyappa Nagubandi - an entrepreneur and co-founder of Possibillion Technologies*

*Courtesy: The Hindu, dt. 25.02.2015*

## INDIAN WIND TURBINE MANUFACTURERS

**Indian Wind Turbine Manufacturers' Association (IWTMA)**, an association formed to promote and harness **wind** energy in **India** recently announced its support to Ministry of New **Renewable Energy** (MNRE), Government of **India** in fulfilling the target of creating 60 GW of **wind** energy by the year 2022.

The growth of **Renewable Energy** in **India** is enormous and Wind Energy proves to be the most effective solution to the problem of depleting fossil fuels, importing of coal, greenhouse gas emission, environmental pollution etc. Wind energy as a renewable, non-polluting and affordable source directly avoids dependency of fuel and transport, can lead to green and clean electricity. With an installed capacity of 21136.3 MW (March 2014) of **wind** energy, **Renewable Energy** Sources (excluding large Hydro) currently accounts for 13.86% of **India's** overall installed power capacity of 228721.73 MW. Wind Energy holds the major portion of 66.7% (of 31707.2 GW total RE capacity) among renewable and continued as the largest supplier of clean energy.

IWTMA sponsored a panel discussion titled 'Onshore Wind' at the first **Renewable Energy** Global Investors Meet & Government Expo (RE-Invest) today. The conference was mainly focusing on policy, regulatory, financing and **other** major issues concerning **wind** power business in **India** and concentrate on building a comprehensive roadmap for achieving our targets. The panel consisted of members from manufacturers, project developers, investors, grid operators and bankers. The session was moderated by former Secretary MNRE Mr. V. Subramanian.

**To achieve the aim of 60 GW the challenges and opportunities that were deliberated by the panel were following:-**

- Grid integration primarily forecasting and scheduling of **wind** power and seamless grid connectivity
- Wind solar hybrid systems to optimize both the **Renewable Energy** sources to minimize use of land, maximize output by hours and reduction in costs
- Availability of land with good **wind** resource will be a major constraint in the coming years as most of the **windy** sites would already be utilized
- Transmission being a critical aspect for future **wind** capacities, adequate transmission planning needs to be done
- Energy storage solutions to feed power during peak period
- Comprehensive policy on **wind** solar and hybrid to optimize generation

Mr. Madhusudan Khemka Chairman IWTMA said, "We fully support the "Make in **India** Campaign" with our turbines of state-of-the-art technology which has almost 70% localization. We also aim at creating rural employment both direct and indirect during the project stage and employment for manufacturing and the estimated persons to be employed which will go up to 160,000 persons by 2022. Addressing these key challenges and issues we are confident of achieving 60 GW target".

Mrs. Varsha Joshi, IAS, Joint Secretary at Ministry of New and **Renewable Energy**, Government of **India** concluded the session outlining that all the deliberated discussions with the stakeholders are part of the **wind** policy. This draft published by the Ministry, will grow to become a comprehensive policy. She added that there is equal emphasis for action and monitoring at the state level.

*Courtesy: EQ International*

## KERALA DECIDES TO TAP ITS RENEWABLE ENERGY POTENTIAL

Kerala has finally decided to tap its resources to meet its energy demands as seen from the host of renewable energy projects announced in the State Budget.

An assessment conducted years ago by Agency for Non-conventional Energy and Rural Technology (ANERT), had the State's wind energy potential completely underestimated. The State had only limited options to tap the wind energy potential due to lack of amicable policies. The wind energy projects were also affected by various other factors. Due to the controversy over acquisition of Adivasi land, the wind turbines set up at Attapadi had run into trouble. According to a study conducted by a private agency in the wind energy sector, Kerala has an untapped wind energy potential of at least 2,000MW of which about 1500MW power could be generated at Walayar and nearby areas.

The Kerala's Finance Minister K.M. Mani announced on Friday, that they are going to set up a Wind farm with a capacity to generate 200MW with the help of National Thermal Power Corporation. With another wind farm with a capacity of 22MW coming up at Kanjikode.

The new proposition comes at a time when neighbouring state Tamil Nadu has practically exhausted its wind energy potential. Wind speeds in several parts of the State, according to experts, are comparable to that of Tamil Nadu.

## US, CHINA FIRMS PLAN SOLAR MANUFACTURING PLANTS IN INDIA

US-based First Solar Inc. and China's Trina Solar are among firms that are considering plans to set up manufacturing facilities in **India**, lured by the nation's ambitious solar power generation target and Prime Minister Narendra Modi's 'Make in **India**' campaign to attract global capital. "There is a lot of interest from major solar equipment manufacturers from across the world given our expansive programme commitments in solar," said a top **Indian** government official requesting anonymity. "Among the companies which plan to set up manufacturing here in **India** are First Solar and Trina Solar." New York Stock Exchange-listed Trina Solar Ltd is the world's largest maker of photovoltaic modules. First Solar builds large solar farms, mainly for utilities.

The Modi government has raised **India**'s solar energy target fivefold to 100,000 megawatts (MW) by 2022 to cut **India**'s overwhelming reliance on imported fossil fuels. In addition, the government has ambitious plans to create 60,000MW of **wind** power capacity by then, with an overall investment of around Rs.10 trillion in the renewable energy sector. US-based Sun Edison Inc. had earlier this month said it plans to establish a joint venture with Adani Enterprises Ltd to build a solar photovoltaic manufacturing facility in **India** with an investment of around \$4 billion. The interest from global companies has risen because of government support for clean energy, experts say. "Clean energy investments in **India** jumped to \$7.9 billion in 2014, helping the country maintain its position as the seventh largest clean energy investor in the world. The upswing was driven by the newly installed government elected in May 2014 which supports clean energy reforms," Bloomberg New Energy Finance said in a 23 January statement. **India**'s push to boost **wind** and solar power production provides opportunities for global companies that are hit by the plunge in international crude oil prices.

Lower oil prices can potentially derail, or at least delay, the world's shift to **wind** and solar energy, as it makes less economic sense to tap costlier renewable energy sources. In response to a question about whether First Solar was planning to set up a manufacturing facility in **India**, the company spokesperson in an emailed statement said: "The current policies that define eligibility for domestic manufactured modules don't create a level playing field for First Solar's Thin Film technology." "We will decide the capacity once we are clear on the policy that allows a level playing field," the spokesperson added. The US has challenged **India**'s solar panel procurement policies at the World Trade Organization. A dispute settlement panel has been established to hear US complaints against **India**'s domestic content requirements on procurement of solar cells and modules under the Jawaharlal Nehru National Solar Mission programme. Washington claims the policy discriminates against foreign manufacturers. Queries emailed to the spokesperson of Trina Solar remained unanswered till press time. Modi has placed special emphasis on manufacturing, in which **India** lags behind Asian economies such as China, to boost economic growth that slumped to sub-5% levels in each of the past two fiscal years. **India** has set for itself an ambitious target of increasing the contribution of manufacturing output to 25% of gross domestic product by 2025, from 16% now.

## INDIA'S FIRST GREEN SPORTS CAR DISPLAYED AT AUTO SHOW IN GUJARAT

Though the Auto show at Gandhinagar, Gujarat was not that exciting, the prototypes of the 'green sports car' stole the attention of one and all. It was a one-off model displayed amidst other known manufacturers like Maruti Suzuki, BMW, Honda, Rolls-Royce, Tata Motors, Hyundai and Mahindra.

The electric sports car prototype is named Supernova Electric Vehicle (SNEV) and claims to cover 1,000 kms in a single charge. It can do a top speed of 150kmph. The production version of the car will be offered with a choice of three batteries - lead acid, lithium ion and super-capacitors.



The lead acid battery supposedly has a charge time of eight hours, the lithium ion batteries two hours, while the super capacitors have a claimed charge time of less than five minutes. The SNEV was developed by Ahmedabad-based Golden Arrow Wireless Pvt. Ltd. at the company's plant in Aslali in Gujarat. The manufacturer has signed a memorandum of understanding with the Madhya Pradesh government to set up a manufacturing plant in 50 acres of land near Raipur in Chhattisgarh. Shashi Vyas, founder of Golden Arrow Wireless, said, "We are, however, looking at setting up plants at multiple locations including Delhi, Mumbai, Bangalore, Raipur and also somewhere in Gujarat. We would need around Rs 2,500 crore to set up the manufacturing sites. We already have around 250 bookings, and can deliver them by the end 2015 if the ARAI approval comes through".

# ENERGY CONSERVATION THROUGH ENERGY EFFICIENCY – 1

## Introduction:

We all know that as a simple rule, demand for Energy keeps going up with increased developments and improving standards of living. We also know that in order to produce and make available more Secondary forms of Energy, i.e Heat, Fuel and Electricity, we need to consume more Primary resources like Coal or Oil or Gas or Nuclear or Renewable Sources. We are seeing in our country also that the demand has been galloping, far exceeding the supplies, that there have always been shortages. Due to depleting resources and due to environmental problems that go along with use of more and more of resources, the need for Conservation is propagated.

**Conservation, in simple terms, comprises of Two important components, namely,**

- a) **Avoiding wastes and**
- b) **Using Energy Efficiently.**

Inefficient use of Energy increases the demand much more and actually results in enormous consumption of Primary Sources. A simple illustration below can make the point clear.



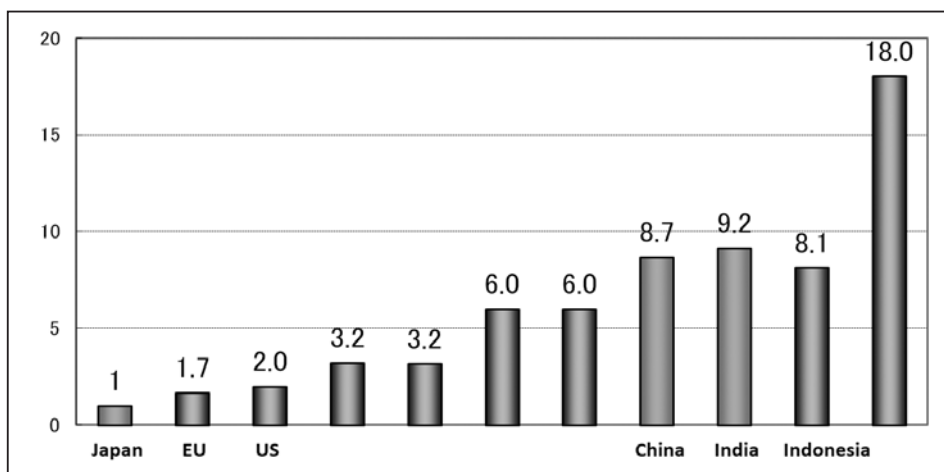
Fire is used for cooking. Figure 2 shows the old and traditional way of cooking, where the overall Efficiency could be as low as 5%. Energy Efficient Stove is shown in figure 3 where the Efficiency could be as high as 40% to 50%.

We are all reading every day about the pressures on Governments to provide more and more of Electricity and Petroleum Products due to galloping demands.

Efficient use of Energy is a matter of great concern everywhere, but India needs to worry more as we really seem to be wasting enormous amount of Energy and consequently the resources, due to inefficiencies in all uses, partly due to subsidies and mostly due to ignorance.

The ultimate measure of Efficiency or Inefficiency of a Country is the Total Primary Energy Spent by a Country in comparison to the GDP or the wealth generated in the forms of Agricultural Production, Industrial Production and Services Revenues generated by that Country. It is an alarming fact that India scores very poorly on this score as can be seen from the data provided below, extracted from one of the Presentations of Petroleum Conservation Research Association.

## Primary Energy Consumption per GDP

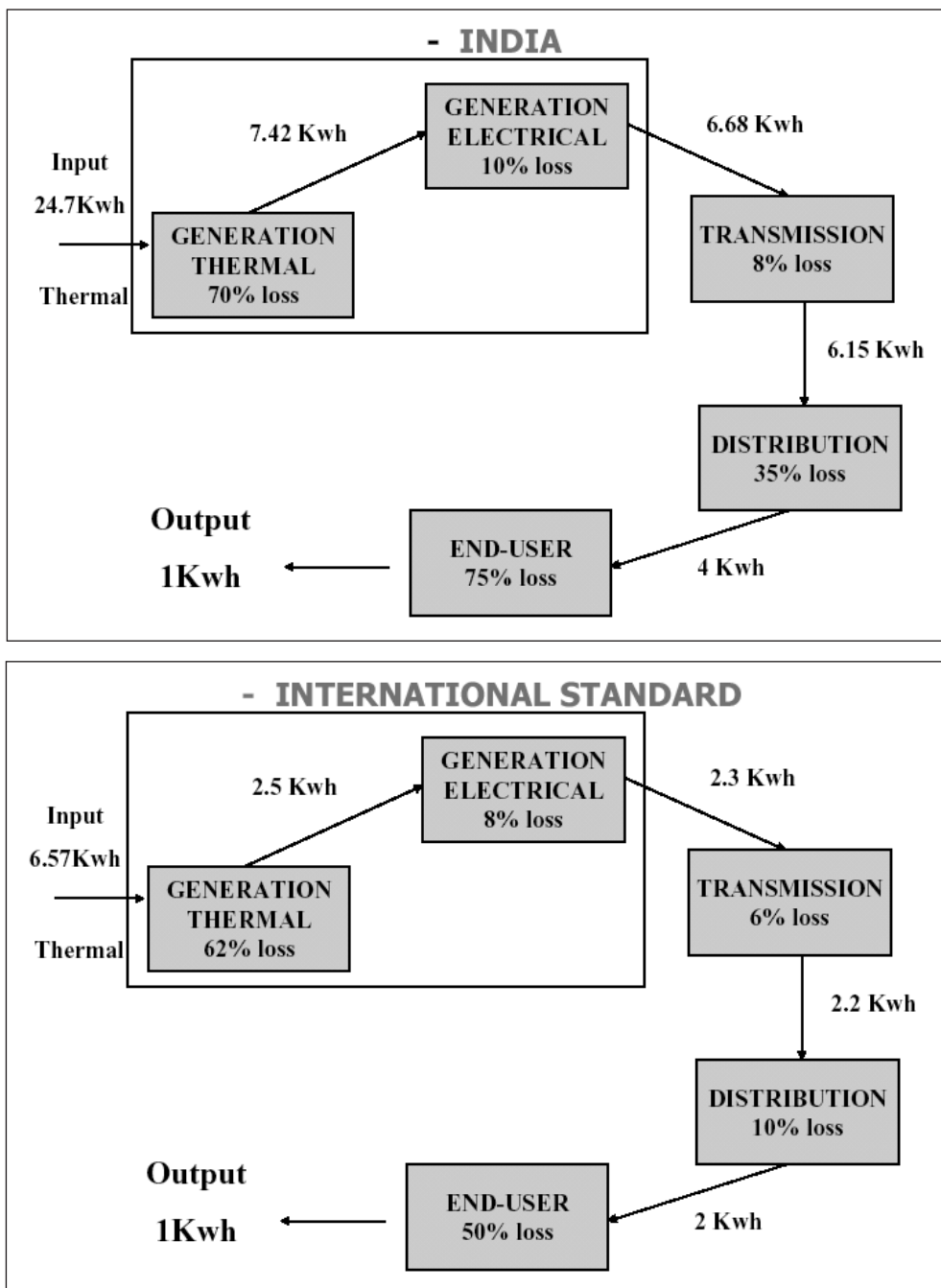


Primary energy consumption (tons in oil equivalent)/GDP (thousand US\$) indicated in the ratio when the Japanese figure is set at 1.

Japanese primary energy consumption per GDP is the lowest in the world due to various energy conservation measures taken for the respective sectors.

As can be seen from the Chart above, India consumes about 9 times of Coal or Oil or other Primary materials to produce a Unit of GDP compared to Japan, which is considered as one of the best.

The Illustration below taken from one of the US Aid Presentations, can make the similar point with regard to Electricity usage.

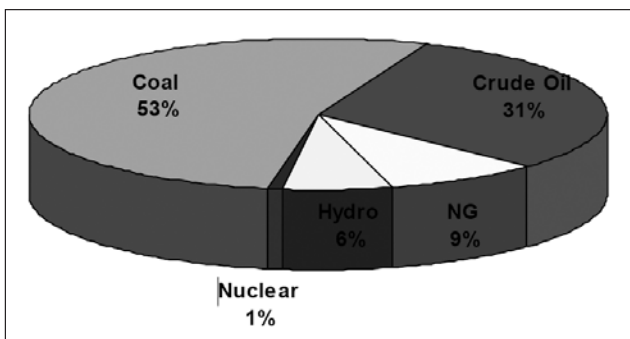


As can be seen, India consumes almost 4 times more Primary Energy resources like Coal or Oil to get the same work done due to inefficiencies at all stages with a large contribution at the “End Use” Stage.

Primary Energy Consumption in all forms of Coal or Oil or Gas or Hydel or Nuclear or any other, is now calculated with the common Thermal Unit of Kilo Calories or KG or TON of Oil Equivalent, assuming 1 Kg oil accounting for 10,000 Kilo Calories of Heat.

Global Consumption of total Primary Energy per Annum at present is about 12,000 MTOE (Million Tons of Oil Equivalent) and Indian Consumption is about 600 MTOE, with the breakup of different forms of Primary Sources as shown below.

As can be seen, the large components are Coal and Oil, comprising of almost 84%. In case we can achieve improvements of Efficiencies of use of Energy, say by even 25%, the Energy Demand can come down drastically and could even result in surpluses instead of shortages.



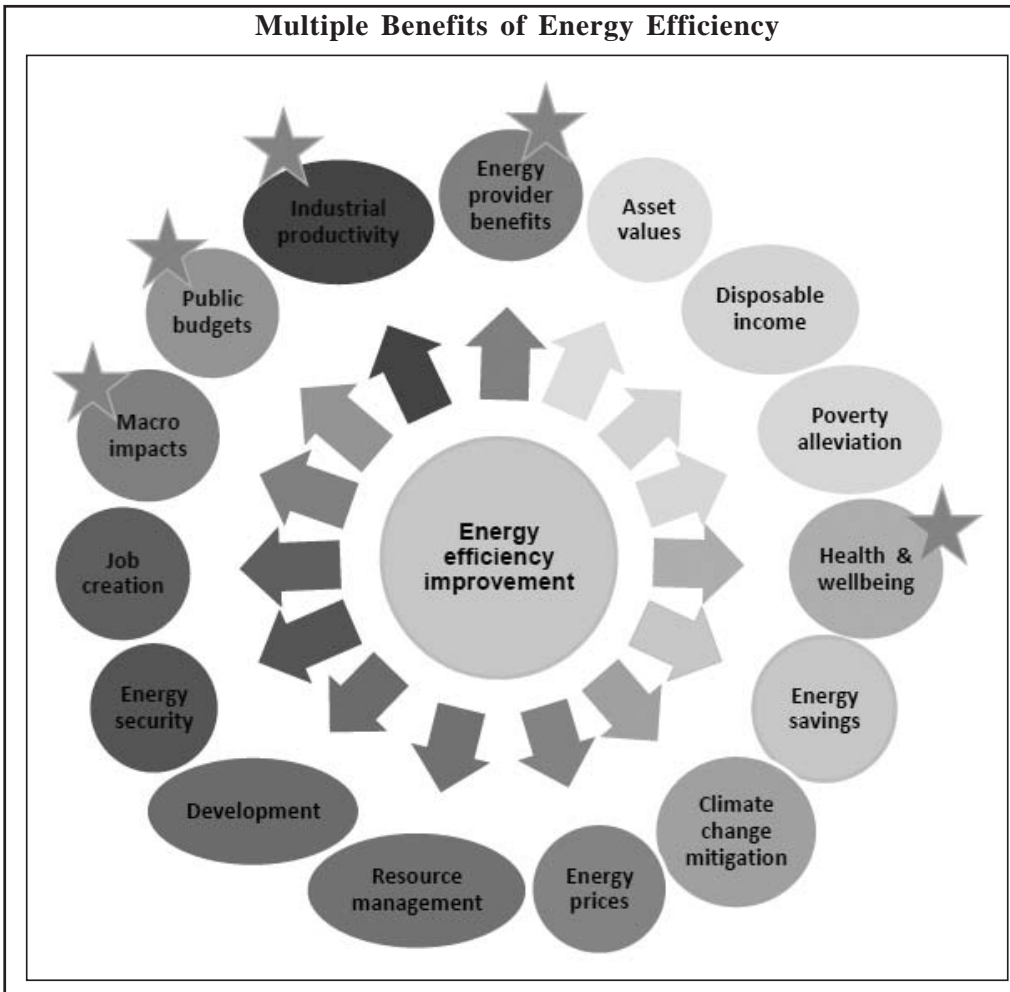
**Energy efficiency is a way of managing and restraining the growth in energy consumption.**

**Something is more energy efficient if it delivers more services for the same energy input, or the same services for less energy input.** For example, when a compact florescent light (CFL) bulb uses less energy (one-third to one-fifth) than an incandescent bulb to produce the same amount of light, the CFL is considered to be more energy efficient.

Conserving energy is our collective responsibility for a better tomorrow.

**Message from DG, BEE**

With the growth of economy, the demand for energy has grown substantially. Further, the high level of energy intensity in some of the sectors is a matter of concern. In such a scenario efficient use of energy resources and their



conservation assume tremendous significance and is essential for curtailment of wasteful consumption and sustainable development. Recognizing the fact that efficient use of energy and its conservation is the least-cost option to meet the increasing energy demand, Government of India has enacted the Energy Conservation Act, 2001 and established the Bureau of Energy Efficiency in March, 2002. The Act provides for institutionalizing and strengthening delivery mechanism for energy efficiency services in the country and provides the much-needed coordination between the various entities. **Energy saving is a national cause and all of us will have to join hands and make all out efforts in making India an energy efficient economy and society, so that not only we remain competitive within our own market but also are able to compete in the international market.**

*(To be Continued)*



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

*We believe energy efficiency-focused technology innovation is key to addressing the significant impact that this growing energy use will have both on today's businesses and our environment. - ANDREW FANARA*



# TAMILNADU ELECTRICAL INSTALLATION ENGINEERS ASSOCIATION 'A' GRADE

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## SHOCKS & SPARKS

**Swachh Bharat Abhiyan** was launched nationwide to focus on sanitation, hygiene and waste management. The aim of the movement is to make India a clean country by 2019, the 150<sup>th</sup> birth anniversary of Mahatma Gandhi.

Swachh Bharat campaign is joked off most of the time. After sixty years of a dynastic rule a change took place. Now let me tell you a recent incidence (no story). I was traveling from Canberra to Sydney by train. At a small station there was a change of the engine, driver which took a minute. The relieved driver walked down the platform and came across an empty coke can on the side under a bench. He picked it up and put it in the bin nearby and moved on as usual. I thought to myself, would it happen in India, why not?

On a more serious note, now let me tell you my experience I had at the Indian consulate in Sydney yesterday. I had gone there for the life certificate. I was amazed at seeing the transformation in that office since my last visit:

The man at the reception asked me even before I could say anything 'sir have you come for the life certificate'. I said 'Yes'. He asked me to give him the documents, take coffee and have a seat.

Some guys were already sitting and some kept coming. After some time, the councillor came out (I was told later that he comes out every half hour), called out the names, made them sign the certificate, signed it himself and handed it over. I was off in half an hour when the web site says it will take one day.

As though this was not enough, there was an old Anglo Indian pensioner from Railways – William D Fransis on a wheel-chair accompanied by his grand daughter. Frail and unable to speak. The councillor saw him and asked for his form first. With the form in hand, he went to him and said 'Sir from next year onwards, please do not come

here for this certificate. Just go to your treating GP (Doctor), he will sign this certificate. After that please post it to us along with a photo copy of your passport. You will get it back in a day and if you desire we will also send it to your paying office.

All pensioners present were amazed at the transformation. Being a bit curious, I stayed on and started asking the receptionist about this noticeable transformation. he told me the following:

We have to send to MEA, a monthly report highlighting the problems faced by visitors to the consulate and what actions have been taken to remove or reduce them? This is the result of that.

I asked him to tell me a few other improvements. He started off with a whole list. Let me tell you one of them. They have started a new emergency service. Say after office hours one learns that one's father has passed away. You SMS your visa request on a given number. If the officer on duty considers it to be an emergency request, he will call you back and speak to you and in all probability for such a case give you a visa the moment you are able to reach him with your passport. I remember my son's tears when he pleaded for a visa to get home after my wife's death. While the Indian embassy tried its best to delay it, his Australian boss in Canberra had to intervene. My eyes are flowing with tears as I remember it while trying to bring this transformation to you. Only one thing has changed since then in the consulate – the PM.

*Guys, this is a National Opportunity for us to redeem and rediscover ourselves. Let us contribute in the effort and not derail it. The least we can do is to have patience. Things are happening.*

*Courtesy: R G Keswani,  
Ieema Journal, January 2015*

## EYE CARE, THE SMARTPHONE WAY

The numbers are scary: 39 million people across the world are blind and 90 per cent of them live in low-income countries. Eighty per cent of blindness is avoidable and the largest number of blind people lives in countries with the lowest number of ophthalmologists. To try and connect patients with doctors, a team at the University of Strathclyde in collaboration with other institutions, has come up with *smartphone-based ophthalmic screening, with a mobile app and lens adaptor*, called '**PEEK VISION**'.

"The main problem is finding out who needs help. With this device, which works as a screening tool, a community nurse, the village head or any person with some training can find out if there is an eye ailment," said Mario Giardini, lecturer in digital health at the University. Dr. Giardini was speaking at a UK-India workshop on affordable medical diagnostics and devices held on Wednesday.

The smartphone can help screen for visual acuity, colour sensitivity and cataracts, can perform retinal imaging and even maintain patient records and, using location

mapping, keep track of patients for follow-up treatment, he explained.

"We will soon be setting up two test sites in India for this project," Dr. Giardini said. While one site may be Hyderabad, the other has not been finalised, he said.

Emphasising however that the device was not a substitute for a doctor, he said the aim of the project was to find patients and link them with doctors to help avoid blindness. The advantages, he said, were that it was easy to use, needed minimal training and could be used in remote locations as well as schools to identify patients.

"Existing eye care tools are expensive, difficult to use and access. Peek turns a smartphone into a comprehensive eye exam tool," the project's website says.

Other speakers spoke on projects focused on antimicrobial resistance and TB diagnosis, among others.

The conference was organised by the British Deputy High Commission in Chennai and the UK Science & Innovation Network. A number of Indian and UK researchers and medical professionals participated.

*Courtesy: The Hindu, dt. 12.02.2015*

## தலை சிறந்த கொடையாளிகள்

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**திரு. அஸிம்  
பிரேம்ஜி**  
விப்ரோ நிறுவனத்  
தலைவர்  
**12,316 கோடி  
ரூபாய்**



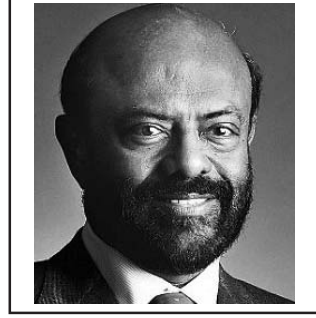
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நிலகேணி**  
இன்.:போசிஸ்  
நிறுவனர்களில் ஒருவர்  
**498 கோடி  
ரூபாய்**



**திரு. அனில்  
அகர்வால்**  
சீசா ஸ்டெர்லைட்  
நிறுவனத் தலைவர்  
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ரூபாய்**



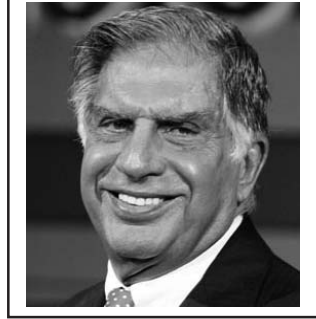
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ஆர் ஸ்ரீராம்**  
கூகுள் இயக்குநர்  
குழு உறுப்பினர்  
**377 கோடி  
ரூபாய்**



**திரு. ஷிவ் நாடார்**  
ஹெச்சிஎல் நிறுவனத்  
தலைவர்  
**1,136 கோடி  
ரூபாய்**



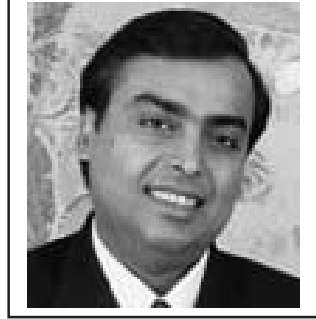
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ஸ்கிரிவாலா**  
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**350 கோடி  
ரூபாய்**



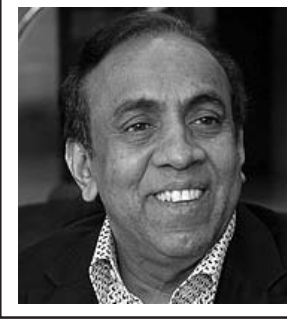
**திரு. ரத்தன் டாடா**  
டாடா குழுமத்தின்  
முன்னாள் தலைவர்  
**620 கோடி  
ரூபாய்**



**திரு. எஸ். கோபால  
கிருஷ்ணன்**  
இன்.:போசிஸ்  
நிறுவனர்களில் ஒருவர்  
**255 கோடி  
ரூபாய்**



**திரு. முகேஷ்  
அம்பானி**  
ரிலையன்ஸ்  
இண்டஸ்ட்ரீஸ்  
**603 கோடி  
ரூபாய்**



**திரு. ரவி பிள்ளை**  
ஆர்பி குழும  
நிறுவனங்களின் தலைவர்  
**145 கோடி  
ரூபாய்**

2013-ம் ஆண்டு செப்டம்பர் முதல் 2014-ம் ஆண்டு அக்டோபர் வரையான காலத்தில் பல திட்டங்களுக்கு நன்கொடை அளித்தவர்கள் பட்டியலில் விபரோ நிறுவனத்தின் தலைவர் அஸிம் பிரேம்ஜி முதலிடத்தில் உள்ளார்.

குறைந்தபட்சம் ரூ.10 கோடி நன்கொடையாக அளித்தவர்கள் பட்டியலில் 50 பேர் உள்ளனர். கடந்த ஆண்டு இப்பட்டியலில் இடம்பெற்றிருந்தவர்கள் எண்ணிக்கை 31.

பட்டியலில் இரண்டாவது இடத்தில் உள்ளவர் அளித்த தொகையைக் காட்டிலும் 6 மடங்கு கூடுதலான தொகையை அளித்து தலை சிறந்த கொடையாளியாகத் திகழ்கிறார். முந்தைய ஆண்டிலும் முதலிடத்திலேயே இருந்தார் பிரேம்ஜி. பெரும்பாலான தொகை கல்விக்காக ஒதுக்கப்பட்டுள்ளது. தென்னிந்தியர்கள் நன்கொடையாக அளித்த தொகை ரூ.13,300 கோடி. இது வட இந்தியர்கள் அளித்த தொகையைக் காட்டிலும் 5 மடங்கு அதிகமாகும்.

கொடையாளிகளில் 15 பேர் மும்பையைச் சேர்ந்தவர்களாவர்.

பட்டியலில் உள்ள 50 பேரில் 11 பேர் இந்தியாவில் வசிப்பவர்கள். இவர்களில் 5 பேர் இந்தியாவில் மட்டுமே தங்களது நன்கொடையை அளித்துள்ளனர்.

50 பேரில் பெரும் பணக் காரர்கள் பட்டியலில் 42 பேர் இடம்பெற்றுள்ளனர்.

கொடையாளிகளில் 73 சதவீதம் பேர் சொந்தமாக தொழில் தொடங்கி முன்னுக்கு வந்தவர்களாவர்.

சென்ட்ரல் ஸ்கொயர் அறக்கட்டளையைச் சேர்ந்த ஆஷிஷ் தவான் மிகச் சிறு வயது (45) கொடையாளி ஆவார். மூத்த குடிமக்கள் வரிசையில் பலோன்ஜி மிஸ்திரி (85) (டாடா குழுமத் தலைவர் சைரஸ் மிஸ்திரியின் தந்தை) உள்ளார். இந்தப் பட்டியலில் புதிதாக 23 பேர் இடம்பெற்றுள்ளனர்.

Courtesy:தி இந்து, தேதி: 12.01.2015

## இரும்பைப் பொன்னாக்கும் வித்தை

கத்தியை எடு என்பதுபோல் பெரியவர் சைகை காட்டினார். மாணிக்கம் சற்றே கத்தியை விலக்கிக்கொண்டான். “இங்க என்ன கிடைக்கும்னு நீ வந்த? நானே ஒரு பிச்சைக்காரன்” என்றார்.

மாணிக்கம் சுற்றுமுற்றும் பார்த்தான். பெரியவர் சொன்னது சரிதான். இங்கே வந்ததில் எந்தப் பலனும் இல்லை. வெறுப்போடு அவரைப் பார்த்தான். அவன் தொழில் திருட்டு. அதற்குப் பிரச்சனை வந்தால் தான் கத்தியைப் பயன்படுத்துவானே தவிர மற்றபடி யாரையும் கொல்வதில்லை. தொழிலுக்குக் குறுக்கே வந்தால் குழந்தை, பெரியவர், பெண்கள் என்று பார்க்க மாட்டான்.

வெறுப்புடன் திரும்பியவனைப் பெரியவர் கூப்பிட்டார். மாணிக்கம் திரும்பினான். “நீ ஏம்பா இவ்வளவு கஷ்டப்பட்டு? இரும்பைப் பொன்னாக மாற்றும் மந்திரத்தை நீ கற்றுக்கொண்டால் திருட வேண்டிய அவசியமே இருக்காதே” என்றார்.

மாணிக்கத்தின் கண்கள் விரிந்தன. அவரிடம் விவரம் கேட்டான். அது ரசவாதம் என்றும் வித்தை என்றார் பெரியவர். அந்த வித்தை உங்களுக்குத் தெரியுமா என்றான் மாணிக்கம்.

பெரியவர் சிரித்தார், “எனக்குத் தெரிந்தால் நான் ஏன் இப்படி இருக்கிறேன்? என்றவர், பக்கத்து ஊரில் இருக்கும் சாமியாருக்குத் தெரியும் என்று பேசிக்கொள்கிறார்கள் என்றார். உற்சாகத்துடன் வேகமாகக் கிளம்பியவனை மீண்டும் தடுத்தார்.

“அவரை மிரட்டிப் பணியவைக்க முடியாது. அவர் உயிருக்குப் பயப்படுபவர் இல்லை. அவரிடம் பணிவாக நடந்துகொண்டால் கற்றுத் தருவார்” என்றார்.

ஒரு முடிவோடு மாணிக்கம் கிளம்பினான்.

பணிவாகத் தன் முன் வந்து நின்ற மாணிக்கத்தைச் சீடனாக ஏற்றுக்கொண்டார் சாமியார். மாணிக்கம் அவர் சொன்ன வேலையெல்லாம் செய்தான். சொல்லாத வேலைகளையும் இழுத்துப் போட்டுக்கொண்டு செய்தான்.

அவர் தூங்குவதற்கு முன் காலை அமுக்கிவிட்டான். தூங்கும்போது விசிறிக்கொண்டே நின்றான்.

ஒரு மாதம் கழிந்தது. “நீயாகக் கேட்காதே, உன் மீது நல்ல அபிப்பிராயம் வந்தால் அவராகவே சொல்லித்தருவார்” என்று பெரியவர் சொல்லியிருந்தார். மாணிக்கம் பொறுமையாகப் பணிகளையும் பணிவிடைகளையும் செய்துவந்தான்.

ஆசிரமத்து வேலைகளைப் பார்த்துப் பார்த்துச் செய்தான். தோட்டம் பூத்துக் குலுங்கியது. ஆசிரமம் பளிச்சென்று மாறியது. சமையலறை, உணவுக் கூடம் ஆகியவை இதற்கு முன் இவ்வளவு சுத்தமாக இருந்ததில்லை.

வருடங்கள் ஓடின. மாணிக்கம் பொறுமையாகக் காத்திருந்தான். இரும்பைப் பொன்னாக்கும் வித்தை தெரிந்துவிட்டால் வாழ்நாள் முழுவதும் கஷ்டப்பட வேண்டிய அவசியமே இல்லை அல்லவா? எனவே பொறுமை காத்தான்.

வேளைக்குச் சாப்பாடு. தங்க இடம், அன்பான குழல் ஆகியவையும் அவனுக்குப் பிடித்திருந்தன. சாமியார் காட்டும் அன்பும் அவனை நெகிழ வைத்திருந்தது. விரைவில் அந்த வித்தை வசப்பட்டுவிடும் என்று நம்பினான்.

சாமியார் நோய்வாய்ப்பட்டார். மாணிக்கம் பதறிப்போனான். அவரைக் கண்போலப் பார்த்துக்கொண்டான். அவர் செய்துவந்த வேலைகளையும் சேர்த்துத் தானே செய்தான். எதுவாக இருந்தாலும் மாணிக்கத்திடம் கேட்டுச் செய்யுங்கள் என்று சாமியார் சொல்லிவிட்டார்.

மாணிக்கத்தால் இந்தப் புதிய அந்தஸ்தை நம்ப முடியவில்லை. அனைவரும் தன்னிடம் பணிவாகவும் அன்பாகவும் பழகுவதைக் கண்டு அவன் மனம் கசிந்தது. தனிமையில் அழுதான்.

இதற்கெல்லாம் எனக்குத் தகுதி இருக்கிறதா என்று நொந்துகொண்டான். எத்தனை நாளுக்கு இந்த நடிப்பு என்று நினைத்து வருந்தினான்.

சாமியாரின் உடல் நிலை மிகவும் மோசமானது. ஒரு நாள் அவருக்குக் கடுமையான காய்ச்சல். எழுந்திருக்கவே முடியவில்லை.

குளிர்ந்த நீரைத் துணியில் நனைத்து மாணிக்கம் ஒத்தடம் கொடுத்தான். சூடு அடங்கவே இல்லை. அவரைத் தன் மடியில் வைத்தபடி நெற்றியில் பற்றுப் போட்டான்.

அவர் உடல் தளர்வதை உணர்ந்து அதிர்ச்சி அடைந்தான். இன்னும் சிறிது நேரம்தான் என்று உணர்ந்தான். சாமியார் தன் கையை மெதுவாக உயர்த்தி அவன் தலையில் கை வைத்து ஆசீர்வதித்தார். மாணிக்கத்தின் கண்களில் கண்ணீர் வழிந்தது.

அதே சமயம் வந்த வேலையும் நினைவுக்கு வந்தது. இப்போது கேட்காவிட்டால் எப்போதும் கேட்க முடியாது என்று தோன்றியது. அவர் காதுக்கு அருகில் குனிந்தான். தயக்கத்துடன் மெல்லிய குரலில் கேட்டுவிட்டான்.

“ஸ்வாமிஜி, உங்களுக்கு இரும்பைப் பொன்னாக்கும் ரசவாதம் தெரியுமாமே? அதை எனக்குச் சொல்லித் தருவீர்களா?”

சாமியாரின் முகத்தில் புன்னகை. “அது உனக்கு ஏற்கனவே தெரியும் அப்பா” என்றார்.

மாணிக்கம் பார்வையில் கேள்விக்குறி.

**“இரும்பாக இருந்த மாணிக்கம் இப்போது தங்கமாக மாறியிருக்கிறானே, இதுதான் பா அந்த ரசவாதம். அது உனக்கு இப்போது நன்றாகவே தெரியும். நீயும் ரசவாதிதான்”.**

சாமியாரின் உயிர் பிரிந்தது. மாணிக்கத்தின் கண்களில் தாரை தாரையாக கண்ணீர் வழிந்தது. Courtesy:தி இந்து, தேதி: 19.02.2015

## மருத்துவ உலகின் ராணி – சோற்றுக் கற்றாழை



நோய்கள் விரட்ட உதவும் பல மருந்துகளுடன் சேர்க்கப் பயன்படும் மூலிகைகளில், கற்றாழைக்கு குறிப்பிட்ட இடமுண்டு. நம் ஊரில் சாதாரணமாக முள் வேலிகளில் வளர்ந்து வரும் கற்றாழைகளின் அளப்பரிய மருத்துவ குணங்களை இங்கே தெரிந்து கொள்ளுங்கள்.

கற்றாழை உலகம் பூராவும் 17ம் நூற்றாண்டு முதல் காஸ்மெட்டிக் பொருள் உற்பத்தியிலும், மருத்துவத்திலும் பயன்படுத்தப்பட்டு வருகிறது. சிறு கற்றாழை மட்டிலும் மருத்துவத்திற்கும், காஸ்மெட்டிக் பொருள் தயாரிப்பதிலும் முதலிடம் பெறுகிறது. சிறு கற்றாழை **சோற்றுக் கற்றாழை** என வழங்கப்படுகிறது. சோற்றுக் கற்றாழையின் மருத்துவ குணங்களைப் பற்றிச் சிலவற்றைத் தெரிந்துகொண்டு, எளிய முறையில் பயன்படுத்தினால் பல நன்மைகளைப் பெறலாம்.

சோற்றுக் கற்றாழை மடல்களைப் பிளந்து நுங்குச் சுளை போல உள்ள சதைப் பகுதியை, சிறு சிறு துண்டுகளாக வெட்டி நல்ல தண்ணீரில் 7-10 முறை நன்றாகக் கழுவி எடுத்துக் கொண்டு மருந்தாகப் பயன்படுத்த வேண்டும். கற்றாழையைக் கையால் தொட்டால் வாய் கசக்கும் என்பார்கள். கழுவிச் சுத்தம் செய்தால். கற்றாழையின் வெறுட்டல் குணமும், கசப்புக் குறைந்து விடும்.

### தீராத வயிற்றுப் புண்களுக்கு...

சிறுநீர் குழாய்களிலும், பிறப்பு உறுப்புக்களிலுள்ள நோய்களை சோற்றுக் கற்றாழை நன்கு செயல்பட்டு முழுமையாக நிவர்த்தி செய்யும். வயிற்றின் சூட்டைத் தணிக்கும். வாய்வுத் தொல்லைகளை நீக்கும். நீடித்த மலச்சிக்கலைப் போக்குவதில் மிகவும் சிறப்பானது. கழுவிச் சுத்தம் செய்த சோற்றுக் கற்றாழையை அரைக்கிலோ எடுத்துக் கொண்டு, இதில் விளக்கெண்ணெய் ஒரு கிலோவும், பனங்கற்கண்டு அரைக்கிலோவும், வெள்ளை வெங்காயச் சாறு கால் கிலோவும் சேர்த்து, ஒரு பாத்திரத்தில் வைத்து அடுப்பில் சிறு தீயாக எரிக்க வேண்டும். சாறுகள் சுண்டியபின் இதை எடுத்து வைத்துக் கொண்டு நோயாளிகள் ஒரு தேக்கரண்டி வீதம், காலை, மாலை சாப்பிட்டு வந்தால், தீராத வயிற்று வலியும், வயிற்றுப் புண்ணும், சூன்மக் கட்டிகளும் நிவர்த்தியாகும். செரிமான சக்தியை அதிகரிக்கும். பசியை உண்டாக்கும்.

இந்த மருந்து பால்வினை நோய்களில் ஒன்றான கனோரியா நோயை முழுமையாகக் குணமாக்கிவிடும்.

கனோரியாவை நீக்குவதில் மிகவும் சக்தி வாய்ந்தது. நம்பிக்கையானது.

### வெட்டை நோய்கள் குணமாக...

கனோரியா நோயினால் ஏற்படும் எரிச்சல், நீர்க்கடுப்பு, நீர்க்கசியும் கிரந்தி, அரிப்பு, தினவு, நிறம் மாறிய சிறுநீர் வெளியேறுதல், இந்திரிய ஒழுக்கு, அரையாப்பு, ஜனன உறுப்பில் உள்ளூக்கும், வெளியிலும் புண் ஏற்பட்ட நிலை, சீழ் பிடித்தல், வெள்ளை வெட்டை நோய்கள் ஆகியன பூரணமாகக் குணமாகும். மருந்து சாப்பிடும் காலங்களில் காரத்தையும், புளியையும் சேர்க்காமல் உணவு உட்கொள்ள வேண்டும்.

சோற்றுக் கற்றாழை மடல் சுத்தம் செய்து எடுத்து, இதில் சிறிது படிக்காரத்தைத் தூவினால் நீர்த்து தண்ணீராகி விடும். இதில் வெண்ணெய், கற்கண்டு, வால் மிளகுக் தூள் சேர்த்து; சாப்பிட்டால் மூத்திரக் கிரிச்சரம், மேக நோயால் ஏற்பட்ட வெட்டை நோய் நீங்கிவிடும். கழுவிச் சுத்தம் செய்த சோற்றுக் கற்றாழை ஒரு கப் சேகரம் செய்து கொண்டு, இதில் சிறிய வெங்காயம் ஒரு கப் நறுக்கிச் சேர்த்து; விளக்கெண்ணெய் 300 கிராம், பனங்கற்கண்டு 300 கிராம் இவை யாவையும் ஒன்று சேர்த்து. அடுப்பில் வைத்து; சிறு தீயாக லேகிய பதம் வரும் வரை எரித்து; எடுத்துக்கொண்டு காலை, மாலை ஒரு தேக்கரண்டி வீதம் சாப்பிட்டு வந்தால் அனைத்து வகையான வயிற்று வலியும், வயிற்றுப் புண்களும் குணமாகும்.

### சிறுநீர் எளிதில் வெளியேற....

கழுவி எடுத்த சோற்றுக் கற்றாழையில் ஒரு மடல் அளவு கற்றாழைத் துண்டுகள் நீர் ஆகாரத்தில் கலந்து குடிக்க வேண்டும். மடல் துண்டுகள் ஐந்து தேக்கரண்டிக்குக் குறையக் கூடாது. இதை, காலையில் ஒரு வேளை சாப்பிட வேண்டும். மூன்றுநாள் உபயோகத்தில் சிறுநீரில் இரத்தம் கலந்து வருதல் நின்று விடும். இதே முறையில், மூன்று தினங்கள் சாப்பிட்டால் நீர்த்தாரை எரிச்சல் குணமாகும். கழுவிச் சுத்தம் செய்த கற்றாழைத் துண்டு ஒரு கப் எடுத்துக் கொண்டு, இதில் சின்ன வெங்காயம் சுட்டுப் பொடியாக்கிய ஐந்து வெங்காயத்துக்குக் குறையாமல் சேர்த்துக் கொண்டு, இதை கற்றாழைச் சோற்றில் கலந்து, கடுக்காய் பொடிகள் மூன்று கடுக்காயில் சேகரித்து, எல்லாவற்றையும் ஒன்றாக்கி சிறிது தண்ணீர் விட்டு மூடி வைத்தால், கால் மணி நேரத்தில் நீர்த்து தண்ணீராகி விடும். இந்தத் தண்ணீரை வடிகட்டிச் சாப்பிட்டால் அரை மணி நேரத்தில் சிறுநீர்க்கட்டு நீங்கிவிடும். தாராளமாக சிறுநீர் வெளியேறி விடும்.

### புண்கள் ஆற.....

கழுவி எடுத்த கற்றாழைச் சோறு 25-50 கிராம் பசும் பாலில் கலந்து காலை, மாலை சாப்பிட்டு வந்தால் பத்து தினங்களில் மூலச் சூடு தணியும். சொறி, அரிப்பு நீங்கும். விந்து உற்பத்தி அதிகரிக்கும். பால்வினை நோயான சொருக்கு நோய் வந்தவர்களின் ஆண் உறுப்பில் புண்கள் உண்டாகும். இதனால் வீக்கமும், புண்ணும் இருக்கும். கழுவி எடுத்த சோற்றுக் கற்றாழையை பாதிக்கப்பட்ட இடத்தில் வைத்துக் கட்டிக் கொள்ள வேண்டும். இரவு படுக்கும்போது இப்படிச் செய்து கொள்ளலாம். இவ்வாறு சில தினங்கள் கட்டி வந்தால், புண்கள் ஆறி விடும். வீக்கம் வற்றிவிடும்.

## பெண்களின் வெள்ளை நோய் குணமாக.....

பெரிய கற்றாழை மடலை நீளவாக்கில் கீறிப் பிளந்து இதில் மூன்று தேக்கரண்டியளவு வெந்தயத்தைப் பதித்து மூடி, நூலால் கட்டி இரவு கூரைமேல் வைத்து எடுத்தால், மூன்றாவது நாளில் விரித்துப் பார்க்கும் போது வெந்தயம் முளை கட்டியிருக்கும். இந்த வெந்தயத்தை மூன்று பாகமாக்கி மூன்று தினங்கள் சாப்பிட்டால் பெண்களுக்கு ஏற்பட்ட வெள்ளை நோய் குணமாகும்.

### கூந்தல் வளர

சதைப்பிடிப்புள்ள மூன்று கற்றாழையின் சதைப் பகுதியைச் சேகரித்து ஒரு பாத்திரத்தில் வைத்து, இதில் சிறிது படிக்காரத் தூளைத் தூவி வைத்திருந்தால், சோற்றுப் பகுதியில் உள்ள சதையின் நீர் பிரிந்து விடும். இந்த நீருக்குச் சமமாக நல்லெண்ணெய் அல்லது தேங்காய் எண்ணெய் கலந்து நீர் சுண்டக் காய்ச்சி எடுத்து வைத்துக் கொண்டு, தினசரி தலைக்குத் தடவி வந்தால் கூந்தல் நன்றாக வளரும். நல்ல தூக்கம் வரும்.

**கண்களில் அடிபட்டால்....** கண்களில் அடிபட்டதாலோ, இதர காரணங்களாலோ கண் சிவந்து வீங்கியிருந்தால் கற்றாழைச் சோற்றை வைத்துக் கட்டி இரவு தூங்கினால் வேதனை குறையும். மூன்று தினங்களில் நோய் குணமாகும். கற்றாழைச் சோற்றில் சிறிது படிக்காரத்தூள் சேர்த்து, ஒரு துணியில் முடிச்சுக் கட்டி, தொங்க விட்டு

ஒரு பாத்திரத்தை வைத்து நீர்சொட்டுவதைச் சேகரம் செய்து, எடுத்துக்கொண்டு, இதைச் சொட்டு மருந்தாக கண்களில் விட்டு வந்தால், கண்நோய்கள், கண்களில் அரிப்பு, கண் சிவப்பு மாறும்.

### குளிர்ச்சி தரும் குளியலுக்கு.....

மூலிகைக் குளியல் எண்ணெய் தயாரிக்க, சோற்றுக் கற்றாழை சோற்றுப் பகுதியை அரைக்கிலோ தயாரித்து ஒரு கிலோ நல்லெண்ணெய் சேர்த்து கரும் வெயிலில் 30 தினங்கள் வைத்து எடுத்து வடிகட்டிக் கொள்ள வேண்டும். எண்ணெய் பசுமை நிறமாக மாறிவிடும். இதில் தேவையான வாசனையைக் கலந்து வைத்துக் கொண்டு, குளியலுக்குப் பயன்படுத்தினால் குளிர்ச்சி தரும் ஆயில் ஆகும்.

அழகு சாதனப் பொருளில் கற்றாழை முக்கியப் பொருளாகச் சேர்த்து தயாரிக்கப்படும் ஜெல் சருமத்தின் பாதுகாவலனாகச் செயல்படுகிறது. சருமத்தின் ஈரப் பசையும் பாதுகாக்கிறது. சரும நோய்களுக்குச் சிறந்த மருந் தாகிறது. கற்றாழை மடல் சாறு பயன்படுத்தப் படுவதால், சூரிய வெப்பமாக்குதல் குறைகிறது. எக்ஸ்ட்ரே கதிர் வீச்சின் கடுமையைத் தடுத்து பாதுகாப்பு அளிக்கிறது. மொத்தத்தில் மருத்துவ உலகின் ராணியாக கற்றாழை வலம் வருகிறது.

Courtesy: Pesot Newsletter, December 2015

## HUMOUR

### Belief vs Non Belief...

A Bar Opened Opposite a Church!

The Church Prayed Daily against the bar business...

Days later the bar was struck by lightning & caught fire which destroyed it.

Bar Owner Sued the Church Authorities for the cause of its destruction, as it was an action because of their Prayer...

The Church Denied all Responsibility!

So, the judge commented, "It's Difficult to Decide the Case because here we have a Bar Owner Who Believes in the Power of Prayer & an Entire Church that Doesn't Believe in it!"

### Coollest Message

*A Businessman who lost everything in a fire placed a Sign Board:*

*"Everything burnt but luckily faith confidence undamaged. Business starts tomorrow".*

### Presence of mind

Moishe the Carpenter, returning home with his week's wages, was accosted by an armed robber on a deserted street.

"Take my money," said Moishe, "but do me a favour: shoot a bullet through my hat otherwise my wife won't believe I was robbed".

The robber obliged. He threw Moishe's hat into the air and put a bullet through it.

"Let's make it look as if I ran into a gang of robbers," said Moishe, "otherwise my wife will call me a coward! Please shoot a number of holes through my coat".

So the robber shot a number of holes through the carpenter's coat.

"And now..."

"Sorry," interrupted the robber. "No more holes. I'm out of bullets".

"That's all I wanted to know!" said Moishe. "Now hand me back my money and some more for the hat and coat that you've ruined or I'll beat you black and blue!"

The robber threw down the money and ran.

**Moral of the Story: Its never too late to use our brains to get out of a difficult situation!!**

### Another way to look...

There was a student who was desirous of taking admission for a study course.

He was smart enough to get through the written test, a GD and was to appear for the personal interview. Later, as the interview progressed, the interviewer found this boy to be bright since he could answer all the questions correctly. The interviewer got impatient and decided to corner the boy.

"Tell me your choice;" said he to the boy, "What's your choice: I shall either ask you ten easy questions or ONE real difficult. Think well before you make up your mind."

The boy thought for a while and said, "My choice is ONE real difficult question".

"Well, good luck to you, you have made your own choice!" said the man on the opposite side. Tell me: What comes first, Day or Night?"

The boy was jolted first but he waited for a while and said: "It's the DAY, sir".

"How???????" the interviewer was smiling ("At last, I got you!" he said to (himself)

"Sorry sir, you promised me that you will not ask me a SECOND difficult question!"

Admission for the course was thus secured.

## மாதே

### மனதில் நின்றாடும் மாதே



கடலரசி தன் அழகையெல்லாம் இங்குதான் கொட்டிச் சென்றாளோ? என்று நினைக்கும் வண்ணம் அமைந்திருக்கிறது மாதே. கேரளத்தின் அருகே உள்ள இந்த இடத்தில் தென்னந்தோப்புகளும், பசுமைக் கரைகளும் கண்ணுக்கும் மனத்துக்கும் விருந்து.

வாணிபம் செய்ய வந்த பிரெஞ்சு வியாபாரிகளின் கப்பல் தரைதட்டி நின்ற இந்த இடம், இப்போதும் விறுவிறுப்பான வியாபாரத் தலமாகத்தான் இருக்கிறது. கோழிக்கோட்டிலிருந்து ஒரு மணி நேரப் பயணத்திலும், கண்ணூரிலிருந்து அரை மணி நேரத்திலும் இந்த இடத்தை அடைந்துவிடலாம்.

ஒன்றா இரண்டா... ஒரு கூடை சுற்றுலாத் தலங்கள். மலபாரில் உள்ள மிக புகழ்பெற்ற செயின்ட் தெரஸா சர்ச் பிரெஞ்சு கட்டிடக் கலைக்கு

எடுத்துக்காட்டாக விளங்குகிறது. மாதேயில் அனைத்து மதத்தினராலும் வழிபடப்படும் இந்த சர்ச், அக்டோபர் மாதம் விழாக் கோலம் பூணும். மாதேக்கு மிக அருகே மலை மீது உள்ள செயின்ட் ஜார்ஜ் கோட்டையும் பிரெஞ்சு அரசே கட்டியது. இங்கிருந்து மாதே நகரை முழுமையாகக் கண்டுக்கலாம். மாதேயைச் சுற்றி வேறு என்ன பார்க்கலாம்?

பேயம்பலம் பீச். கண்ணுக்கு விருந்தாகப் பசுமையை அள்ளித் தரும் இந்த பீச்சின் மறுபுறத்திலிருந்து செங்குத்தாக நீண்டு கடலுக்கு மூக்கை நீட்டிக்கொண்டிருக்கும் பாறை கருத்துக்கும் விருந்து. அப்படியே பக்கத்தில் 14 கிலோ மீட்டர் போனால் முழுப்பிலங்காடு பீச், நீண்ட தூய்மையான கடற்கரை. நீச்சலுக்கு உகந்தது. 400 வருடங்களுக்கு முற்பட்ட ராமர் கோயில் மாதேயிலிருந்து 7 கிலோ மீட்டர் தூரத்தில் திருவண்காட்டில் உள்ளது. தலசேரி கோட்டையும் புராதனச் சின்னமாக திருவல்லிப்பாடு கண்ணு மலை மீது காணப்படுகிறது.

*Courtesy: தி இந்த. ஜய வருட மலர் 2014*

## 20 MOST PEACEFUL COUNTRIES IN THE WORLD - 4

### SLOVENIA



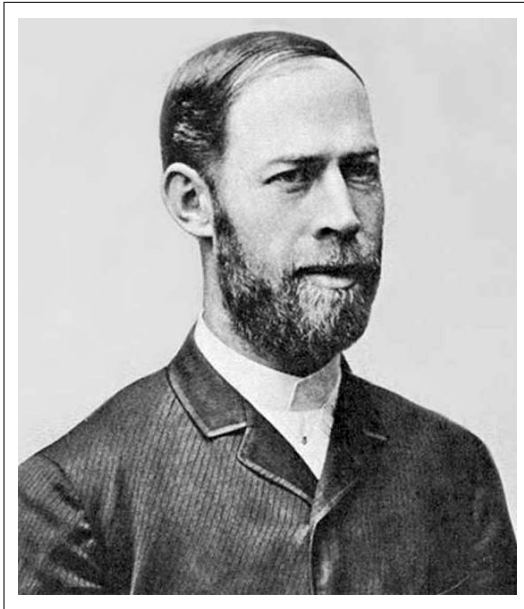
A beautiful European country, **Slovenia** is also among the most peaceful countries in the world. The country got its lowest marks in funding for the United Nations peacekeeping missions, number of police and security officers, level of perceived criminality in society, number of organized internal conflicts, violent protests, and number of internal and external wars fought. I agree with the Global Peace Index and believe that Slovenia deserves its place in the list of the most peaceful countries on Earth. Moreover, with its wonderful cities like Maribor and Ljubljana teeming with unique culture, Slovenia is a fantastic travel destination.

*(To be continued)  
Courtesy: Amerikanki*

# HEINRICH RUDOLF HERTZ (1857 - 1894)

## Early years

Heinrich Rudolf Hertz was born in Hamburg in 1857. While studying at the Gelehrtenschule des Johanneums in Hamburg, Heinrich Rudolf Hertz showed an aptitude for sciences as well as languages, learning Arabic and Sanskrit. He studied sciences and engineering in the German cities of Dresden, Munich and Berlin, where he studied under Gustav R. Kirchhoff and Hermann von Helmholtz. In 1880, Hertz obtained his PhD from the University of Berlin; and remained for post-doctoral study under Hermann von Helmholtz. In 1883, Hertz took a post as a lecturer in theoretical physics at the University of Kiel. In 1885, Hertz became a full professor at the University of Karlsruhe where he discovered electromagnetic waves.



The most dramatic prediction of Maxwell's theory of electromagnetism, published in 1865, was the existence of electromagnetic waves moving at the speed of light, and the conclusion that light itself was just such a wave. This challenged experimentalists to generate and detect electromagnetic radiation using some form of electrical apparatus. The first successful radio transmission was made by David Edward Hughes in 1879, but it would not be conclusively proven to have been electromagnetic waves until the experiments of Heinrich Hertz in 1886. For the Hertz radio wave transmitter, he used a high voltage induction coil, a condenser (capacitor, Leyden jar) and a spark gap—whose poles on either side are formed by spheres of 2 cm radius—to cause a spark discharge between the spark gap's poles oscillating at a frequency determined by the values of the capacitor and the induction coil.

To prove there really was radiation emitted, it had to be detected. Hertz used a piece of copper wire, 1 mm thick, bent into a circle of a diameter of 7.5 cm, with a small

brass sphere on one end, and the other end of the wire was pointed, with the point near the sphere. He bought a screw mechanism so that the point could be moved very close to the sphere in a controlled fashion. This "receiver" was designed so that current oscillating back and forth in the wire would have a natural period close to that of the "transmitter" described above. The presence of oscillating charge in the receiver would be signaled by sparks across the (tiny) gap between the point and the sphere (typically, this gap was hundredths of a millimeter).

In more advanced experiments, Hertz measured the velocity of electromagnetic radiation and found it to be the same as the light's velocity. He also showed that the nature of radio waves' reflection and refraction was the same as those of light and established beyond any doubt that light is a form of electromagnetic radiation obeying the Maxwell equations. Hertz's experiments triggered broad interest in radio research that eventually produced commercially successful wireless telegraph, audio radio, and later television. In 1930 the International Electrotechnical Commission (IEC) honoured Hertz by naming the unit of frequency—one cycle per second—the "hertz".

## Meteorology

He always had a deep interest in meteorology probably derived from his contacts with Wilhelm von Bezold (who was Hertz's professor in a laboratory course at the Munich Polytechnic in the summer of 1878). Hertz, however, did not contribute much to the field himself except some early articles as an assistant to Helmholtz in Berlin, including research on the evaporation of liquids, a new kind of hygrometer, and a graphical means of determining the properties of moist air when subjected to adiabatic changes.

## Contact mechanics

In 1886–1889, Hertz published two articles on what was to become known as the field of contact mechanics. Hertz is well known for his contributions to the field of electrodynamics; however, most papers that look into the fundamental nature of contact cite his two papers as a source for some important ideas. His work basically summarises how two axi-symmetric objects placed in contact will behave under loading, he obtained results based upon the classical theory of elasticity and continuum mechanics. The most significant failure of his theory was the neglect of any nature of adhesion between the two solids, which proves to be important as the materials composing the solids start to assume high elasticity. It was natural to neglect adhesion in that age as there were no experimental methods of testing for it.

To develop his theory Hertz used his observation of elliptical Newton's rings formed upon placing a glass sphere upon a lens as the basis of assuming that the

pressure exerted by the sphere follows an elliptical distribution. He used the formation of Newton's rings again while validating his theory with experiments in calculating the displacement which the sphere has into the lens. Hertz's theory is recovered from their formulation if the adhesion of the materials is assumed to be zero. Similar to this theory, however using different assumptions, B. V. Derjaguin, V. M. Muller and Y. P. DMT theory proved to be rather premature and needed several revisions before it came to be accepted as another material contact theory in addition to the JKR theory. Both the DMT and the JKR theories form the basis of contact mechanics upon which all transition contact models are based and used in material parameter prediction in nanoindentation and atomic force microscopy. So Hertz's research from his days as a lecturer, preceding his great work on electromagnetism, which he himself considered with his characteristic soberness to be trivial, has come down to the age of nanotechnology.

### **Electromagnetic research**

In 1886, Hertz developed the Hertz antenna receiver. This is a set of terminals which is not electrically grounded for its operation. He also developed a transmitting type of dipole antenna, which was a centered driven element for transmitting UHF radio waves. These antennas are the simplest practical antennas from a theoretical point of view. In 1887, Hertz experimented with radio waves in his laboratory. Hertz altered Maxwell's equations to take this view into account for electromagnetism. Hertz used a Ruhmkorff coil-driven spark gap and one meter wire pair as a radiator. Capacity spheres were present at the ends for circuit resonance adjustments. His receiver, a precursor to the dipole antenna, was a simple half-wave dipole antenna for shortwaves. Hertz published his work in a book titled: *Electric waves: being researches on the propagation of electric action with finite velocity through space.*

Through experimentation, he proved that transverse free space electromagnetic waves can travel over some distance. Hertz had positioned the oscillator about 12 meters from a zinc reflecting plate to produce standing waves. Each wave was about 4 meters. Using the ring detector, he recorded how the magnitude and wave's component direction varied. Hertz measured Maxwell's waves and demonstrated that the velocity of radio waves was equal to the velocity of light. The electric field intensity and polarity was also measured by Hertz. (Hertz, 1887, 1888).

The Hertzian cone was first described by Hertz as a type of wave-front propagation through various media. His experiments expanded the field of electromagnetic transmission and his apparatus was developed further by others in the radio. Hertz also found that radio waves

could be transmitted through different types of materials, and were reflected by others, leading in the distant future to radar. Hertz helped establish the photoelectric effect (which was later explained by Albert Einstein) when he noticed that a charged object loses its charge more readily when illuminated by ultraviolet light. In 1887, he made observations of the photo electric effect and of the production and reception of electromagnetic (EM) waves, published in the journal *Annalen der Physik*. His receiver consisted of a coil with a spark gap, whereby a spark would be seen upon detection of EM waves. He placed the apparatus in a darkened box to see the spark better. He observed that the maximum spark length was reduced when in the box. A glass panel placed between the source of EM waves and the receiver absorbed ultraviolet radiation that assisted the electrons in jumping across the gap. When removed, the spark length would increase. He observed no decrease in spark length when he substituted quartz for glass, as quartz does not absorb UV radiation. Hertz concluded his months of investigation and reported the results obtained. He did not further pursue investigation of this effect, nor did he make any attempt at explaining how the observed phenomenon was brought about. His discoveries would later be more fully understood by others and be part of the new "wireless age". In bulk, Hertz' experiments explain reflection, refraction, polarization, interference, and velocity of electric waves.

In 1892, Hertz began experimenting and demonstrated that cathode rays could penetrate very thin metal foil (such as aluminium).

### **Death at age 36**

In 1892, an infection was diagnosed (after a bout of severe migraines) and Hertz underwent some operations to correct the illness. He died of Wegener's granulomatosis at the age of 36 in Bonn, Germany in 1894, and was buried in the main Protestant Ohlsdorf Cemetery in Hamburg.

### **Legacy and honors**

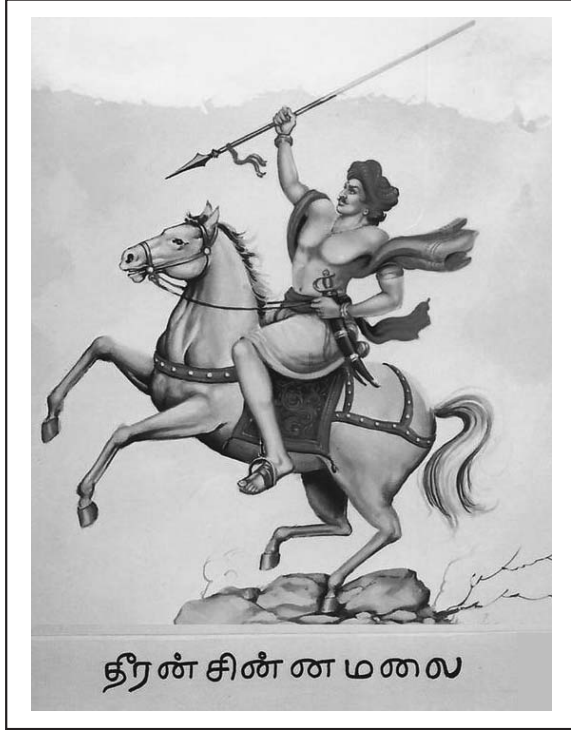
Heinrich Hertz' nephew Gustav Ludwig Hertz was a Nobel Prize winner, and Gustav's son Carl Helmut Hertz invented medical ultrasonography. The SI unit *hertz* (Hz) was established in his honor by the IEC in 1930 for frequency, an expression of the number of times that a repeated event occurs per second. It was adopted by the CGPM (Conférence générale des poids et mesures) in 1960, officially replacing the previous name, "cycles per second" (cps). In 1969 (East Germany), a Heinrich Hertz memorial medal was cast. The IEEE Heinrich Hertz Medal, established in 1987, is "*for outstanding achievements in Hertzian waves[...] presented annually to an individual for achievements which are theoretical or experimental in nature*".

*Maxwell's theory is Maxwell's system of equations. – HEINRICH HERTZ*



# DHEERAN CHINNAMALAI

Dheeran Chinnamalai born as Theerthagiri Sarkkarai Mandraadiyaar or Theerthagiri Gounder on April 17, 1756) was a Kongu chieftain and Palayakkarar from Tamil Nadu who rose up in revolt against the British East India Company in the Kongu Nadu, Southern India. He was born in Melapalayam, near Erode in the South Indian state of Tamil Nadu. He is held with high regard by the Gounder community who continue use him as a symbol of Independence for the community.



## Statue of Dheeran Chinnamalai at Chennai

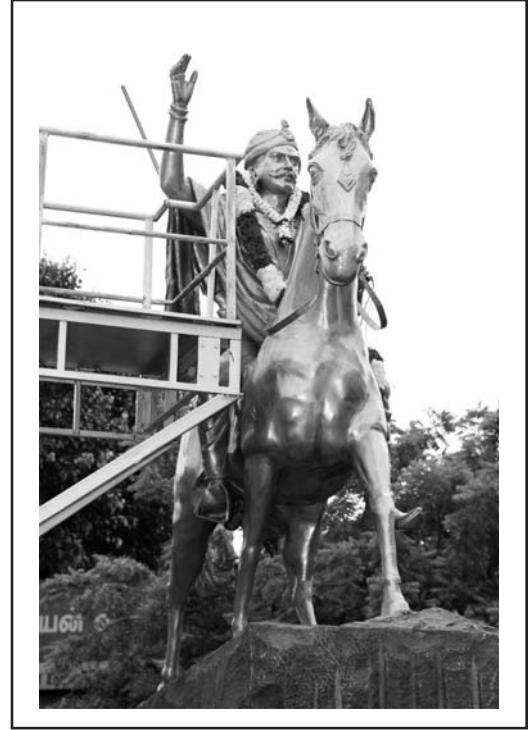
He was one of the main leaders in the Polygar Wars and commanded a vast army, notably during the Second Polygar War that took place in 1801–1802. A thousand-strong army under him took French Military training in modern warfare alongside Tipu's Mysore forces to fight against the British East India company. They helped Tipu Sultan in his war against the British and were instrumental in victories at Chitheswaram, Mazahavalli and Srirangapatna.

After Tipu's death, Chinnamalai settled down at Odanilai in Kongu Nadu and constructed a fort there and defeated the British in battles at Cauvery in 1801, Odanilai in 1802 and Arachalur in 1804. Later, Chinnamalai left his fort to avoid

cannon attack and engaged in guerrilla warfare while he was stationed at Karumalai in the Palani region. He was captured by the British who hanged him at Sankagiri Fort on 31 July 1805 (Adiperukku day).

## Honors and monuments

Statues and memorials commemorating Dheeran Chinnamalai exist in Chennai, Tiruchirappalli



and Arachalur, Erode. In July 2005, a commemorative postage stamp on him was issued.

Until 1997, the state transport corporation headquartered at Tiruchirapalli was known as 'Dheeran Chinnamalai' Transport Corporation. Until 1996, Karur district was known as 'Dheeran Chinnamalai' District. Erode Collector office is housed in 'Dheeran Chinnamalai Maaligai'. In April 2012 the Chief Minister of Tamil Nadu, Jayalalithaa, announced that a memorial for Dheeran Chinnamalai would be built at the place where he was hanged.

# POMEGRANATE POWER



1. It is believed to prevent heart disease as it is laden with anti-oxidants
2. Its anti-inflammatory properties are believed to keep cancer away.
3. Eating a fruit every day is a great way to add fibre to one's diet.
4. The juice of the fruit makes a great mouthwash, preventing plaque formation.
5. Research shows that pomegranate could keep Alzheimer's at bay.

*Courtesy: The Hindu, dt. 06.02.2015*

## TIRUKKURAL AND MANAGEMENT IN A 'NUTSHELL' - 23



In Management in Action, there is always a question of Ethics and appropriateness of decision/action for the particular situation or problem.

How do we know what's ethical or what's the right thing to do? Here are some solid leadership guidelines for you and your team members.

Is it legal?

Does it comply with our rules and guidelines?

Is it in sync with our organizational values?

Does it match our stated commitments and guarantees?

Will I be comfortable and guilt-free if I do it?

Would I do it to my family or friends?

Would I be perfectly okay with someone doing it to me?

Would the most ethical person I know do it?

If your answers pass the above questions, then what you are likely to do can be considered to have passed the "Ethical Action Test".

Tirukkural deals with all these and more to teach conduct of Life and Management. In the list of Questions given above for Ethical Action Test, the first four deal with the Organization and second four deal with the Decision maker and the decision making.

In one Kural below, Tiruvalluvar states that the consideration and action will be proper and Ethical if only it keeps in mind the Organizational guidelines.

*Karumam Sithaiyamal Kannoda Vallarkku*

*Urimai Udaithuiv Vulagu*

*Kural 578*

கரும்ம சிதையாமல் கண்ணோட வல்லார்க்கு  
உரிமை உடைத்துஇவ் வுலகு. குறள் 578

**"Success is for one who can consider, decide and act without violating the Purpose, Principles and Guidelines of the Organization"**

In another Kural given below, Tiruvalluvar advocates a simple guideline that each person should put himself in the situation and consider whether he will do it to himself or his family or friends and decide.

*Thannuyirku Innamai Thanarivan Enkolo*

*Mannuyirkku Inna Seyal*

*Kural 318*

தன்உயிர்க்கு இன்னாமை தானறிவான் என்கொலோ  
மன்னுயிர்க்கு இன்னா செயல்? குறள் 318

**"One who knows and understands what he will consider as improper and unethical when meted out to him; how will he make an improper decision and act"**

In another Kural, as an answer for the last question, Tiruvalluvar brings out the need for action tuning with the people with more experience.

*Thammin Periar Thamara Ozhuguthal*

*Vanmaiyl Ellam Thalai*

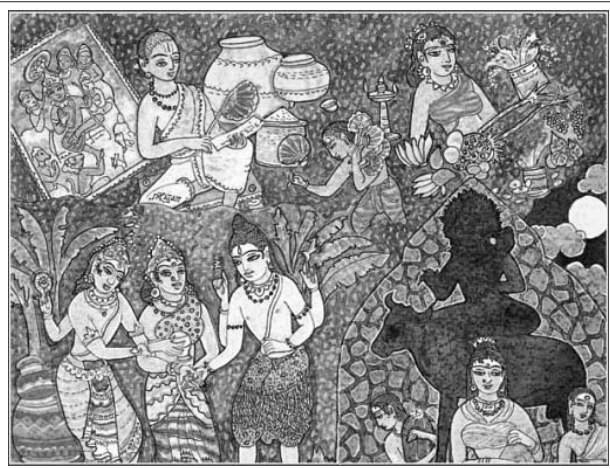
*Kural 444*

தம்மின் பெரியார் தமரா ஒழுகுதல்  
வன்மையுள் எல்லாம் தலை குறள் 444

**"If those that are worthier than thyself have become thy intimates, thou hath acquired a strength before which all other strength falleth"**

## HOME FESTIVALS - 4

சித்திரை - Chitrai (April/May)

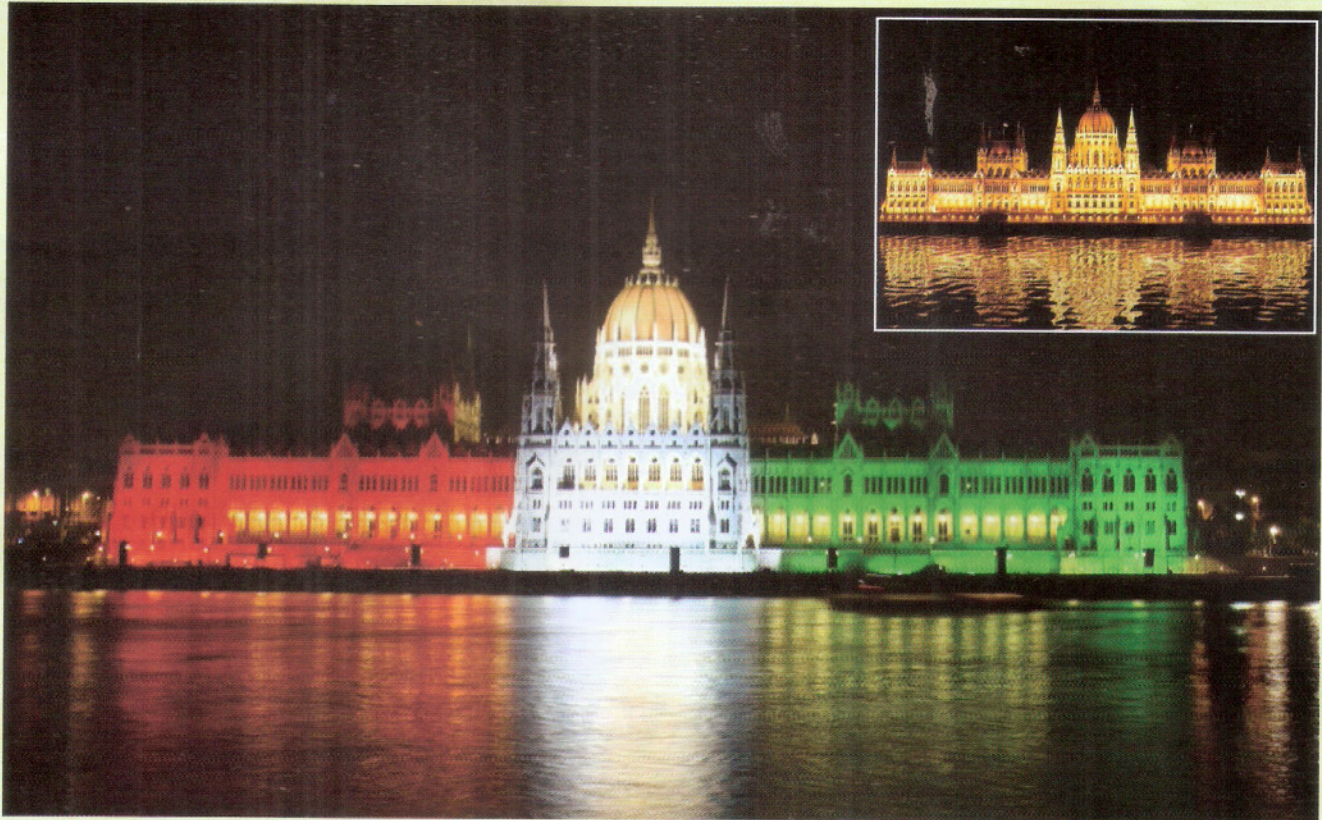


This month begins with the completion of Ram Navami, the nine days of celebration of Lord Rama's birth ages ago, which started in the previous month. At the upper left we see a decorated picture of Lord Rama's coronation. Next (Proceeding clock wise) comes a

Vaisnava priest telling the stories of Lord Rama's birth and life; behind him are great pots 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 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)

## BUDAPEST PARLIAMENT



The Parliament building, a magnificent example of Neo-Gothic architecture (although displaying Renaissance and Baroque characters too), is just over 100 years old. 7 years after Budapest as such was united from 3 different cities (Buda, Pest and Obuda) in 1873 the Hungarian diet decided to establish a new and representative Parliament building. After an international competition Imre Steindls idea was chosen. Construction based on the winning plan began in 1885 and the building was inaugurated on the 1000<sup>th</sup> anniversary of Hungary in 1896, and fully completed in 1902. Both runner-up designs were also built facing the Parliament building. One is the Museum of Ethnography and the other is the Ministry of Agriculture. The Budapest Parliament building is the third largest Parliament building in the world. It has 691 rooms (including more than 200 offices), 20 kilometers (12.5 miles) of stairs and at 96 meters (315 feet) it is the same height as the St. Stephen's Basilica. It is 268 m (879 ft) long and 123 m (404 ft) wide. Its interior includes 10 courtyards, 13 passenger and freight elevators.

One of the famous parts of the building is the hexadecagonal (sixteen-sided) central hall, with huge chambers adjoining it: the Lower House and the Upper House. The modern National Assembly is unicameral and meets in the Lower House, while the Upper House is used as a conference and meeting room. The Holy Crown of Hungary, which is also depicted in the coat of arms of Hungary, has been displayed in the central hall since 2000.

### About Budapest

Budapest is the capital of Hungary and also with 2 Million inhabitants the biggest city of the country counting for approximately 20% of the population. Hungary is really rich in history, from the Turkish invasion over the Hungarian-Austrian empire to world class inventions the country has a lot to add.



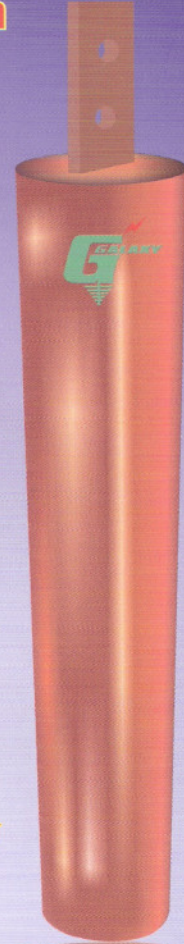
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