ELECTRICAL INSTALLATION ENGINEER

NEWS LETTER

TAMILNADU ELECTRICAL INSTALLATION ENGINEERS' ASSOCIATION 'A' GRADE (Regn. No. 211/1992)
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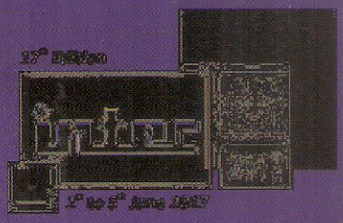
ISSUE NO. 135	VOL : No. 12/2017	MONTHLY ISSUE NO. 5	PRIVATE CIRCULATION ONLY	MAY 2017

EVENTS

L&T Training Programme

1. Automatic Source Transfer Schemes – Application & Solutions in LV System	2nd June 2017
2. Introduction to Industrial Electrical Systems	5th – 7th June 2017
3. Selection of LV Switchgear and Applications	5th – 9th June 2017
4. Industrial Protection with Numerical Relays	12th – 15th June 2017
5. Breaker Maintenance Workshop – C - Power ACB	19th – 21st June 2017
6. Breaker Maintenance Workshop – U – Power Omega ACB	22nd – 23rd June 2017
7. Introduction to Industrial Electrical Systems	26th – 28th June 2017

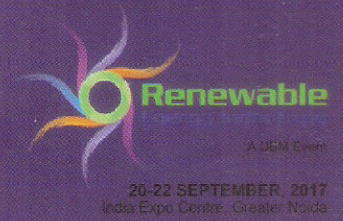
Venue: L&T Ltd., Switchgear Training Centre, Nilgiris
Contact Tel.: 0423-2517107 **Fax:** 0423-2517158
Email: stc_coonoor@lntebg.com



Events Profile: This much-awaited International Industrial Trade Fair INTEC 2017 IS brought to you by CODISSIA – The Coimbatore District Small Industries Association, brings together the very best in technological advancement. INTEC is a congregation of various Industries exhibiting their finest innovations and services.
Date: 1ST – 5th June 2017
Veneue: CODISSIA Trade Fair Complex, Coimbatore
Website: http://www.intec.codissia.com/

Events Profile: NREC Summit 2017 is one of the leading events in the RE sector attended by governments officials, national and international organizations, global RE consultants and solution providers, research scholars and subject matter experts. NREC offers the right platform to network and meet relevant prospects.
Date: 23th – 24th June 2017
Venue: Bengaluru, M.G Road, Bengaluru, India
Website: https://www.townscript.com/e/nrec-summit-2017-124142

Events Profile: 8th World Renewable Energy Technology Congress & Expo-2017 from 21st to 23rd August, 2017 at the Expo & Convention Centre, Manekshaw Centre, Delhi Cantt, Delhi, India. The theme of the conference is "Renewable Energy: What Works".
Date: 22nd August 2017
Venue: Expo & Convention Centre, Manekshaw Centre, Delhi, India
Website: www.ee-foundation.org/sustainability.html



Events Profile: Organised by UBM India, Renewable Energy India Expo intends to accelerate the growth of India's Renewable Energy sector and contribute to the country's sustainable economic development. The show aims to upscale and mainstream the applications of renewable energy resources, showcase innovations, and enrich deliberations by providing the industry with an international exhibition and conference platform.
Date: 20th – 22nd September 2017
Venue: India Expo Centre, Greater Noida, India
Website: http://www.renewableenergyindiaexpo.com/

EDITORIAL

Dear Members, Fellow Professionals and Friends,

Seasons Greetings To One And All!

May is the month when **National Technology Day is observed on the 11th of May**. This reminds us of the great role played by Technology in all spheres of life and our responsibility to ensure propagation and application of Technologies which benefit the Society for its growth and welfare and at the same time which will be safe for all and ensure preservation of Nature and Environment. Today the World at large and India in particular is confronted with lot of problems, be it Agriculture, Water or Energy or Environment and more such. A deep and unbiased analysis will show that Technology and the lack of it can both be the reason and solutions for all the problems.

Technology and Research has helped Agriculture in India to a very great extent that we are self sufficient in Food since the '80s. This can be appreciated if we know the historical fact that in the '60s and in the earlier decades, there was starvation in India and we depended on imports and PL480 grants etc for food. There was even a global prediction that millions will die in India of starvation from the late '70s, but, thanks to the successful "Green Revolution" efforts from the late '60s, that we had the **'First Self Sufficient Year' in food production in 1980.** In the application of technologies and 'Mechanization' of Agriculture we lag behind and still employ almost 50 or 60% of population in Agriculture. With large scale application of Technology and Mechanization, the manpower can be better employed with intelligence, skills and training for much better wealth generation, in these days of scarcity of youthful workforce the world over.

Water is another commodity of great concern the world over, but here the technologies are misused to dig/bore deeper and deeper to get water instead of focusing technologies more on harvesting, storing and distributing all the available and recurring rains and flood waters. The scope in India for all these activities are abundant and it is time that 'Good Senses' prevail and actions are initiated and speeded up in this regard.

In the area of Energy again, we have 2 serious problems on hand. One is Energy Security, where, though we (India) seem to be apparently secure today, the dangers loom large as we still depend on huge imports of Oil and Coal and our over dependence on "Fossils" itself is dangerous both to the Energy Security and Security of the Earth and the Environment. Large scale 'Renewable Energies' is the solution and the present initiatives of Solar Energy should soon include 'Bio Energy' Technologies promotion and employment as the potential in India for 'Bio Energy' is huge with all kinds of 'Waste to Energy' Solutions. The second problem is the 'Efficiency Levels' in uses of all Energy, where we (India) seem to be lagging behind very much. Large scale application of Better Technologies, Better Materials and Better Methods can all go to save lots and lots of Energy as we (India) seem to be spending about 4 to 6 times more of Energy to accomplish the same work compared to the Best Practices of the advanced Nations like Japan.

We thank all those members who have helped us by participating in the advertisement appearing for the issue April 2017 – Elmettlerr, Universal Earthing Systems Pvt. Ltd., Supreme Power Equipment Pvt. Ltd., Flir Systems India Pvt. Ltd., Galaxy Earthing Electrodes (P) Ltd., Alfa Switchgear (I) Pvt. Ltd., Ashlok Safe Earthing Electrode Ltd., Safvolt Switchgears Pvt Ltd., Power Cable Corporation, Consul Neowatt Power Solutions Pvt. Ltd., Dehn India Pvt. Ltd., OBO Bettermann India Pvt. Ltd., Wilson Power and Distribution Technologies Pvt. Ltd.

EDITOR

"We are stuck with technology when what we really want is just stuff that works."
- Douglas Adams, The Salmon of Doubt

ELECTRICAL INSTALLATION ENGINEER

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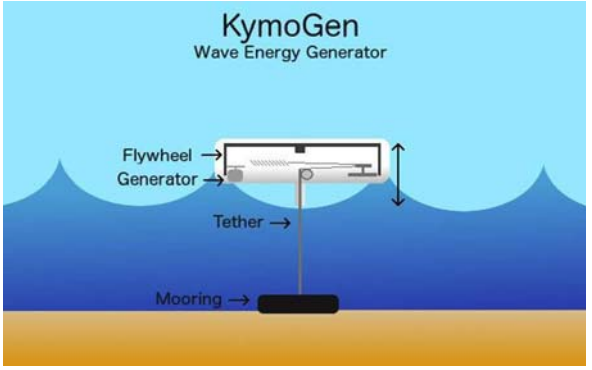
CONTENTS

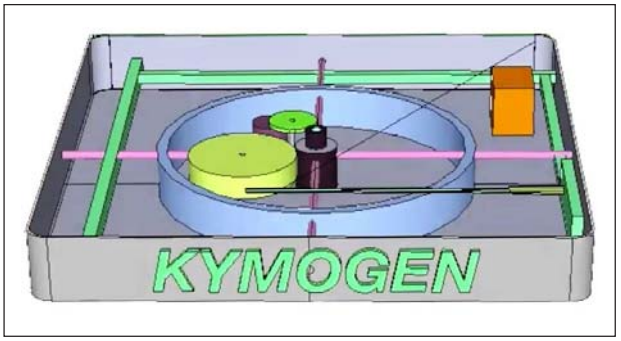
MEMBERS DETAILS

S.No.	Company Name	District	Contact No.	License No.
241.	MRM Power Consultants	Madurai	94421 81382, 96003 22383	EA 2870
242.	Perfect Engineering	Madurai	98421 60104	EA 2220
243.	The Electrical Industries	Madurai	0452-2341756, 94433 23422	EA 1754
244.	Annai Electricals	Madurai	98425 95013, 98425 79308	EA 2958
245.	Lasmi Chander Engg. Co. Pvt. Ltd.	Nagarcoil	04652–263443, 94432 37163	ESA 191
246.	Power Engineering Co.	Nagarcoil	04652–279414, 94433 79414	EA 2090
247.	Sharon Electricals	Nagarcoil	98429 34474, 94864 72445	EA 2692
248.	Padma Electricals	Nagarcoil	98945 91310	EA 1924
249.	Tino Engineering Pvt Ltd	Nagarcoil	04652-264942, 94434 46942	EA 2796
250.	Turbo Electrical Engineers	Namakkal	98428 64512, 98428 64513	EA 2314
251.	A.M. Manickam	Neyveli	04142–262247, 94432 62247	ESA 147
252.	Goutom Banerjee	Neyveli	04142-254623, 94432 68623	ESA 392
253.	Essar Electricals	Ooty	0423–2444248, 98430 15260	EA 1591
254.	Chemin Controls & Instrumentation P. Ltd.	Pondicherry	0413-2271155, 2277685	1/CA/96
255.	Paowertech Engineers	Pondicherry	0413-2203020, 98430 39062	EA 2701

THE KYMOGEN WAVE ENERGY GENERATOR

Mechanical Engineer **David Hartmann** and **Craftsman Jason Ballash** have designed a new wave power technology called the **KymoGen**, which has the potential to produce clean, low-cost energy using the constant power of waves. Key to the design is its simplicity. A portable 8'x8' platform is tethered to a mooring on the sea floor. Inside the floating platform, the tether is connected to a drive system which spins a flywheel as the waves rise and fall, providing constant power between waves. The generated electricity can then either be stored, or connected directly to existing power grids.





Weighing in at an estimated 800 lbs, the KymoGen can output 2 hp in as little as 12 inch waves and 8hp in 4 foot waves. Larger KymoGens could generate substantially more in rougher waters. The estimated average output per day is 25 to 100 kilowatt hours. It will be constructed of high strength Marine Composites, and the platform can accommodate wind or solar technologies to increase the energy output.

The name KymoGen comes from the word Generator combined with Kymopoleia "**the wave walker**" the greek goddess of waves. A Kickstarter campaign will be launched in March 2015. Plans are to have the first units produced in May 2015, with large scale manufacturing by September 2015. We'll be sure to post updates as the project gets underway. *In the meantime you can find more info and contact information at KymoGen.com*

SIEMENS AWARDED CYBER SECURITY CERTIFICATE FOR DIGITAL GRID AUTOMATION SOLUTIONS

Siemens is the first company worldwide to have received a certificate for network automation solutions from TÜV Süd, Munich, Germany, in accordance with the international standards series IEC 62443. The secure substation framework from Siemens has been certified to IEC 62443-2-4 (requirements for system integrators) and IEC 62443-3-3 (requirements for the security functions of systems). The certified architecture is based on Siemens' experience and knowledge as a globally active company, and the processes described in the certification ensure the necessary transparency of the security-relevant procedures in line with the standards. Siemens thus develops and implements network automation solutions for power supply companies and grid operators which are based on the latest international standards in terms of cyber security and have been adapted to the current security guidelines.

In addition to the existing standards for cyber security, IEC 62443 has evolved today into one of the most future-oriented security standards worldwide. It goes further than other standards and defines requirements for all parties involved, including product suppliers, system integrators and operators. Whereas IEC 62443-2-4 certification is based on a security concept and engineering process developed by Siemens, the secure substation framework from Siemens is the basis for evaluation in accordance with IEC-62443-3-3. This security framework is made up of products such as the station automation system Sicam PAS/PQS and Sicam AK3, as well as the operating and monitoring system Sicam SCC, Siprotec 5 protection devices and the Siemens Ruggedcom portfolio consisting of switches, routers and firewalls.

Digitalization and cyber security are two closely interrelated topics that are of great strategic importance for Siemens. With regard to the further development of cyber security measures for its network automation products, systems and solutions, for example, Siemens is taking a comprehensive security approach that is driven by international standards such as IEC 62443.

In order to further improve the security standards for intelligent power supply grids, Siemens experts are represented in the relevant international standardization organizations. Furthermore, Siemens advises supervisory bodies on technical and process-related topics. Thanks to a company-wide cyber emergency response team (CERT), Siemens has a global overview of vulnerabilities if and when they occur. This also applies for the cyber security of power supply grids, where digitalization is making further advances.

Secure network automation solutions are part of the Siemens Division Energy Management's product portfolio. As a product supplier, system integrator, and solution and service provider, the Division offers power supply companies and industry cost-efficient, reliable, and intelligent solutions for the transmission and distribution of electrical power. The portfolio ranges from products and systems for low-voltage and distribution networks and smart grid and energy automation solutions to high voltage transmission systems. With a presence in more than 100 countries, the Siemens Division earned approximately €11.9 billion in sales and €895 million in profit and employed around 52,000 employees worldwide last fiscal year, which ended on September 30, 2016.

For further information on Division Energy Management, please see *www.siemens.com/energy-management*.

Even the technology that promises to unite us, divide us. Each of us is now electronically connected to the globe and yet we feel utterly alone - DAN BROWN ANGELS & DEMONS

A simplified schematic diagram (fig. 1) that helps understanding the salient features of the micro-grid under discussion is given below.

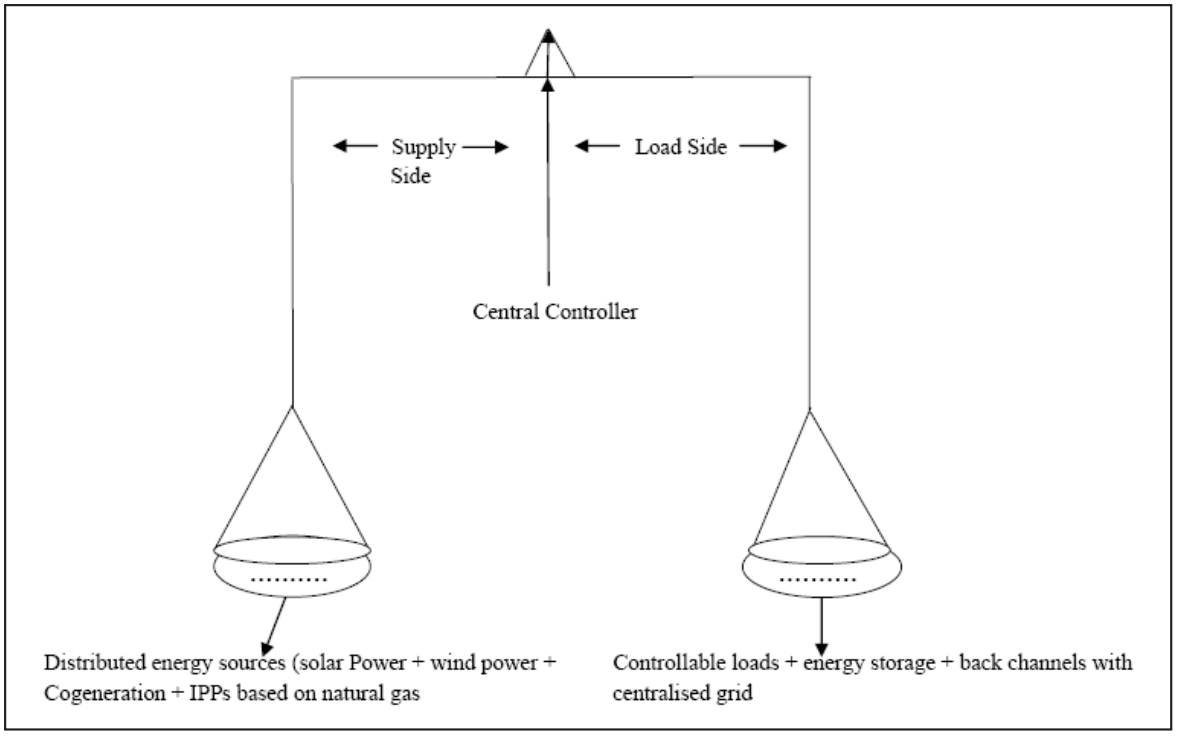


Fig 1. Schematic (functional) diagram of micro grid

Among the readymade solutions available to the problems faced in power systems, common choice is to expand the systems further and make it bigger. The result is the creation of a gigantic maze of interconnection points and nodes connecting various power plants and controlling sub-stations. It makes the network more cumbersome than the previous one; yet it brings the tangible benefits to the consumers. In this context, the decentralisation of the existing network also throws its hat in the ring as one of the pragmatic solutions. However it demands more detailed studies and follow up works.

All these factors elevate the significance of the reliability and resiliency aspects of the electricity grid. These two are totally different terms. **"Reliability**" means that the electric power supply should be continuously maintained or available without any restrictions / limitations. **"Resiliency"** is related to the strength or capability of the power delivery system to recover itself from the faults / adverse events quickly without major impacts / interruptions to the consumers. It is expected that by making appropriate refinements to the existing grid, its reliability and resilence may be improved to a higher level. It means that when generating sources are placed closer to the load centres, at times of crisis, the required sectionalisations can be carried out quickly and hence the goal of minimal impacts to the consumers can be ensured. In reality, it is also difficult to attain this objective. It is mainly because of the influence brought by many uncontrolled factors. In this regard, microgrid can be considered as a panacea for all these problems.

Enter the Microgrid

(i) Salient features: A Microgrid is non-invasive, unobstrusive and can be introduced easily in any existing network. It can be adopted in steps / modules. It brings yeoman service during the occurance of severe weather related events that lead to power outages. A case in point was the happening of super storm sandy in USA. Actually this event catapulated microgrid to the centre stage. The role played by microgrid during that crisis period was incomparable. Without its aid, several thousands of people would have faced untold sufferings. For a number of days, it helped to maintain uninterrupted heat and electricity supply to the consumers in many isolated locations. It also enabled many critical infrastructure to continue functioning.

Had it been in our midst in (Greater Chennai) during the periods of **"Vardha"** cyclone (2016) or **"Great Diluge"** (2015), our people would have been spared the sufferings / hardships they had faced / experienced then.

(ii) Impact on Environment

Now let us see its impact on environment. Surprisingly, it has a friendly relationship with the environment. It acts as a **"Catalyst"** for the renewable energy applications. Expectedly, it adds a strong renewable energy component in the present power delivery systems. It is mainly due to the prevalence of the **"solar rich environment".** It helps the wider applications of wind electric power and solar power.

(iii) Energy Storage

The next feature that comes in line is the view point which presents its role in Energy Storage. It simply helps adding the energy storage component to the present mix of the distributed generating sources and the controlled loads and firms up the power output of the network. The introduction of energy storage facilities also stabilize the microgrid and improve its **"Demand Response"** capabilities. A fast response to the reduction of loads when critical peak loads occurs is also made possible. Among the other benefits, it brings in its wings are,

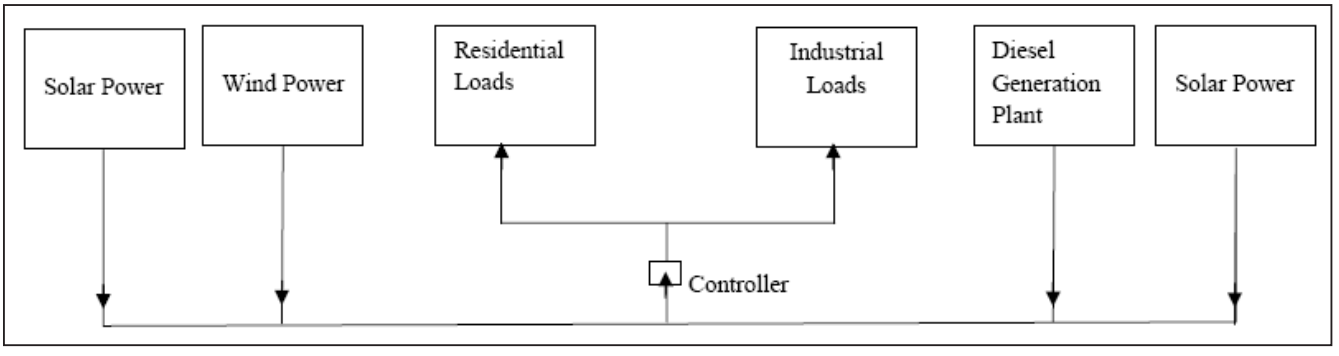
- Optimization of the load management assets
- Quick dispatches of the renewable energy components to the needy locations
- Optimization of the load management on the basis of demand and cost
- Time shifting of the load profile and finally
- Optimal demand management

With all these factors, it can be firmly stated that microgrid will have its own place in all electricity grids in the near future. Industrial loads and residential consumers are expected reap tangible benefits from it.

(iv) Need for Standardisation of Microgrid

In this context, one major point that needs attention is that at present, there is no standardisation exists for microgrid. This standardisation is essentially required for its seamless entry into the existing power network. No doubt such a step will strengthen / reinforce the 'resiliency' of the present electricity grid.

The integration or combination of Wind electric generators, Photo voltaic cells, Fuel cells and Diesel Generation Plant / cogeneration plants (based on natural gas) redefine the cost effective sizes and applications of micro grid. As outlined earlier, it is a **"Stand – alone Power Systems"** complete with generation, distribution and loads. The present technology helps to integrate all these components into a reliable system. All these aspects are shown in the sketch below. (Fig .2)



Among the successful microgrid adaptations, the combined heat and power (cogeneration) stations occupies the prime position. As stated earlier, it exhibited its relevance during the end of 19th century itself i.e. when Edison adopted this feature in his Pearl Street station in New York. Then heat and power needs of the neighbouring buildings were met from this station. Currently in USA around 41000 CHP facilities are in service; these facilities have a combined generation of nearly 8 GW (8000 MW). It is also reported that nearly 200 multi family housing communities have opt for this facility. Let me sign off here.

(To be continued…)

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ABB AND IBM PARTNER IN INDUSTRIAL ARTIFICIAL INTELLIGENCE

ABB and IBM announced a strategic collaboration that brings together ABB's industry leading digital offering, ABB Ability TM, with IBM Watson Internet of Things cognitive capabilities to unlock new value for customers in utilities, industry, transport and infrastructure using artificial intelligence.

The new suite of breakthrough solutions aims to help organizations tackle some of their biggest challenges – improving quality control, reducing downtime and increasing speed and yield of industrial processes – in a completely new way. The solutions enable current connected systems that simply gather data to become cognitive industrial machines that use data to understand, sense, reason and take actions to support industrial workers.

Organizations using the solutions will benefit from ABB's deep domain knowledge and extensive portfolio of digital solutions combined with IBM's expertise in artificial intelligence and machine learning as well as different industry verticals.

Combining ABB Ability and IBM Watson for Superior Customer Value - With an installed base of 70 million connected devices, 70,000 digital control systems and 6,000 enterprise software solutions, ABB is a trusted leader in the industrial space, and has a four decade long history of creating digital solutions for customers. IBM is a leader in artificial intelligence and cognitive computing. Together, IBM and ABB will create powerful solutions for customers to benefit from the Fourth Industrial Revolution.

ABB CEO, Ulrich Spiesshofer enumerates: *"This powerful combination marks truly the next level of industrial technology, moving beyond current connected systems that simply gather data, to industrial operations and machines that use data to sense, analyze, optimize and take actions that drive greater uptime, speed and yield for industrial customers."*

Cognitive Advances into Industrial Applications - *"This important collaboration with ABB will take Watson even deeper into industrial applications — from manufacturing, to utilities, to transportation and more,"* said **GinniRometty, IBM Chairman, president and CEO.** *"The data generated from industrial companies' products, facilities and systems holds the promise of exponential advances in innovation, efficiency and safety. Only with Watson's broad cognitive capabilities and our platform's unique support for industries can this vast new resource be turned into value, with trust. We are eager to work in partnership with ABB on this new industrial era."*

The first two joint industry solutions powered by ABB Ability and Watson will bring real-time cognitive insights to the factory floor and smart grids.

Real-time Cognitive Insights and Artificial Intelligence on the Factory Floor - ABB and IBM will leverage Watson's artificial intelligence to help find defects via real-time production images that are captured through an ABB system, and then analyzed using IBM Watson IoT for Manufacturing. Previously these inspections were done manually, which was often a slow and error-prone process. By bringing the power of Watson's real time cognitive insights directly to the shop floor in combination with ABB's industrial automation technology, companies will be better equipped to increase the volume flowing through their production lines while improving accuracy and consistency. As parts flow through the manufacturing process, the solution will alert the manufacturer to critical faults – not visible to the human eye – in the quality of assembly. This enables fast intervention from quality control experts. Easier identification of defects impacts all goods on the production line, and helps improve a company's competitiveness while helping avoid costly recalls and reputational damage.

Real-time Cognitive Insights to Smart Grids - In another example ABB and IBM will apply Watson's capabilities to predict supply patterns in electricity generation and demand from historical and weather data, to help utilities optimize the operation and maintenance of today's smart grids, which are facing the increased complexity created by the new balance of conventional as well as renewable power sources. Forecasts of temperature, sunshine and wind speed will be used to predict consumption demand, which will help utilities determine optimal load management as well as real-time pricing.

About ABB - ABB is a pioneering technology leader in electrification products, robotics and motion, industrial automation and power grids, serving customers in utilities, industry and transport & infrastructure globally. Continuing more than a 125-year history of innovation, ABB today is writing the future of industrial digitalization and driving the Energy and Fourth Industrial Revolutions. ABB operates in more than 100 countries with about 132,000 employees.

ABB'S INTELLIGENT CENTER POINT ENERGY GRID TO MANAGE CRITICAL GRID OPERATIONS IN REAL TIME

CenterPoint Energy's intelligent grid is designed to provide best-in-class service to their 2.4 million metered customers in south east Texas. The new technology and the utility's storm response teams were put to test during a severe storm in 2016 with wind, lightning and wide spread flooding as well as road closures. More than 240,000 customers experienced interrupted service.

During the storm, more than 600 over head line fuses and 650 transformers were taken out of action, resulting in extensive outages. A swift restoration by the field crews was also hampered due to the road closures across Houston. This required the handling of a lot of data related to the power outages – to quickly understand the situation, prioritize actions and deploy resources.

The intelligent grid solution deployed by CenterPoint Energy has, at its heart, ABB's Network Manager advanced distribution management system. It uses information from the 2.4 million advanced meters and field sensors to enable real-time grid monitoring and control. It is integrated with ABB's Service Suite mobile work forcé management software and an advanced outage analytics package to tie it all together.

"We are proud to have contributed to CenterPoint Energy's digital transformation with intelligent grid solutions that deliver real-time actionable data and enable efficient misión critical response to events such as the Houston floods, making it posible to restore power to consumers quickly and efficiently" said Massimo Danieli, Managing Director of the Grid Automation business unit, a part of the company's Power Grids division. "Our ABB Ability based digital offering enables utilities to minimize the impact of outages, and supports our vision of enabling a stronger, smarter and greener grid."

The new technology installed over the last few years has helped CenterPoint to quickly identify, isolate and restore power following outages. In addition, advanced meters and data analytics provided immediate in sight into the situation so the right crews with the right equipment can be sent to restore the outage.

"Over the last few years our smart grid technology has reduced outages by more than 194 million minutes, enabled restoration of more than 1.5 million outage cases without a customer phone call, and saved consumers $20-25 million per year in eliminated fees from service automation. At the same time, we saved more than 1.65 million gallons of fuel, which is equivalent to more than 14,900 tons of carbondioxide emissions" said Kenny Mercado, Senior Vice President Electric Operations of CenterPoint Energy. "As a result of our Advanced Metering System and Intelligent Grid we have seen a 23 percent improvement in power reliability and are able to identify outages 50-70 percent faster."

In the case of a power outage the customers are notified by text, email or phone and they receive an estimated time of restoration, status updates and confirmation when their power supply is restored. The displays with in CenterPoint's control room show outage case details and available restoration resources, so controllers can quickly and effectively identify trouble spots and send field crews.

These digitalization efforts began in 2009 when CenterPoint Energy received a $200 million stimulus grant from the US Department of Energy to improve there liability and efficiency of the Houston power grid. The back drop was provided by HurricaneIke in 2008, when 1.9 million consumers were impacted by power outages and some of them left with out power for weeks. CenterPoint's digital transformation of the grid included automation of 31 substations; the installation of 866 intelligent grid switching devices on more than 200 distribution circuits, and distribution line monitors with remote terminal units. A wireless radio frequency mesh telecommunications network was also built across the utility's coverage area.

CenterPoint Energy has received many awards for its improved power reliability including the Edison Electric Institute's **"Emergency Recovery Award"** *earlier this year, for its outstanding power restoration efforts after the severe thunder storms and flooding that hit Houston in 2016.*

Please no matter how we advance technologically, please don't abondon the book. There is nothing in our material World more beautiful than the book.

- PATTI SMITH

INTERNATIONAL COPPER ASSOCIATION INDIA

The International Copper Association India (ICAI) is a member of Copper Alliance and the Indian arm of the International Copper Association Limited (ICA), the leading not for profit organization for the promotion of copper worldwide set up in 1959.

ICA India was formed in 1998 to actively associate with the growing number of copper users in India. The objective is to *"Defend and grow markets for copper based on its superior technical performance and its contribution to a higher quality of life worldwide"*.

ICA India conducts various programmes in the interest of Electrical Safety, Energy Efficiency and Sustainability. Employing a mix of market development and regulation advocacy approach to encourage the use of copper.

Thereby, accelerating changes and transforming the long-term markets for Copper in a sustainable way through its various major initiatives such as:

Encourage safe house wiring practices in the Building Construction sector Increase awareness of Power Quality through Asia Power Quality Initiative (APQI) Platform Propagate the use of Energy Efficient Motors for energy savings in Industries Promote 5 mm Microgroove Copper Tube heat exchangers technology to OEMs Promote the use of High Energy Efficient Motors and Copper Motor Rotors to Industries Reduce distribution losses in the Power sector through the use of low loss Distribution Transformers Encourage Renewable Energy Technologies like solar water heaters ICA India drives its initiatives through seminars, workshops and training programs across India in collaboration with other organizations, institutions and trade bodies. It also publishes technical handbooks and information booklets and brochures aimed at spreading general awareness of the benefits of Copper. The organization receives support from its global-level members and from major Indian copper producers, fabricators, cable and wire manufacturers and EE motor manufacturers. Other global development organizations also support some of ICA India programs.

About ICA and Copper Alliance

ICA and the Copper Alliance™ are responsible for guiding policy and strategy and for funding international initiatives and promotional activities. Headquartered in New York, the organization has offices in four primary regions: Asia, Europe and Africa, Latin America and North America.

Copper Alliance™ programs and initiatives are executed in nearly 60 countries through its regional offices and 26 copper promotion centers. This network of global copper centers and industry leading members have been unified under a common brand and visual identity referred to as Copper Alliance™.

We focus our efforts in three areas:

1. Market Growth
2. Market Defense
3. Market Access
   - ➢ We provide the industry with a license to operate
   - ➢ We protect market access and develop strategies that drive demand
   - ➢ We develop new copper markets
   - ➢ We reposition existing copper application more favourably versus competitive materials
   - ➢ We connect copper and copper industry in a positive way with critical areas of societal concern

Building wire program aims to promote electrical safety. The objective is to ensure that the international electricity safety standards and codes are embraced by all the electricity users in India and Bangladesh by apprising them of the benefits of following the established right wiring practices mainly Copper wires and thus, avoiding fire or other accidents.

For achieving these objectives, ICAI is working on discouraging users from usage of lower denomination cross section wires at or below 1 mm^2 in buildings and increasing the minimum denomination of these wires to 1.5 mm^2.

Considering the need for applying these standards to old buildings too, ICAI is working for making it mandatory for periodic inspection of such buildings and for ensuring that they follow the right wiring practices during renovation or rewiring.

Key Highlights

- Training Program: About 15,000 new electricians and electrical contractors were addressed in 2013-14 through 245 seminars on **"Electrical Safety in Buildings"** across the country covering 24 states.
- Improved Wiring Standards: ICA India has convinced 15 state PWDs out of 24 state PWDs to specify Copper (earlier Aluminium & Copper) as the only conductor for wiring within all government buildings. Minimum 1.5 mm2 diameter was specified for light load, a shift from 0.75 mm2/ 1.00 mm2.
- Promotion of Standards: For promoting the revised "National Electrical Code" (NEC-2011), Promotion Campaign was taken up by organizing seminars in sixteen major towns during 2013 - 2014 with focus on electrical safety aspects to be followed during electrical installations in buildings in accordance with the latest revision in NEC-2011.

Power Quality and Reliability **is the key to successful delivery of quality product and operation of an industry. It is now even more critical to the industry because of increasing application of electronic loads and electronic controllers which are sensitive to the quality of power supplied. These can have serious economic consequences and cost business millions of rupees each year in revenues loss, process improvements, and scrapped product. There is a dire need for all concerned to discuss the business of power quality and the latest technologies for improving power system efficiency and reliability.**

The proliferation of computers and other sensitive devices throughout our manufacturing and office environment has fostered the need to design the electrical systems of buildings and industrial establishments with an eye toward power quality issues. Poor power quality affects the reliable operation of machines, systems, automation, equipments, processes and computer-based equipment, which are now so ubiquitous. Often more important than the physical effect on the equipment is the loss of productivity resulting from equipment failure, mis-calculations and downtime. The vast majority of power quality problems in any installation originate within the same establishment or utility. The most serious consequence of poor power quality, frequently, is not the physical hardware that may be damaged, but the lost data, reduced productivity, costly downtime and poor product quality. Like most ailments, they are much easier and cheaper to prevent than to diagnose and cure.

The Institute of Electrical & Electronic Engineers (IEEE), various government agencies and other organizations have been studying these problems and effects for several years. As a result, they have issued design guidelines and recommended practices that are known to greatly mitigate, if not eliminate, the incidence and severity of power quality related problems.

There are a variety of techniques that can help prevent or alleviate the effects of poor power quality. Amongst others, the simple solution is to involve better electrical designs and installation of additional wiring. These techniques are inexpensive to install, especially when an installation is undergoing construction and they may also be cost effective during retrofits.

5 mm MicroGroove Copper Tube Heat Exchangers

The "less is more" principle popularized by American inventor R. Buckminster Fuller is especially apt with respect to coil designs for air-conditioning and refrigeration appliances. Demands to increase energy efficiency and lower material costs forces manufacturers to reconsider their coil designs. Also, concerns about the atmosphere are driving manufacturers to reduce refrigerant volumes and minimize the ozone depletion potential (ODP) and global warming potential (GWP) of refrigerants.

Copper Tubes are the HVAC Industry Standard for a reason

Condenser and evaporator coils with round copper tubes and aluminum fin have been a winning combination in the HVAC industry for many years. Manufacturers appreciate the assembly advantages provided by these components, and technicians find it easy to join and repair copper tubing in the field. More importantly, this well established technology has a proven record of durability and a high level of customer satisfaction. Demands for lower costing, energy efficient, environmentally friendly alternatives have moved the copper tube industry toward tubing that is smaller in diameter. The advantages of smaller tubes include higher heat transfer, less refrigerant and smaller unit size.

Overall Benefits of Economical, Eco-friendly MicroGroove Copper Tubes

Demands for reduced raw materials costs and the use of environmentally friendlier refrigerants have been the impetus for heat exchanger designs that are based on smaller diameter copper tubes. Reducing the tube diameter achieves weight and material cost reductions, increases compatibility with new refrigerants, and increases energy efficiency, all without compromising quality. In addition, the advantages of using copper — familiar manufacturing processes, recyclability, sustainability, durability and corrosion resistance — are maintained. Energy efficiency and reduced overall system size can be achieved at a lower material cost with smaller diameter tubes. Smaller tubes result in reduced usage of tube materials, fin materials and refrigerants, contributing to overall reduction in system cost.

MicroGroove Copper Tubes Equal Increased Heat Transfer

The goal in residential and commercial air conditioner design and manufacture is to reduce cost and increase energy efficiency. Copper is a means for achieving that goal. Smaller diameter tubes allow for higher heat transfer efficiency because the refrigerant flow is closer to the tube wall than it is in larger diameter tubes. Because smaller diameter tubes can be designed with a higher **"heat transfer coefficient",** they can achieve the same performance as larger diameter tubes with less tube and less fin.

MicroGroove Copper Tubes Work Well Under High Pressure

The inherent strength of smaller diameter tubes is an advantage, especially in light of the higher pressure requirements of modern refrigerants. Although the number of tubes in an evaporator or condenser is likely to increase with smaller diameter tubes, potential increases in weight can be offset by more compact coils resulting from higher heat transfer efficiency.

Fin Designs for MicroGroove Copper Tubes

Fins can be made from aluminum or copper. In either case, less fin material is required for coils with small diameter copper tubes compared to larger diameter tubes. Since less fin material is required, copper fins are an attractive alternative fin material, providing advantages with regard to corrosion resistance.

Manufacturing MicroGroove Copper Tubes

Copper tubes are produced by a number of different processes, but they all allow efficient and economical production of sizes from very large to very small diameters. For air conditioning and refrigeration applications, the tubes are provided with inner surface enhancements to increase the surface area. Rifling or grooving the inside of the tube helps to mix the refrigerant, homogenizes.

The refrigerant temperature across any tube section and improves heat transfer performance. Reducing the diameter of the tube contributes to the mixing or refrigerant turbulence, further improving heat transfer. Existing air-conditioner coils comprised of round copper tubes and aluminum fins (CTAF coils) typically are mechanically assembled using tube expansion. MicroGroove copper tubes also can be assembled using tube expansion with minor modifications to the expansion tube.

2013 Air Con Industry Report

Indian room air conditioners market was estimated to be 3.5 mn units in 2013 with a penetration of 3% in the Indian market. This market is expected to grow by 15% annually in next few years mainly due to raising income levels, urbanisation, expansion of modern retail and exclusive company's outlets. Over the past few years, rural market has registered impressive growth and is expected to grow by CAGR of 31% from 2006 to 2016 whereas urban market is expected to grow by CAGR 12% during the same period. Preference for quitter RACs, aesthetic looks and energy efficiency has resulted in increasing share of split RACs with a market share of 83% in 2013.

The economic, social and environmental aspects of sustainable development rely on the complex optimization of many factors, including resource conservation, waste minimization, energy efficiency, climate change mitigation, longer product life cycles, and effective recycling. Copper, the "green" material, plays an important role in all of these solutions. Energy efficiency is of dominant importance nowadays due to increasing electrical energy demand, increasing awareness of Global warming & increase in prices of fossil fuels. Bridging this gap from the supply side is a very difficult and expensive proposition. The only viable way to handle this crisis, apart from capacity addition, is the efficient use of available energy, which is possible by using energy efficient devices. Electric motors are a basic need of industry. Motors and motor driven systems are huge consumers of electricity, they are estimated to account for 43%-46% of all global electricity consumption & Moreover electrical motor driven systems consume approximately 70% of energy consumed by the industry. If the entire world were to adopt a least life cycle approach to motor systems, the energy efficiency savings potential is 3,890 billion kWh p.a. by 2030, nearly 30 percent of the total. However, the penetration of energy efficient motors remains low in India and at the same time, below IE1 motors have a substantial market share. Harmonization of the current Indian Standards with IEC 600034-30 shall enable the promulgation of labelling up to IE3 / IE4 and the phase-out of below IE2 motors. Electrical energy consumption can be greatly reduced by replacing older, worn out motors with energy-efficient equivalents and specifying energy efficient motors in new equipment. Such practices not only lower energy costs but also improve equipment reliability.

Essential to consider Least Lifecycle Cost:

Energy efficiency improvements are usually technically simple, relatively low cost and quick and easy to implement. Often, it is simply a matter of sensible purchasing decisions, **buying the unit with the lowest lifetime cost rather than the one with the lowest purchase price.**

Copper Die-Cast Rotor Technology for Induction Motors & Pumps

The electrical efficiency of motors can be improved by replacing the standard aluminium electrical conductor in the motor rotor with copper, which has a much higher electrical conductivity. Until recently, die-cast motor rotors were produced only from aluminium while researchers worked on solving technological issues with copper pressure die-casting. Today, copper pressure die-casting is a proven technology and thousands of die-cast copper motor rotors are produced annually for motor applications where energy savings are prime design objectives. The use of copper in place of aluminum for conductor bars and end rings of induction motor rotors results in improvements in motor energy efficiency due to a significant reduction in IR losses. Motor modelling by a number of manufacturers has demonstrated that motors with copper rotors yield overall rotor loss reductions from 15 to 20% compared to aluminum. The advantages of motors with copper motor rotors on an equivalent basis with aluminium include the following;

- They generate less heat and reduce thermal stresses, including those on insulation, which enable them to operate longer.
- The increased electrical conductivity of the copper rotor material plus the need for a smaller volume of steel enables the motors to be shorter in length.
- Motors have 1-5% higher energy efficiency ratings, so therefore consume less energy.
- Motors have lower overall manufacturing costs.

Current and potential applications for motors incorporating die cast copper rotors

Application	Driver
Agricultural pumps	Efficiency, torque
Water circulation pumps	Efficiency, torque
Oil well pumps	Efficiency, torque
Aeronautic applications	Low volume, high speed
Refrigeration compressors	High efficiency
Ceiling conveyor belt	Low Weight

Copper as a choice for rotors in Motors & Pumps:

Transformers are among the most efficient machines ever designed by mankind, and are usually built of copper or aluminum. As copper has conductivity almost twice that of aluminum, it is often preferred in transformer construction. The largest power transformers have efficiencies at full load of 99.75%. Distribution copper-based transformers are smaller, less efficient and more lightly loaded. Transformers in urban distribution (typically 250-1,000kVa) may lose 1-2% of energy transformed as heat. For smaller transformers in rural areas (50-100kVa), efficiency in operation can be as low as 95%.

Most of the distribution transformers installed by the State Electricity Boards use high levels of energy which results in huge losses. A large number of Distribution Transformers used in India, particularly in smaller ratings such as 25KVA, 63KVA, 100KVA (11KV/415V, 3 phase) use conventional materials and methods of manufacture, resulting in very high losses.

The failure rate of these transformers is very high, around 16% (in Govt. SEBs), which is not favourably comparable to international norms of 1 to 2%. Further the life of these conventional transformers is very low (6-8 years). The higher failure rate also adds to the already high Transmission & Distribution (T&D) losses in the power distribution network of SEBs.

Why Choose Copper

The advantages of using Copper in transformer windings:

- Inherent low loss material
- Special skills not needed during jointing and termination (significant percentage of transformer failure can be attributed to defective joints and termination)
- Copper scores over Aluminium in several respects such as conductivity, resistance, thermal conductivity, better withstanding capability during short circuit, etc.
- Easy availability and competitive pricing favours **"Copper"** usage.

The attributes of copper for electrical applications is well appreciated due to its better electrical conductivity. The advantages of using copper include:

- Improved Performance by way of reduced losses and higher Efficiencies and reduced temperature rise
- Increased power density resulting in reduced size (Less power to space ratio) and reduced active material content resulting in material cost reduction

With the technological breakthrough in copper die casting, now it is economically viable for mass production of copper rotors. In india copper rotors are commercial viable, and are supplied by KITRA industries, who has done continuous R&D for developing good quality rotors with world's lowest process cost & are supplying commercially in large quantities.

Switch to IE2 / IE3 EE Motors

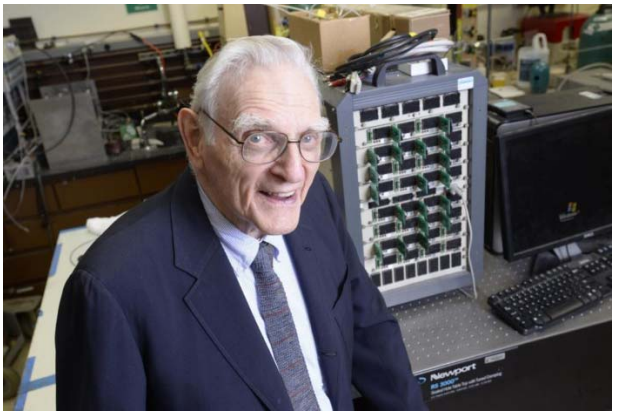
Benefits of Energy Efficient Motors:

Many efficient motors run cooler and are more likely to withstand voltage variations and harmonics than standard motors.

Many efficient motors have a slightly higher power factor on average than their standard counterparts.

Most efficient motors operate more quietly than standard motors.

LITHIUM-ION BATTERY INVENTOR INTRODUCES NEW TECHNOLOGY FOR FAST-CHARGING, NONCOMBUSTIBLE BATTERIES



A team of engineers led by 94-year-old John Good enough, professor in the Cockrell School of Engineering at The University of Texas at Austin and co-inventor of the lithium-ion battery, has developed the first all-solid-state battery cells that could lead to safer, faster-charging, longer-lasting rechargeable batteries for handheld mobile devices, electric cars and stationary energy storage. Good enough's latest breakthrough, completed with Cockrell School senior research fellow Maria Helena Braga, is a low-cost all-solid-state **battery** that is noncombustible and has a long cycle life (battery life) with a high volumetric **energy density** and fast rates of charge and discharge. The engineers describe their new technology in a recent paper published in the journal *Energy & Environmental Science*.

"Cost, safety, energy density, rates of charge and discharge and cycle life are critical for battery-driven cars to be more widely adopted. We believe our discovery solves many of the problems that are inherent in today's batteries," Good enough said.

The researchers demonstrated that their new **battery cells** have at least three times as much energy density as today's lithium-ion batteries. A battery cell's energy density gives an electric vehicle its driving range, so a higher energy density means that a car can drive more miles between charges. The UT Austin battery formulation also allows for a greater number of charging and discharging cycles, which equates to longer-lasting batteries, as well as a faster rate of recharge (minutes rather than hours).

Today's lithium-ion batteries use liquid electrolytes to transport the lithium ions between the anode (the negative side of the battery) and the cathode (the positive side of the battery). If a battery cell is charged too quickly, it can cause dendrites or "metal whiskers" to form and cross through the liquid electrolytes, causing a short circuit that can lead to explosions and fires. Instead of liquid electrolytes, the researchers rely on glass electrolytes that enable the use of an alkali-metal anode without the formation of dendrites.

The use of an alkali-metal anode (lithium, sodium or potassium)—which isn't possible with conventional batteries—increases the energy density of a cathode and delivers a long cycle life. In experiments, the researchers' cells have demonstrated more than 1,200 cycles with low cell resistance.

Additionally, because the solid-glass electrolytes can operate, or have high conductivity, at -20 degrees Celsius, this type of battery in a car could perform well in subzero degree weather. This is the first all-solid-state battery cell that can operate under 60 degree Celsius.

Braga began developing solid-glass electrolytes with colleagues while she was at the University of Porto in Portugal. About two years ago, she began collaborating with Good enough and researcher Andrew J. Murchison at UT Austin. Braga said that Good enough brought an understanding of the composition and properties of the solid-glass electrolytes that resulted in a new version of the electrolytes that is now patented through the UT Austin Office of Technology Commercialization.

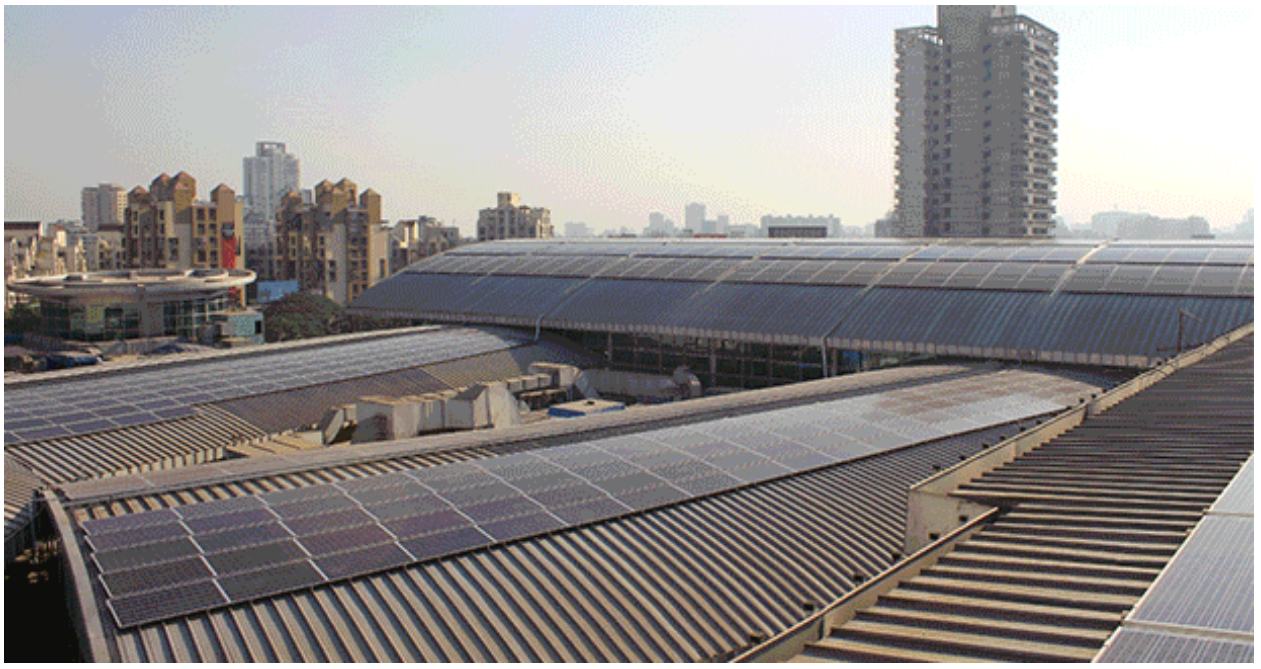
The engineers' glass electrolytes allow them to plate and strip alkali metals on both the cathode and the anode side without dendrites, which simplifies battery cell fabrication.

Another advantage is that the battery cells can be made from earth-friendly materials.

"The glass **electrolytes** allow for the substitution of low-cost sodium for lithium. Sodium is extracted from seawater that is widely available," Braga said.

Good enough and Braga are continuing to advance their battery-related research and are working on several patents. In the short term, they hope to work with battery makers to develop and test their new materials in electric vehicles and energy storage devices.

MUMBAI'S VIVIANA MALL INSTALLS INDIA'S LARGEST ROOFTOP SOLAR PLANT



Viviana Mall in Mumbai has installed one of the largest single-site solar plants in India.

The mall, located in Thane, has constructed a 900,000 volt-ampere rooftop solar power plant, which the company said was the biggest in India.

900,000 volt-ampere refers to the peak capacity of the power plant. It implies that at full power (during noon on a sunny day for example), you can power 80,000 LED lamps using the electricity generated by the rooftop panels, or operate 9,000 LCD televisions.

The plant will be able to generate about 720 units of electricity per hour, or about 3,033 units in one day (panels are assumed to work only for about 4.2 hours a day due to limited sunlight availability).

A plant of that size can generate enough power to meet the entire electricity needs of 100-150 households.

The mall expects to save 30% of its electricity usage by using solar energy and aims to generate around 33 lakh unit of electricity in the next three years.

"This is in sync with the initiative of Prime Minister, NarendraModi's vision to raise renewable capacity to 175 gigawatts by 2022 from 45 gigawatts at present," said Sheth Corp, the company that owns the shopping destination.

Solar power is seen as the primary solution to the global warming crisis that is staring the world in its face. It is expected that if the world continues to use fossil fuels at the current rate, human life will become difficult on the planet in around 150 years or so.

"We believe solar is the power of our future. We as a part of the society are taking a small step towards saving energy by installing solar power plant in the mall. We received full co-operation, guidance and support from all concern government departments. We also aim to increase the power generation in coming years by 15 per cent and would want to be known as the greenest mall of India," said AshwinSheth, Chairman and Managing Director, Sheth Corp &Viviana Mall.

PLASTIC BAGS ARE NOT BIO-DEGRADABLE & DO NOT DECOMPOSE FULLY

Where as paper bags are Reusable & Bio-degradable. You have altered your House, your Car & Life style. But still you spread the Cause & Need to save your Environment. Promote & Make Use of Solar Energy for pollution free. ***Say no to Plastic bags.***

TECHNICAL SEMINAR PHOTOS – 25.03.2017

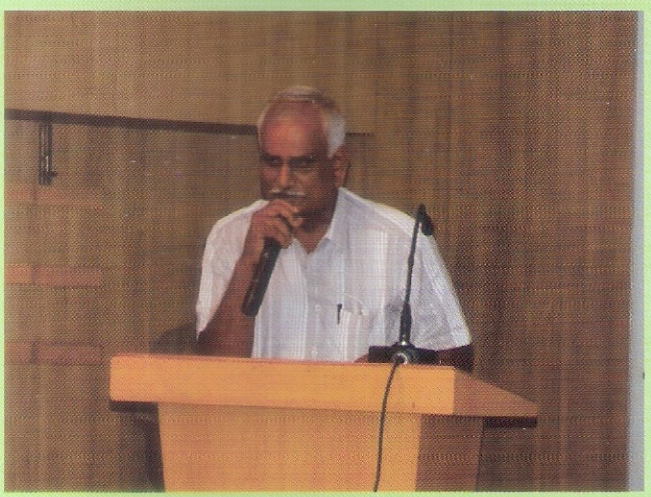
TNEIEA Members

Speech by Mr. **N. N. Baranidharan,**
Member, Erode, TNEIEA

Left to Right: **Mr. S. Ponnambalanathan**, *Vice President, Madurai, TNEIEA;*
Er. S. Gopalakrishnan, *Secretary, TNEIEA;*
Er. S.D. Poongundran, *President, TNEIEA;*
Mr. K.S. Bimal, *Vice President, M/s. LUKER Electric Technologies Pvt. Ltd.;*
Er. M. Balamurugan, *Treasurer, TNEIEA*

Delegates at the Meeting

Special address by
Er. S.D. Poongundran,
President, TNEIEA



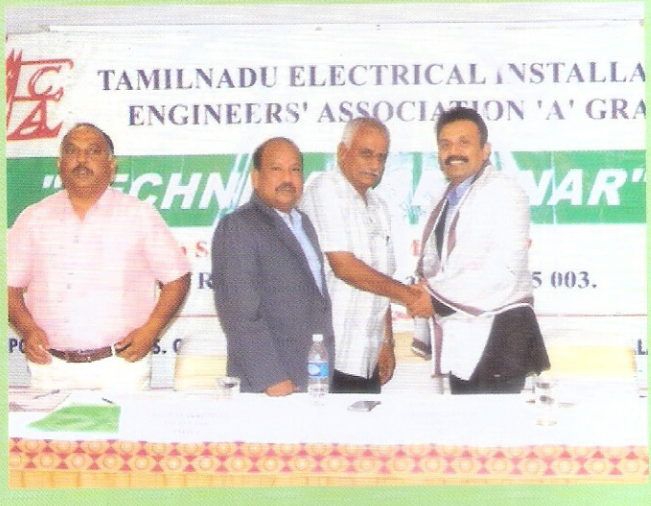
Welcome address by
Mr. S. Ponnambalanathan,
Vice President, Madurai, TNEIEA

Technical papers presentation by
Mr. K.S. Bimal, *Vice President*,
M/s. LUKER Electric Technologies Pvt. Ltd.

Technical Session

Speech by **Mr. M. Aathimoolam**,
Design Engineer,
M/s. LUKER Electric Technologies Pvt. Ltd.

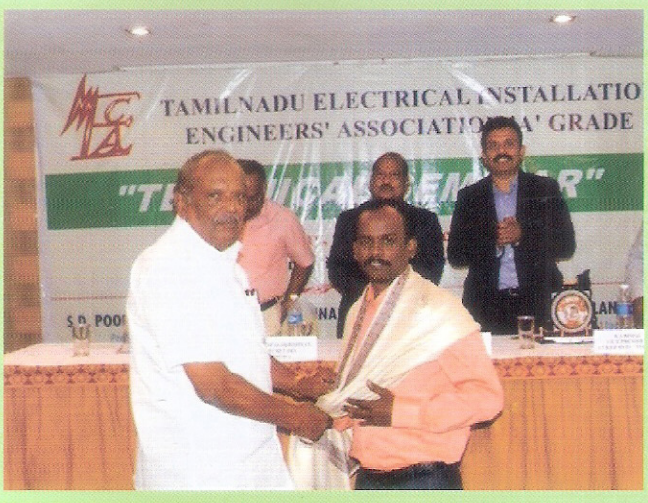
Technical Session



Mr. S. Ponnambalanathan,
Vice President Madurai, TNEIEA honouring
Mr. K.S. Bimal, *Vice President*,
M/s. LUKER Electric Technologies Pvt. Ltd.

Mr. D. Santhanam, Member *TNEIEA*
honouring
Mr. K.S. Bimal, *Vice President*,
M/s. LUKER Electric Technologies Pvt. Ltd.

Mr. R. Sathiyamurthi, *Member, Theni, TNEIEA* honouring
Mr. M. Aathimoolam, *Design Engineer, M/s. LUKER Electric Technologies Pvt. Ltd.*



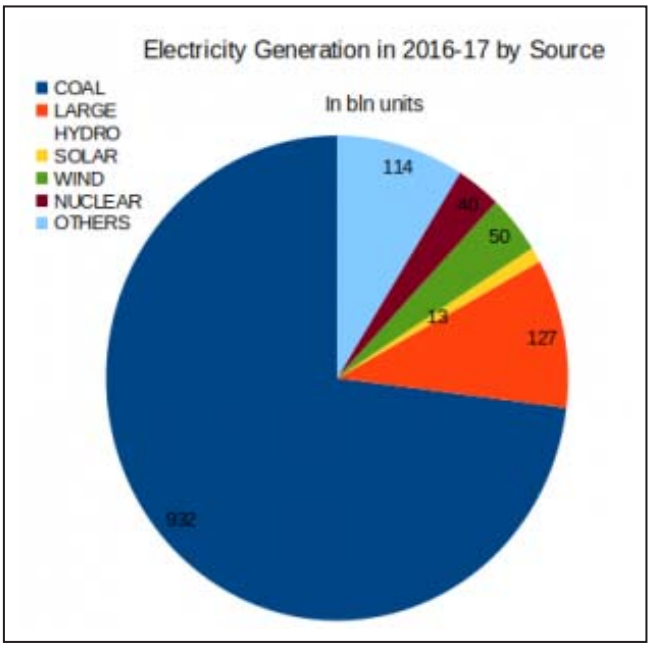
Mr. J. John, *Vice President Thirunelveli, TNEIEA* honouring
Mr. Justin Diraviam, *Proprietor, M/s. Es. Je. Electro Systems, Madurai.*

Mr. R. Muralidharan, *Vice President Cuddalore, TNEIEA* honouring
Mr. S. Ponnambalanathan, *Vice President Madurai, TNEIEA*

Vote of Thanks by
Mr. S. Gopalakrishnan,
Secretary, TNEIEA

SOLAR POWER OUTPUT UP 75% THIS YEAR, BUT STILL ONLY 1% OF TOTAL

Production of electricity from solar power is all set to rise 75% this year, while that from wind is on track to rise 51%, according to the latest numbers available with the ministry of new and renewable resources, government of India.



Despite this, the two will only account for less than 5% of the total power produced.

The higher production figures for solar are largely in line with the growth in installed capacity.

Total grid-connected solar power generation capacity is set to rise from about 6 GW in March 2016 to about 10 to 11 GW at the end of March, though that is well below the target of 12.7 GW.

Together, the power production from alternate sources will go up by 28% in the ongoing financial year, going by the trends seen in the ten months from April 2016 to January 2017. The financial year is due to end this month.

The overall growth rate for power production from alternate energy would have been higher but for a steep fall in the production of power from the burning of sugarcane bagasse, which is considered a 'green' source as sugarcane sucks up more carbon dioxide that is released at the time of the combustion of the waste material.

STILL MINUSCULE

Despite the hype surrounding the increasing generation capacity of solar and wind, the absolute power generation figures are far more modest.

For example, against India's capacity to produce about 250 GW of power by burning coal, it has a capacity of about 28 GW of wind power and around 10 GW of grid-connected solar.

In other words, the wind capacity is equal to 11% of the total thermal capacity, while solar is 3.2%.

However, in actual production of electricity, both are even further behind.

For example, solar produced about 10.56 billion units (kWh) of electricity in India in the first ten months of this year and is likely to end up producing close to 13 billion units for the full year.

Assuming that the average capacity for the year is around 8.5 GW, this implies a production rate of about 1.52 billion units of power per GW. This also represents an efficiency (or load) of 17.5% — which is superior to the 14-15% seen in European countries.

However, these output numbers are dwarfed by the figures for coal-based powers.

The 250 GW of coal-power plants produced 827 billion units of electricity in the first 324 days of this year, implying that they are on track to outputting around 932 units for the full year.

In other words, though solar accounts for 3.2% of the capacity of thermal plants, the actual production this year is likely to be only 1.4% of their output.

This is because of the higher efficiency of coal plants, which can be run 24 hours a day. Per GW of capacity, coal plants are on track to produce 3.73 billion units compared to only 1.52 billion for solar and 1.79 for wind.

OVERALL ENERGY MIX

The numbers reveal that alternate sources of power are likely to contribute about 85 billion units out of the total 1276 billion units of power produced in India in 2016-17.

Within this, the share of solar will be a 1.02%, while wind will contribute 3.92%.

Large hydropower plants, which are also 'renewable' power, will contribute about 127 bln units or 10% of the total.

SCHNEIDER ELECTRIC INDIA AFFIRMS COMMITMENT TO ENERGY EFFICIENCY THROUGH RESEARCH IN LOW TECHNOLOGIES

Further reiterating its commitment to energy efficiency and access to clean energy, Schneider Electric India, today showcased a range of low-cost clean technologies which were on display at the catamaran as part of the Nomade des Mers (Nomad of the Seas) expedition. The expedition – which began in 2015 at Brittany (France) and will conclude in Indonesia – arrived at the Chennai port on April 11, 2017, after passing through Morocco, Senegal, Guinea Bissau, Cape Verde, Brazil, South Africa, Madagascar, Mozambique, the Maldives and Sri Lanka. The Schneider Electric Foundation, under the aegis of Fondation de France, is a key patron of the expedition to aid research and promote low technologies (low tech).

The mission of the Nomade des Mersproject, is to showcase useful, simple and accessible technologies that are also environmentally friendly: low technologies. The catamaran will spend three years travelling the globe testing independent technologies and developing the international low-tech stakeholder and user community. On board, low-tech devices will be put to the test, optimized and linked to others to assess synergies toward achieving a self-sustaining ecosystem.

Speaking about the expedition, Nadine Bouquin, Vice-President Offer Creation & Governance, Schneider Electric said, "Schneider Electric Foundation is delighted to act as main patron of this project and support the expedition which is very much aligned to our commitment towards promoting sustainable low cost technology and solutions for a greener future. We believe such iconic projects have a profound effect on people and are stepping stones to address the worldwide challenge of climate change."

The arrival of the ship at the Chennai port was celebrated by Schneider Electric at its Chennai plant with a contest amongst chosen employees, trainees and engineering students on innovative technologies. The objective of the event was to create innovative low tech solutions for a greener future. The winning solution would be displayed and showcased in the ship and will be a part of it in the rest of its expedition.

Present at the occasion, **Mr Ramesh Phatak**, R&D Head, Schneider Electric India said, leveraging scale economies with low technologies is a powerful answer to bolster energy access for a country like India, which has one of the lowest per-capita energy consumption. "These low-cost technologies are simple, cheap and easy to build system designed to tackle basic needs while respecting the environment. The prototype low-cost technologies can play an important role in meeting energy needs in isolated and off-grid areas as well as further add to the momentum established with regard to making India a net exporter of power", added Mr Pathak.

Describing a phenomenon of "Energy Dilemma", Mr Phatak said that the fastest growing sources of environmental impact are not necessarily the tangible, visible ones; although they may dominate the debate and agenda. Increasingly significant are the 'unseen' consequences of technology like e-commerce, virtual reality, remote services, big data, remote collaboration, mobility, the Internet of Things etc.; all of which are instinctively perceived as comparatively 'environmentally friendly' but whose impacts – often, far away from the end user - can be equally pervasive.

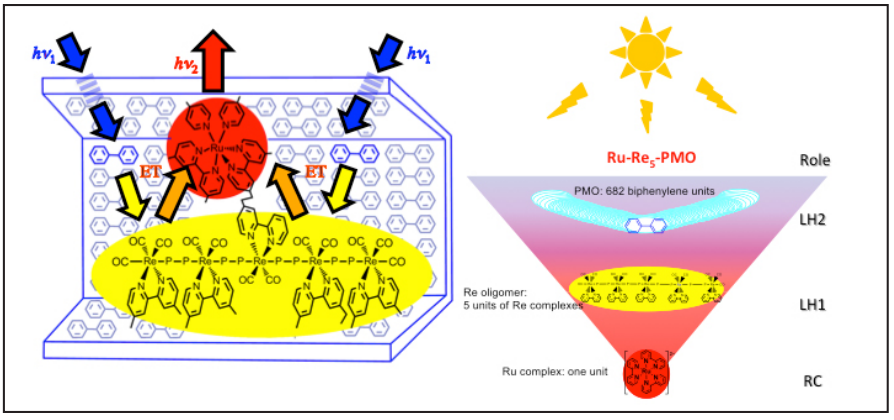
The solutions achieved through the research will be prototyped and submitted for approval by a jury of experts with the long-term ambition of creating a veritable "library" of tutorial videos open to everyone (individuals, NGOs in the field and local entrepreneurs, etc.). As a financial, technological and human patron of Nomade des Mers, the Schneider Electric Foundation will harness the skills and expertise of Schneider Electric employees for the expedition. At each stop, volunteers of the Schneider Electric Teachers association will be able to take part in events, share their knowledge and pass along their skills. In addition, recognized technical experts who have been granted Schneider Electric's "Edison" label will be invited to participate actively in LowTech Lab by collaborating on studies on selected technologies and sharing results from some of their research.

About the Schneider Electric Foundation

Created in 1998, the Schneider Electric Foundation, under the aegis of the Fondation de France, has worked together with its partners to implement solutions to address the energy issues faced by the world's most underprivileged people. In emerging economies, the Foundation supports professional training programmes in energy-related trades, thereby contributing to the Schneider Electric Access to Energy program. In mature economies, the Foundation fights against fuel poverty by offering training and awareness-raising programs for the concerned households. The Schneider Electric Foundation pays special attention to the involvement of its employees across all programs. **For more information about the Schneider Electric Foundation and its work, please visit:** *http://www.schneider-electric.com/en/about-us/sustainability/foundation.jsp.*

LIGHT-HARVESTING: MIMICKING PHOTOSYNTHESIS WITH MAN-MADE LEAVES

A new, efficient light-harvesting system based on the principles of natural photosynthesis is developed by researchers at Tokyo Tech.



Scientists have long been trying to emulate the way in which plants harvest energy from the sun through photosynthesis. Plants are able to absorb photons from even weak sunlight using light antennae made from chlorophyll molecules in their leaves. This absorbed energy is then transferred to reaction centers wherein the plants create the sugars they use as food. So far, artificial systems built to replicate this super-efficient natural process have been limited to a single reaction center with a few light absorbers, and have been unable to absorb enough energy from light sources with low photon levels such as sunlight.

Now, Osamu Ishitani at the Tokyo Institute of Technology, along with researchers from Toyota Central R&D Labs, Inc., has created an efficient, artificial light-harvesting system based on the natural two-step process of photosynthesis. The new system uses man-made 'leaves' as light absorbers, which relay energy through a metal complex to feed a final energy acceptor.

"It is difficult to make an efficient solar-energy converter using molecular devices such as so-called photocatalysts because the molecules are so small and solar light is so dilute," explains Ishitani. "Such systems would require huge numbers of molecular devices, which are expensive and time-consuming to make. Introducing devices with the ability to harvest light into solar-energy conversion would be one possible solution."

Ishitani and his team realized that building a system with multiple light absorbers feeding a smaller number of energy relay 'antennae' linked to an energy acceptor would allow more photons to be absorbed from dilute light, with less energy being lost along the way.

The researchers created a device with 440 'leaves' using tubes made from so-called periodic mesoporousorganosilica (PMO) and light-absorbing biphenyl (Bp). The PMO-Bp complexes were linked to five connected rhenium metal sticks, which transferred the light energy harvested by PMO-Bp directly to a central ruthenium sphere. In this way, the photons from the light source were concentrated very efficiently, first through the rhenium sticks and then into the ruthenium reaction center, with little loss of energy en-route.

In a series of tests using the new system, Ishitani and his team found that the reaction center of their device was capable of emitting a strong light powered by the photonic energy from the man-made 'leaves'.

The new system could be used to build better photocatalysts, which can be used for a number of purposes including CO_2 reduction and water oxidation photocatalysis. However, Ishitani and co-workers state that it will be some time before artificial photosynthesis becomes commonplace in such systems, because the process requires considerable further research and development.

NEC ENERGY SOLUTIONS TO BUILD AND OPERATE 50 MW OF GRID ENERGY STORAGE FACILITIES IN UK FOR VLC ENERGY

Facilities will provide Enhanced Frequency Response to the UK electricity grid

Feb 28, 2017 – Westborough, MA, USA and Tokyo, Japan – NEC Energy Solutions, Inc. (NEC ES), a subsidiary of NEC Corporation (NEC; TSE: 6701), announced today that it has signed a contract to build and operate a total of 50 MW of energy storage projects with VLC Energy, a new joint venture company created by Low Carbon, a renewable energy investment company, and VPI Immingham, the owner of one of the largest combined heat and power plants in Europe and part of the Vitol Group.

The projects, which include a 40 MW facility in Glassenbury, UK and a 10 MW installation in Cleator, UK will be the largest portfolio of battery sites connected to the UK grid once operational later this year. The Cleator and Glassenbury sites secured two contracts with National Grid in August 2016 for battery energy storage systems to provide Enhanced Frequency Response (EFR) to the UK system operator.

NEC ES will provide turnkey EPC and O&M services which includes its GSS® grid storage solution, installation and commissioning, and ten years of operations and maintenance services for each project. The facilities will be operated by NEC ES under the new EFR guidelines, will provide seasonal Triad avoidance services and will also participate in other markets. Project execution is already underway and the systems are expected to be installed and operational in November 2017.

Justin Thesiger, Operations Director, at Low Carbon, said, "We're delighted to work with NEC Energy Solutions to develop the UK's largest portfolio of energy storage plants for National Grid. These battery sites will pave the way for more renewable energy sources, such as solar power and wind energy, to be connected to the UK's overall power mix by helping to balance energy supply and demand more effectively. This in turn should help to challenge the causes of climate change and meet growing demand for renewable energy."

About NEC Energy Solutions - NEC Energy Solutions designs, manufactures, and integrates smart energy storage solutions for the electric grid and applications with critical power needs. Its megawatt-scale energy storage and control systems provide greater stability to the grid while maximizing renewable generation, while in telecom, datacenter, and other industrial applications, its high performance lithium-ion battery systems provide better value than traditional lead-acid batteries in tough, critical power applications. Learn more at www.neces.com.

About Low Carbon - Low Carbon is a privately owned investment company committed to the development and operation of renewable energy power production. Low Carbon invests into both renewable energy developers and projects across a range of renewable energy technologies including solar, wind, anaerobic digestion, combined heat and power, concentrated solar power and energy storage. Low Carbon has a strong management team with a proven track record in the development, construction, financing and management of renewable energy assets. For UK solar alone, Low Carbon has funded more than 320MW. Low Carbon remains involved in the projects for the long term with a dedicated asset management team that manages assets on balance sheet and for third parties (unlisted and listed). www.lowcarbon.com

About VPI Immingham - VPI Immingham is a combined heat and power (CHP) plant near Immingham, on the South Bank of the river Humber. It is one of the largest CHP plants in Europe, capable of generating 1,240 MW – about 2.5% of UK peak electricity demand and up to 930 tonnes of steam per hour, which is used by nearby oil refineries to turn crude oil into products such as gasoline. It is part of the Vitol Group, an energy and commodities company. Vitol's primary business is the trading and distribution of energy products globally – it trades over six million barrels per day of crude oil and products and at any time, has 200 ships transporting its cargoes. Vitol's clients include national oil companies, multinationals, leading industrial and chemical companies and the world's largest airlines. Founded in Rotterdam in 1966, today Vitol serves clients from some 40 offices worldwide and is invested in energy assets globally including; circa 15.5mm^3 of storage across six continents, 390kbpd of refining capacity and Shell-branded downstream businesses in 16 African countries, as well as Australia. Revenues in 2015 were $168 billion. www.vitol.com

Press contact(s): For all inquiries regarding NEC Energy Solutions, please contact: Roger Lin, rlin@neces.com, **+1-508-497-7261**

ENERGY CONSERVATION THROUGH ENERGY EFFICIENCY – 26

EMDS: The details gathered from the International studies and analysis are continued which are quite similar to Indian experience, except that the percentages of Electricity consumed by EMDS are much higher and the combined efficiency levels are still lower leaving lot of scope for improvements. Let us now look at some more dimensions and details of EMDS.

Demand by motor size

In terms of numbers of running motors (installed stock), small motors are the most common:

2 billion out of an estimated global total of 2.23 billion are rated at less than 0.75 kW. The relatively few large motors account for a considerable share of overall motor electricity consumption (Wikström, 2009). However, it is estimated that medium size motors consume almost three quarters of the global electricity demand of all motors (Table 1).

Demand by motor application

Table 1: Estimated electricity demand for the three major groups of electric motors (2009)

Motor Size	Output size, p_m (kw)				Operation		Number of running stock (millions)	Life – time (Years)	Sales (million / year)	Motor efficiency		Power (p_e)	Electricity demand (TWh / year)
	Min	Max.	Median	Total GW_m	Hours / Year	Load factor				Nominal	Mean	Total GW_e	
Small	0.001	0.75	0.16	316	1 500	40%	2 000	6.7	300	40%	30%	422	632 (9.1%)
Medium	0.75	375	9.5	2 182	3 000	60%	230	7.7	30	86%	84%	1 559	4 676 (67.6%)
Large	375	100 000	750	450	4 500	70%	0.6	15.0	0.04	90%	88%	358	1 611 (23.3%)
Total				2 948			2 231	6.8	330		79%	2 338	6 919 (100%)

Abbreviations: e = electrical m = mechanical p = power source = A+B international 2009

In these estimates of electricity demand disaggregated by motor application, the term motor application refers to the kind of machine that is driven by the shaft of the electric motor. Several layers of definitions exist, with the largest segment being rotating machines (Table 2).

Motor use in the sectors by application and complementing assumptions on motor electricity demand is broken down in the sector application matrix (Table 3). Motor electricity demand for mechanical movement (transport of people and goods) and compressors (compressed air and cooling) account for about 30% of total global electricity motor demand. The remaining part, of less than 40%, is consumed in equal amounts by fans and pumps (Figure 1).

The top down analysis provides several preliminary results:

- The estimated total global electricity use of all electric motors in 2006 was between 6 900 TWh and 7 200 TWh.
- Electric motors account for between 44% and 46% of total global electricity consumption; industry accounts for 64% of this, the commercial sector for 20% and the residential sector 13%.
- General purpose industrial electric motors of between 0.75 kW and 375 kW consumed 4 700 TWh (68% of the total for all motors); their share of global electricity demand is 30%.
- The three economies with the highest electricity consumption for motors are China, the United States and the European Union, which collectively consumed 4 000 TWh (56% of global electricity demand for motors); the addition of four more countries (Japan, Russia, Canada and India) adds another 1 200 TWh (18%), which makes a total of 5 200 TWh (74%).
- Four major motor applications dominate the electricity demand of motors: compressors (32%), mechanical movement (30%), pumps (19%) and fans (19%).

- The net mechanical energy used in motor applications is estimated to be roughly 50% of the electrical energy input into motors (*e.g.* on average it is thought electric motor systems operate at an efficiency of about 50%). The losses occur in the motors themselves as well as in throttles and dampers, gears, transmissions, clutches, brakes, VFDs, etc. (Figure 2).

Electric motors		Pumps	Drinking Water	Water/refrigerant	Sewage	Oil
Rotating machines	Application	Closed loop	Closed water supply system	Heating, cooling and chilling system	Pressure sewage system	Hydraulic pumps
		Open pipe	Water supply system	Irrigation, cooling tower	Sewage system	Pipeline
		Fans	Air	Gas		
			Room air supply and exhaust, blowers	Natural gas systems		
		Compressors	Refrigerant	Air	Gas	
			Cooling machines for air conditioning and commercial freezers, refrigerators and freezers	Compressed-air storage and distribution system, pneumatic systems	Liquification systems	
		Rotating/mix/stir	Roller, rotors	Extruder	Textile handling	Mixers, stirring
		Solid	Metal, stone, plastics	Aluminium, plastics	Weaving, washing, drying	Food, colour, plastics
		Liquid				Food colour, plastics
		Transport	People	Goods	Vehicles	
		Vertical	Passenger elevator	Goods, elevator, cranes, hoists		
		Inclinded	Escalator	Conveyor	Cog wheel train, cable car, ropeway	
		Horizontal	Conveyor	Conveyor	Train, tram, trolley, cars, buses, electric cars, bikes and bicycles	
Linear motors			Open/close	Sort	Grab and place	
Back and forth movement			Valve		Robot	
Stepper motor			Open/close	Position		
Angular position			Value	Servo		

Table 2: Applications of all kinds of electric motors

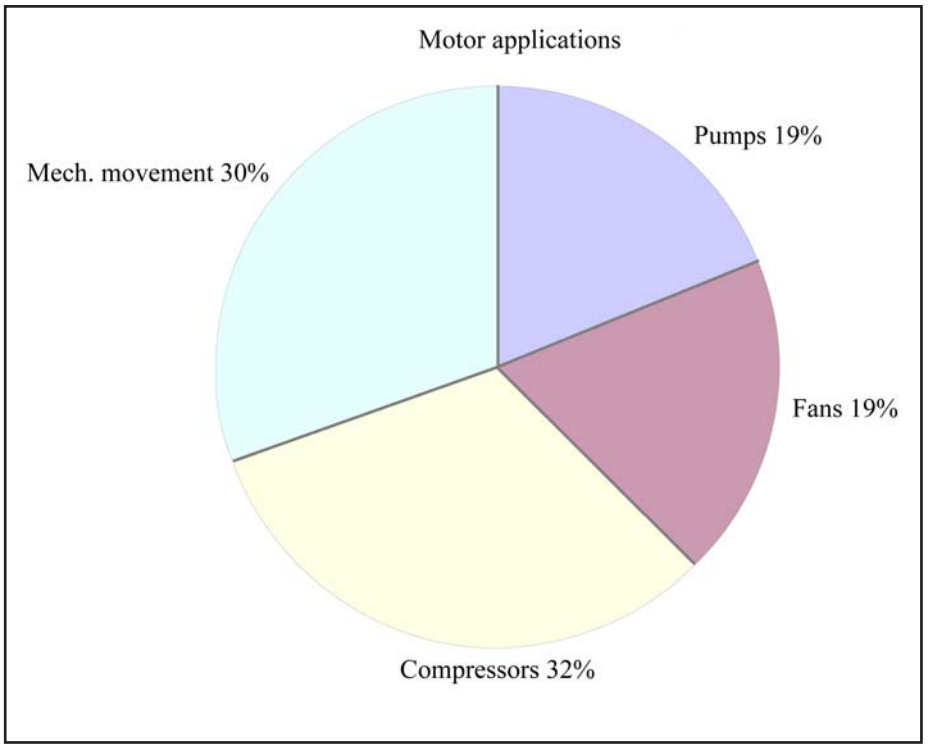


FIGURE 1: Estimated share of global motor electricity demand by application (2009)

Source: De Almeida et al. 2008b; A+B International, 2009.

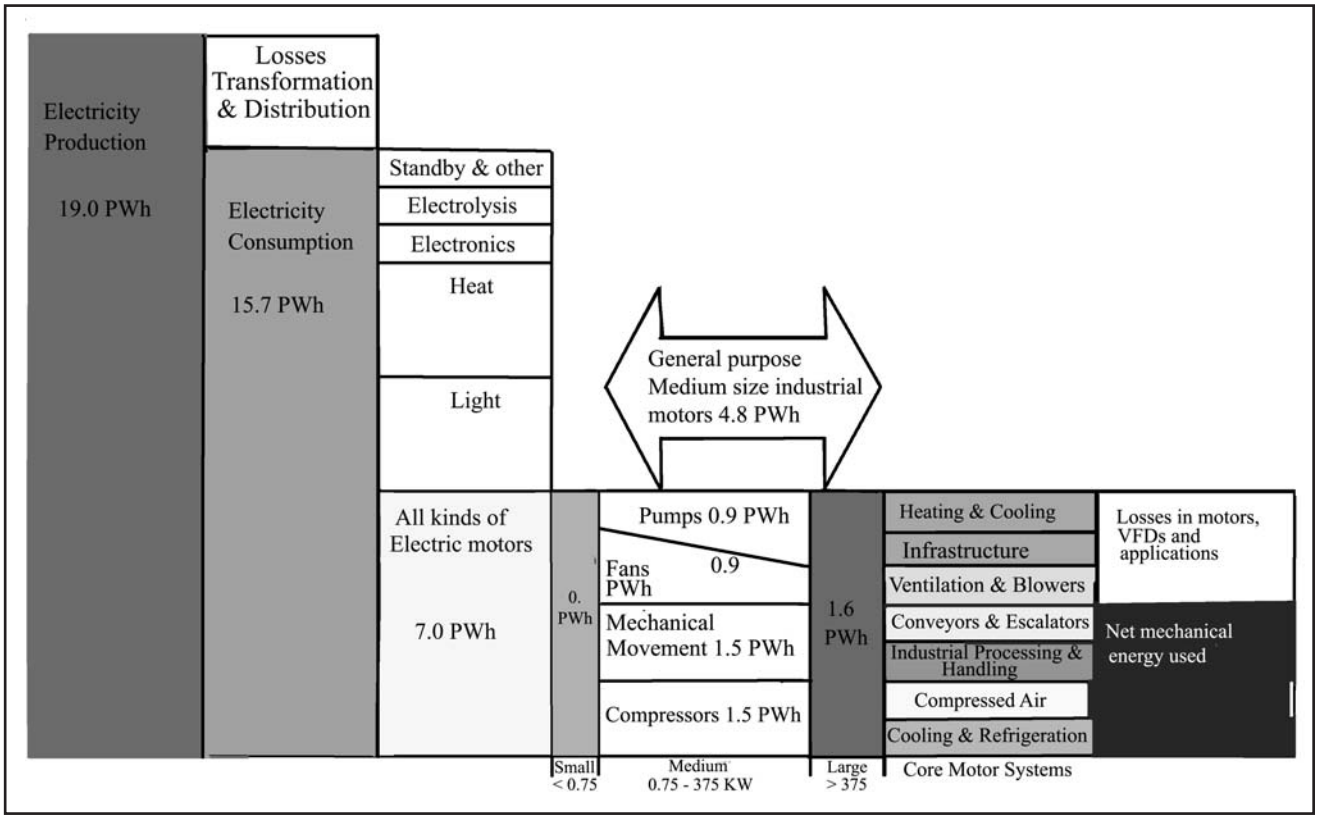


FIGURE 2: Estimated overall efficiency and electricity use for all types of electric motor systems

Sectors	Total demand of electric motors (TWh/year)	Pumps		Fans		Compressors		Mechanical Movement	
		Demand (TWh/yr)	Sector motor share	Demand (TWh/yr)	Sector motor share	Demand (TWh/yr)	Sector motor share	Demand (TWh/yr)	Sector motor share
Industry	4 488	942	21%	718	16%	1 122	25%	1 705	38%
Commercial	1 412	223	16%	339	24%	603	43%	247	18%
Agricultural	101	20	20%	20	20%	20	20%	40	40%
Transport	159	16	10%	16	10%	48	30%	80	50%
Residential	948	142	15%	237	25%	474	50%	95	10%
Total	7 108	1 344	18.9%	1 330	18.7%	2 267	31.9%	2 167	30.5%

Table 3: Estimated global motor electricity demand by sector and application (2006)

As seen above, the EMDS mainly comprises of Compressors, Pumps, Fans and Mechanical Movements like conveyors etc, but in Indian situation, the Percentage of Pumps are much more and Mechanical Movements are relatively lesser percentage.

(To be continued)

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HUMOUR - A Funny Situation and a Moral

Suddenly, a cockroach flew from somewhere and sat on a lady. I wondered if this was the cockroaches response to all the glory that was spoken about it!

She started screaming out of fear. With panic stricken face and trembling voice, she started jumping, with both her hands desperately trying to get rid of the cockroach. Her reaction was contagious, as everyone in her group got cranky to what was happening. The lady finally managed to push the cockroach to another lady in the group. Now, it was the turn of the other lady in the group to continue the drama.

The waiter rushed forward to their rescue. In the relay of throwing, the cockroach next fell upon the waiter. The waiter stood firm, composed himself and observed the behavior of the cockroach on his shirt. When he was confident enough, he grabbed and threw it out with his fingers.

Sipping my coffee and watching the amusement, the antenna of my mind picked up a few thoughts and started wondering, was the cockroach responsible for their histrionic behavior?

If so, then why was the waiter not disturbed? He handled it near to perfection, without any chaos.

It is not the cockroach, but the inability of the ladies to handle the disturbance caused by the cockroach that disturbed the ladies.

I realised even in my case then, it is not the shouting of my father or my boss that disturbs me, but its my inability to handle the disturbances caused by their shouting that disturbs me. Its not the traffic jams on the road that disturbs me, but my inability to handle the disturbance caused by the traffic jam that disturbs me. More than the problem, its my reaction to the problem that hurts me.

The Take-Away: The women reacted, whereas the waiter responded.

*We should not react in life, we should always respond.
**Reactions are always instinctive whereas responses are always intellectual*

Grey Hair... A curious child asked his mother: "Mommy, why are some of your hairs turning grey?"

The mother tried to use this occasion to teach her child: "It is because of you, dear. Every bad action of yours will turn one of my hairs grey!"

The child replied innocently: "Now I know why grandmother has only has only grey hairs on her head".

Brag... Q: Men often brag that there are women waiting by the phone at this very moment for their call. Who are these women?

A: Women who answer Toll-free numbers.

The first Step... Two co-workers were talking by the water fountain one guy said, "Today I got through the first step of getting divorced".

The second guy replies, "Oh, did you go to Mr. Guggenbeim? Everyone goes to him for divorces".

The first man replies, "No, I just got married".

Typhoid Tetanus! Measles...! A new nurse listened while the doctor was yelling, "Typhoid! Tetanus! Measles"

The new nurse asked another nurse, "Why is he doing that?"

The other nurse replied, "Oh, he just likes to call the shots around here".

Traffic Court... At a traffic court, the judge asked the motorist: Tell me, why did you park your car here?

The man said: "Well, there was a sign that said "fine for parking."

SEAWIND SYSTEMS AND DR. TECHN. OLAV OLSEN STRATEGIC ALLIANCE - 6.2MW DEMONSTRATOR PROJECT

Seawind Systems and Dr. Techn. Olav Olsen announced today that they have formalized a strategic alliance agreement to drive new business value by accelerating introduction of 2-bladed offshore wind energy systems using Olav Olsen designed concrete fixed and floating gravity based structures.

Offshore wind is a renewable energy source with tremendous potential, but significant roadblocks prevent it from becoming a self-sustaining industry. High current installation and maintenance costs make it unattractive for private sector investments and it is heavily reliant on on-going subsidies.

Olav Weider, Managing Director at Olav Olsen said: 'The Seawind team's life-long work has been to develop a commercially viable alternative to current 3-bladed turbines. The European Union recently awarded their efforts with a 'Seal of Excellence'. We are excited to participate in their 6.2MW Demonstrator project at the MetCentre demonstration facility in Karmøy.'

Martin Jakubowski, CEO of Seawind: 'The high cost of wind energy is due to the fact that current offshore models are modified versions of heavy, three-bladed onshore turbines, not made for offshore operations. Offshore wind energy is restricted to moderate climates, because current models cannot withstand harsher conditions, like hurricanes. Seawind will offer the first 6.2 MW two-bladed upwind energy turbine specifically designed for offshore. With its teetering hinge and yaw control, it is built for violent offshore conditions. It contains less material and fewer parts, has longer expected life and on board maintainability. We are very proud that we are able to work with the prestigious engineering company Olav Olsen on our first offshore Demonstrator'.

Seawind implements key enabling technology into rugged turbines, made to be installed and operated at sea. Even in storm-prone areas, like East Asia and the US. The turbine nacelle has a helipad that allows heavy helicopters to safely transport personnel and equipment. The LCOE will be significantly lower than for traditional offshore wind turbine systems.

Seawind and Olav Olsen have entered into a strategic alliance to build a first Demonstrator in 2018 of the Seawind 2-bladed turbine using an innovative Olav Olsen support structure. Olav Weider: 'Offshore concrete structures such as the Condeep platforms have been the company's trademark since the seventies. We have worked closely with the Seawind technical team to develop an specific design for their unique 2-bladed wind turbine'. Olav Olsen has a track record in installing highly innovative offshore structures.

Seawind Systems AS management has been working on offshore wind and renewable technologies for the past 20 years. The engineering branch of Seawind Systems AS, based in Genoa, is comprised of engineers well versed in the design of wind turbines. Seawind distinguishes itself from traditional wind turbine manufacturers as wind turbine engineering teams traditionally do not design both the support structures and installation methods at sea. The Seawind technology was originally developed for grid scale energy production in the United States using the most sophisticated simulation software for helicopter rotors coming out of Hamilton Standard and NASA fundamental research results. This made it possible to adapt most efficiently to any wind conditions with the highest tolerance, reliability and safety under all weather conditions, including cyclones.

Dr.techn.Olav Olsen AS is an independent structural and marine engineering company based in Lysaker, Norway. The core competence of the company is advanced structural engineering, the marine environment, concept development and project execution. Dr.techn.Olav Olsen was instrumental in the development of the Condeep concrete platform for the North Sea and has since then participated in the design of approximately 70% of the world's offshore concrete structures. Based on this world-leading expertise, the company is now involved in a broad range of projects for various industries such as Oil & Gas, Offshore wind and marine renewables, Coastal engineering, Transportation and Civil Construction.

BIG, BEAUTIFUL AND SUSTAINABLE – 10 OF THE WORLD'S MOST ENERGY EFFICIENT OFFICES - 10

INTERNATIONAL RENEWABLE ENERGY AGENCY HEADQUARTERS, ABU DHABI (UNITED ARAB EMIRATES)

The newest building on the list having been opened in 2015, IRENA's headquarters in Abu Dhabi fits perfectly into the regions futuristic skyline. *It is the first building in Abu Dhabi to be awarded the* **Pearl Estidama Construction rating certificate by the Abu Dhabi Planning Council,** *which aims to promote the development of sustainable buildings*.Designed with the country's extreme climate in mind, the building has permanent external screening installed on the windows that maximises the amount of light allowed into the building whilst minimising the heating effect inside. The windows are designed so that 90% of solar radiation does not enter into the building.

In order to produce its own energy, the building's rooftop is home to a 1000m^2 photovoltaic system and its solar powered thermal water heaters are expected to fulfil 75% of the building's annual hot water demands.

THE WORLDS TOP 10 MOST INNOVATIVE COMPANIES IN ENERGY - 10

MOSAIC

For applying the crowd funding model to solar energy installations. Mosaic is an online solar market place that connects investors—anyone who wants to invest at least $25—with solar projects. Since launching in 2012, Mosaic has crowd funded more than $5.6 million in investments for all sorts of worthy solar projects (on top of university housing, convention centers, affordable housing complexes, etc.). It's a win-win: Investors make money from loan interest, while residents and municipalities get to reduce their energy bills.

KALPANA SAROJ | *Kamani Tube* | ENTREPRENEUR

KAMANI
TUBES LIMITED

Survival is an eternal theme in Kalpana Saroj's life and in her business too. Kalpana Saroj is a gutsy, at times reckless, Dalit, school drop-out, child-bride, slum dweller, suicide survivor, and business woman and aprominent face of Dalit enterprise. That is the against-all-odds story of Kalpana Saroj, who **got the Padma Shri award for trade and industry in 2012.**

Saroj has interests in real estate, sugar, steel and films, but is best known for picking up a company called Kamini Tubes from the sick bed in 2006 - debt of Rs 116 crore, salary and provident fund dues of over 500 workers, 170 court cases and giving it a new life. The current revenue of the company is Rs 250 Cr with 900 employees. Kalpana has indeed traversed quite a distance from Murtizapura, a hamlet in the interiors of Maharashtra. Today, she presides over varied businesses. The single factory Sai Krupa Sakhar Karkhana in Ahmednagar, in which she holds a substantial stake, is graduating to an integrated sugar complex. A diversification into steel manufacturing and mining has come about recently. A bauxite mining initiative across 1,230 acres in Udgir, along the Maharashtra- Karnataka border, is being drawn out. Saroj has had a troubled past. She was married at 12. A broken marriage forced her to return to her village. She returned to Mumbai after surviving a suicide attempt in the village and laboured at a hosiery unit. She remarried and took over a steel almirah fabrication business on her husband's death and stumbled into the construction business. From then on, she rode the realty wave. Alongside, Saroj dabbled in social work, which brought her into close proximity with politicians of all hues. It enabled her to climb the social ladder quickly. Her tryst with KTL was also thrown up by the ecosystem she was in. Saroj bid for the company when it was put up for sale by IDBI. In March 2006, her scheme for revival was accepted. KTL started commercial production in December 2010. Sales stands at about Rs. 1 crore. The company is quickly moving into newer areas of demand. Few companies in India have had such a chequered history, and fewer still have such a chairperson.

HUMOUR - FUNNY QUOTES OR SAYINGS: TECHNOLOGY

1. Cars will soon have the Internet on the dashboard. I worry that this will distract me from my texting. - ***Andy Borowitz***

2. I'd rather check my Facebook than face my checkbook. - ***Craig Coelho***

3. "User" is the word used by the computer professional when they mean "idiot." - ***Dave Barry***

4. What did people do when they went to the bathroom before smart phones? - ***Aaron Cobra Mervis þ@FeelingMervis***

5. Each time I shut my computer down, I throw my head back in maniacal laughter and scream "Fool! I was only using you!" - ***Bridger Winegar***

6. A computer once beat me at chess, but it was no match for me at kick boxing. - ***Emo Philips***

7. The problem with quotes on the internet is you can never be certain they're authentic. - ***Abraham Lincoln***

8. AT&T to wed T-Mobile. Following the ceremony there will be no reception. - ***Richard Lerner***

9. To err is human, but to really foul things up you need a computer. - ***Paul Ehrlich***

10. Toyota has announced it will start integrating Microsoft technology into their vehicles. It's perfect for the person who wants a car that crashes every ten minutes. - ***Conan O'Brien***

11. Give a man a fish, and he will eat for a day. Give a man Twitter, and he will forget to eat and starve to death. - ***Andy Borowitz***

12. The population of earth has reached 7 billion people, every single one of whom send you irritating emails to join something called "LinkedIn." - ***Dave Barry***

13. Compulsive texting gives me the willies. It's just another form of butt scratching. - ***Garrison Keillor***

14. In a perfect world, answering machines would come with a "Get to the point" button. - ***Jason Love***

TULIP SHAPED SOLAR PLANTS TO BE INSTALLED IN ETHIOPIA

AORA Solar has announced that it will begin construction of its solar-biogas power plants in Ethiopia. Construction of the first pilot plant will start by mid-2015. Ethiopia's Minister of Water, Irrigation and Energy has stated that

"AORA's unique solar-hybrid technology is impressive and well-suited to provide both energy and heat to support local economic development in off-grid rural locations in Ethiopia." AORA currently already has active sites in Samar, Israel and Almeria, Spain.

What is AORA's Tulip Hybrid System? A lens in the tulip-shaped tower receives concentrated solar rays that are reflected off of 50 mirrors. Behind the lens, the 1000 Celsius temperature is used to heat the pressurized air, resulting in a hot pressurized gas. This gas is then used to turn the blades of a turbine to generate electricity. The mirrors are synchronized to constantly follow the sun's rays, directing the light toward the tower's lens at all times.

During cloudy weather or nightfall, the tower's turbine automatically switch to using biofuels or traditional fuels to heat the air inside and power the turbine. This allows the tower to continue producing energy 24/7. Unlike conventional solar thermal systems that use steam to drive large turbines, the Tulip requires only 8% of the amount of water, making it perfect for desert regions.

TULIP SHAPED SOLAR PLANTS TO BE INSTALLED IN ETHIOPIA

அவகோடா பழம் உண்பதால் கிடைக்கும் நன்மைகள்....

மனிதனின் ஆரோக்கியத்தை மேம்படுத்துவதில் மிகச் சிறந்த பங்கு வகிக்கிறது அவகோடா பழம், இதில் நல்ல கொழுப்புக்கள், மக்னீசியம், பொட்டாசியம், வைட்டமின் சி, வைட்டமின் கே1, வைட்டமின் பி6 மற்றும் கார்போஹைட்ரேட்டுகள் அடங்கியுள்ளன.

ஆர்த்தரைட்டீஸ் வந்து கஷ்டப்படுபவர்கள் இந்த பழங்களை தின்றால் அவர்களின் மூட்டுவலி மறைந்துவிடும். வயோதிகத்தால் ஏற்படும் மூட்டுவலி எலும்பு தேய்மானத்தால் தோன்றக்கூடியது. இந்தப்பழம் தின்றால் மூட்டுப்பகுதிகளில் எலும்பு தேய்மானம் ஏற்படாது. எண்ணெய்ச் சத்து மிகுந்த இப்பழத்தின் சதைப்பகுதி வைட்டமின், புரதம் மற்றும் தாது உப்புகள் நிறைந்தது. வறண்ட சருமத்தினருக்கு இப்பழம் ஒரு வரப்பிரசாதம். எண்ணெய் சத்து மிகுந்த இப்பழம் அழகு சாதனப் பொருட் தயாரிப்பில் முக்கிய இடம் வகிக்கின்றது. சிறுநீரகத்தில் ஏற்படும் கற்கள் மற்றும் சிறுநீர்ப்பை பிரச்சினைகளை தீர்க்க இந்த பழத்தை நாம் சாப்பிடலாம். இது சிறுநீரை அதிகளவில் உற்பத்திசெய்து சிறுநீர்ப் பாதையில் உள்ள கற்களின் அடைப்பை நீக்குகின்றது. உடலில் சர்க்கரையின் அளவினைக் கட்டுப்படுத்துகின்றது. செரிமான பிரச்சினைகளையும் சரிசெய்யக்கூடியது. கெட்ட கொழுப்பை குறைப்பதால் நமக்கு உடல்நலம் மற்றும் உடற்பருமன் ஏற்படுவது தடுக்கப்படுகின்றது. இதில் பொட்டாசியம் சத்துக்கள் அதிகம் இருப்பதால், இரத்த அழுத்த பிரச்சனையால் அவதிப்படுபவர்களுக்கு மிகச் சிறந்ததாகும். மேலும் இதனை தொடர்ந்து சாப்பிட்டு வந்தால் கெட்ட கொழுப்புகளை குறைத்து நல்ல கொழுப்புகளின் அளவை அதிகரிக்கும். இதிலுள்ள ஆன்டி ஆக்சிடன்டுகள் நோய் எதிர்ப்பு சக்தியை அதிகரிக்கின்றன. நார்ச்சத்து நிறைந்திருப்பதால் உடல் எடையை குறைப்பதில் முக்கிய பங்கு வகிக்கிறது. புற்றுநோய்ப் போன்ற கொடிய நோய் தாக்கியவர்களுக்கு அவகோடா பழம் அதிகமாக கொடுத்தால் அது நோய் எதிர்ப்புத்தன்மையை அதிகரிக்கும். இரத்த அழுத்தம் போன்ற பிரச்சினைகளை கட்டுப்படுத்தும். அவகோடா பழத்திலுள்ள சேர்மங்கள் ஆர்த்ரிடிஸ் வலி மற்றும் இதர எலும்பு பிரச்சனைகளை சரிசெய்வதாக ஆய்வின் மூலம் நிரூபிக்கப்பட்டுள்ளது. எனவே எலும்புகள் வலிமையடைகின்றன. கண்களின் பார்வை திறன் புரை வளர்தல் ஆகியவை கட்டுப்படுத்தப்படுகின்றது. இந்த அவகோடா மிகவும் பயனுள்ள பழம். சிறுநீரக பிரச்சனையால் அவதிப்படாமல் இருக்கவும் தெளிவான கண்பார்வைக்கும் அவகோடா பழத்தை தொடர்ந்து உட்கொண்டு வருவது அவசியமாகும்.

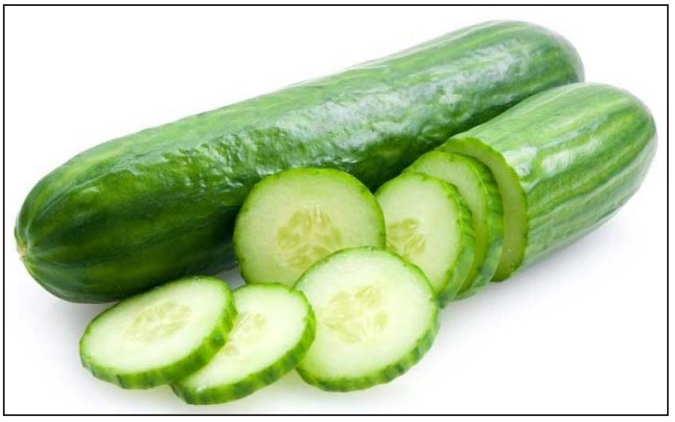
Courtesy: PESOT, March 2017

வாழை இலையில் சாப்பிடுவதால் கிடைக்க கூடிய நன்மைகள்

எத்தனையோ பாரம்பரியமான விஷயங்களை, நம் முன்னோர்கள் அற்புதமாய் கண்டுபிடித்து வைத்திருக்கிற விஷயங்களை தவறவிட்டு விட்டோம். அதில் ஒன்றுதான் இந்த வாழை இலையில் சாப்பிடுவது. வாழை இலையில் சாப்பிடுவதால், இளநரை வராமல் நீண்டநாட்கள் தலைமுடி கருப்பாக இருக்கும். வாழை இலை ஒரு கிருமி நாசினியாகும். உணவில் உள்ள நச்சுக்கிருமிகளை வாழை இலை அழிக்கும் தன்மை கொண்டது. தீக்காயம் பட்டவரை வாழை இலையில் கிடத்துவதை கண்டிருப்பீர்கள். வாழை இலை படுக்கையும், வாழைத்தண்டுச் சாறும் வாழைக்கிழங்கின் சாறும் நல்லதொரு **நச்சு முறிப்பான்கள் ஆகும்.** இன்றைக்கும் கிராமங்களில் பாம்பு கடித்து விட்டால் முதலில் வாழைச்சாறு பருகக்கொடுப்பார்கள். நச்சு முறிந்துவிடும். திருமணப் பந்தலிலும் வாழை மரம். இடுகாட்டுப் பாடையிலும் வாழை மரம். மக்கள் கூடும் எந்த திருவிழாக் கூட்டங்களிலும் வாழை மரம் என்று எங்கெங்கு காணினும் வாழை மரத்தை வைத்தான் நம் தமிழன். அதாவது நச்சு முறிப்புக்கு என்றுதான் அவ்வாறு செய்தான். வாழை இலை பயன்படுத்தி சாப்பிடுபவர்களுக்கு நோய்கள் வருவதில்லை. இதை என்றாவது யோசித்து பார்த்திருக்கிறீர்களா? வாழை இலையில் தொடர்ந்து உணவு உட்கொண்டு வந்தால் தோல் பளபளப்பாகும். உடல் நலம் பெறும். மந்தம், வலிமைக்குறைவு, இளைப்பு போன்ற பாதிப்புகள் நீங்கும். அழல் எனப்படும் பித்தமும் தணியும். வாழையிலையின் மேல் உள்ள பச்சைத் தன்மை (குளோரோபில்) உணவை எளிதில் சீரணமடையச் செய்வதுடன் வயிற்றுப் புண்ணை ஆற்றும் தன்மை கொண்டது. நன்கு பசியைத் தூண்டும். வாழையிலையில் உண்பவர்கள் நோயின்றி நீண்ட ஆரோக்கியத்துடன் வாழ்வார்கள்.

Courtesy: PESOT, March 2017

கோடை வெயிலிலிருந்து பாதுகாப்பு தரும் வெள்ளரிக்காய்



வெயில் காலத்தில் ஏற்படும் சிறுநீரக பாதை பிரச்சினைகளை வெள்ளரிக்காய் தீர்க்க உதவும். மேலும் வெள்ளரிக்காயை பயன்படுத்துவதால் கிடைக்கும் பலன்களை பார்க்கலாம்.

இயற்கை நம்மை காலத்திற்கேற்ற பாதுகாப்புகளை கொடுத்து நம்மை காக்கிறது. அதை நாம் முழுமையாய் உணராமல் விடுவதால்தான் பாதிப்புகளுக்கு ஆளாகின்றோம். உதாரணமாக கோடையில் அதிகம் கிடைப்பதுதான் வெள்ளரிக்காய். குவிந்து கிடக்கும் இதன் அருமையினை பற்றி நன்கு அறிந்தால் இதன் பலன்களை முழுமையாய் பெறுவோம்.

- கோடை என்றாலே உடலில் நீர் சத்து எளிதில் குறையும். இதனால் உடலின் கழிவுப்பொருள் வெளியேற்றத்தில் பிரச்சினை ஏற்படலாம். வெள்ளரியில் நார்ச்சத்தும், நீர் சத்தும் அதிகம் என்பதால் இந்த பிரச்சினை இருக்காது.
- வெள்ளரி சிறுநீரக பாதை பிரச்சினைகளை தீர்க்க உதவும். வெள்ளரி சாறு இருவேளை குடித்தால் போதும். உடலிலுள்ள நச்சுகளை வெளியேற்றி ரத்தத்தினை சுத்தம் செய்து விடும். சிறுநீரகத்தின் அழுத்தத்தினை குறைத்து சிறுநீரகங்களை ஆரோக்கியமாய் வைக்கும்.
- வெள்ளரிக்காய்க்கு நெஞ்செரிச்சல், வயிற்றுப்புண் இவைகளை நீக்கும் ஆற்றல் உள்ளது. தினமும் இதன் சாறு எடுத்துக் கொள்ள இப்பிரச்சினைகள் தீரும். ஜீரண சக்தி கூடும்.
- வெள்ளரி குடலிலுள்ள நாடா பூச்சிகளை நீக்கும். இதிலுள்ள எகிப்ஸின் என்ற என்ஸைம் நாடா பூச்சிகளை கொன்று விடும்.
- வெள்ளரி ரத்த அழுத்தத்தினை சீராய் வைக்கும். இதிலுள்ள பொட்டாசியம் உப்பு (சோடியம்) அளவினை சீர் செய்து தாது உப்புகளை சீராய் வைக்கும்.
- வெள்ளரி வீக்கத்தினை குறைக்கும். இதிலுள்ள பீட்டா கரோடின் நோய் எதிர்ப்பு சக்தியினை அளிக்கும். வீக்கம் தரக்கூடிய பராஸ்டோக்ளான்டின் என்ற பொருளை தடுக்கும். உடல் முன்னேற வெள்ளரி உதவும்.
- வெள்ளரி சர்க்கரை நோயாளிகளுக்குச் சிறந்தது. வெள்ளரியில் உள்ள ஹார்மோன் உடலின் கணையம் இன்சுலின் ஹார்மோன் சுரக்க உதவுகின்றது.
- வெள்ளரி பல வகை புற்று நோய்களை எதிர்க்கும் சக்தி வாய்ந்தது. நோய் எதிர்ப்பு சக்தியும் அளிக்க வல்லது.
- இதிலுள்ள சில பொருட்களை (ஸ்பைடோ கெமிக்கல்) வாய் துர்நாற்றத்தினை நீக்க வல்லது.
- உடலில் நச்சுத்தன்மையை நீக்குவது.
- வெள்ளரியில் உள்ள வைட்டமின் 'கே' எலும்புகளை உறுதிப்படுத்த வல்லது.
- நரம்புகளுக்கு வலு அளிப்பது.
- குறைந்த கலோரியின் காரணமாக உடல் எடை குறைய உதவுகின்றது.

மிக சிலருக்கு வெள்ளரி அலர்ஜி இருக்கலாம். இவர்கள் வெள்ளரியினை பச்சையாக உண்ணாமல் சமைத்து உண்ணலாம். மிக சிலருக்கு வயிற்றுவலி ஏற்படலாம்.

மிக அதிகமாக உண்பதனை தவிர்ப்பது நல்லது. அழகு பராமரிப்பில் வெள்ளரிக்காய் மிக சிறந்த இடத்தினை பெறுகின்றது. வெள்ளரி + தயிர் + சோற்று கற்றாளை + அரை டீஸ்பூன் எலுமிச்சை பழம் சாறு கலந்து ஈரமான உடல், முகம் முழுவதும் தடவி 10 நிமிடங்கள் கழித்து குளித்து விடுங்கள்.

- உடல் அழகாகும், இறுகும்.
- கண்களின் மீது வெள்ளரி துண்டுகள் வைக்க கண் இறுக்கம் நீங்கும். கண் கருமை நீங்கும். சுருக்கம் நீங்கும்.

Courtesy: http://npapp.in/51esCZ/a2fa

இளநீர் பருகுவீர் - கோடை வெயிலிலிருந்து காப்பீர்

MOTHER

A Young boy had a mother with only one eye. He hated her and he was embarrassed in school because of her.

One day he said to her "if you're only going to make me a laughing stock, why don't you just die?" His mom did not respond…

The boy wanted to get away from his mother, so he studied hard, got married, had children and bought a house of his own.

Then one day, his mother came to visit him. She hadn't seen him in years and she didn't even meet her grandchildren.

When she stood by the door, her grandchildren laughed at her, and his son yelled at her for coming over uninvited. He screamed: "How dare you come to my house and scare my children! GET OUT OF HERE! Now!!!"

And to this, his mother quietly answered: "Oh, I'm so sorry. I may have gotten the wrong address."

…and she disappeared out of sight.

One day, the son received a letter regarding a school reunion. He went back to his hometown and after the reunion he thought he might pay a short visit to his mother.

But the neighbours told him that she died.

He did not shed a single tear.

They handed him a letter that his mother wrote to him a day before she died.

"My dearest son,

I think of you all the time. I'm sorry that I came to your house and scared your children.

I was so glad when I heard you were coming for the reunion.

But I may not be able to even get out of bed to see you. I'm sorry that I was a constant embarrassment to you when you were growing up.

You see… when you were very little, you got into an accident.

…and lost your eye. As a mother, I couldn't stand watching you having to grow up with one eye.

So I gave you mine.

I was so proud of my son who was seeing a whole new world for me, in my place, with that eye.

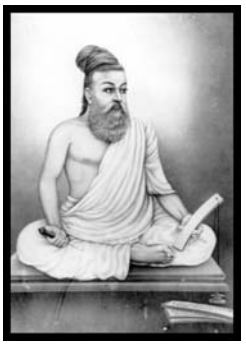
With all my love to you,

Your mother."

Love your parents.

You might not know what they have sacrificed for you.

TIRUKKURAL AND MANAGEMENT IN A 'NUTSHELL' - 49



Recently, at a Conference of Business Leaders there were deliberations about what are the Qualities that make a Leader. One of the Top B Courage and Confidenceusiness Leader in the meet presented a "5 – C" Model of Leadership, which are as follows:

a) Competency
b) Courage and Confidence (Paired into one)
c) Communication
d) Consistency
e) Compass or Integrity

Tiruvalluvar, no doubt, deals with all these in a very comprehensive manner and in this part, let us review what he has to advise us about "Competency". Competency may simply mean Knowledge and capability and expertise in a particular field or fields. Valluvar adds more clarity to this concept by specifying that the expertise must be clubbed with absolute clarity of the subject to be able to take decisions and with ability to practice with compassion and without selfishness.

Anbuarivu Thetram Avaainmai Innangum
Nankudaiyan Katte Thelivu Kural 513

அன்புஅறிவு தேற்றம் அவாஇன்மை இந்நான்கும்
நன்குடையான் கட்டே தெளிவு. குறள் 513

"This is the person who can be clear and perform who possesses the combination of Compassion, Knowledge, Expertise and without Greed"

Valluvar in another Kural brings out that there are many who are competent but are unable to perform in the right manner.

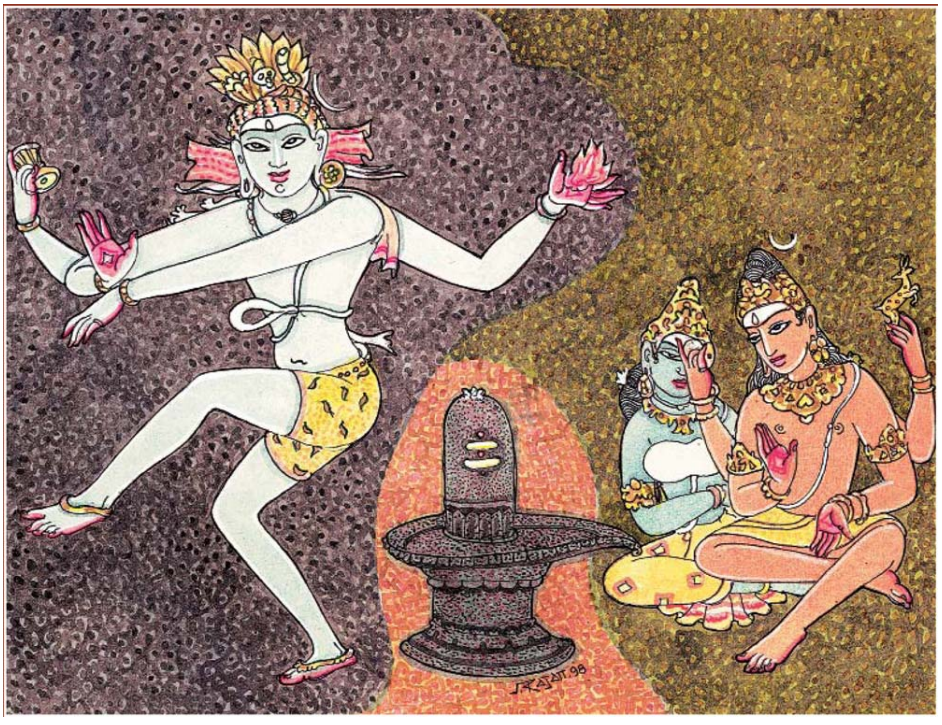
Enaivagaiyaan Theriyak Kannum Vinaivagaiyaan
Veruagum Maandhar Palar Kural 514

எனைவகையான் தேறியக் கண்ணும் வினைவகையான்
வேறுஆகும் மாந்தர் பலர். குறள் 514

"There are persons who seem to possess expertise and competency by all tests; but they are very different when it comes to actual performance"

HOME FESTIVALS - 6

ஆனி - Aani (June/July)



This is the one month of the year when there are no home festivals - Coinciding not uncoincidentally with an intense month of agricultural effort. However, during Aani, major temple festivals are held for Lord Siva as Nataraja, King of Dance (above left), and for Siva and Parvati.

(To be continued)

To be poor and be without trees, is to be the most starved human being in the World.
To be poor and have trees, is to be completely rich in ways that money can never buy.
- CLARISSA PINKOLA ESTER

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