



ELECTRICAL

INSTALLATION ENGINEER

NEWS LETTER

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

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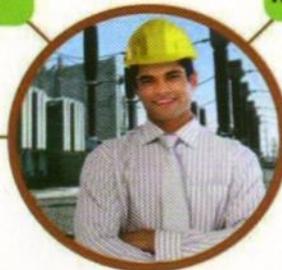
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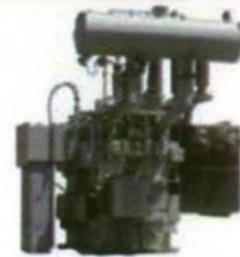


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EDITORIAL

Dear Members, Fellow Professionals and Friends,

Seasons Greetings To One And All!

We can all certainly feel Good and Happy and Proud about the successful completion of General Elections and the taking over of New Government at the center. We being one of the largest Democracies of the World, the World at large wonders and appreciates our capability and commitment. EVMs and VVPATs have proved their worth as there were reports of 100% tally and there were no complaints at all from the booths about the VVPAT confirmation. Indian Technological capability is proved again to our delight.

It is Good that the same Governments are continuing both at the Center and Tamilnadu so that there could be continuity of Good Developments, sort out all problems that crept up, be it GST or any other problem and take the country forward.. The promises indicate that that they will be attending to the Water, Irrigation and Agriculture apart from Infrastructure and various other issues. Power and Energy are always priority areas and the aggression of the Government to groom renewable energy efforts are very encouraging. More of Hydel Energy and Bio Energy are expected to add on to the Energy basket.

June month is marked by observance of "World Environment Day" on the 5th by all people of the World to remind ourselves of the Dangers if we do not ensure a Safe and Healthy Environment. Engineers from all over India and from all over the World observe this day as they certainly have a greater responsibility than all the other Professionals. The Government and all the Professional and people bodies observe the **World Environment Day** this year on theme "**Air Pollution**". A write up on the celebration is published separately in the issue.

As we all know, one of the main causes of Air Pollution is Automobiles of all kinds and capacities. We are aware that in our capital city of Delhi, they had to ban automobiles completely for some period as the pollution levels had gone beyond acceptable levels. Pollution levels are increasing rapidly in all other cities too. It is good that the Government is working on EVs for all types including 2 Wheelers, Cars and Buses to ply in cities so that the pollution can be reduced drastically. We are aware that EVs need Electrical Energy and it has to be "CLEAN". Countries like Germany has shown the way with Solar and Wind and our country is also working very seriously on these. We have an added advantage of good potential of Bio Energy, and as believed by the World, India can certainly play a leading role in Renewable Energy, During the last innings, the present Central Government had announced schemes to encourage production of millions of tons of **Compressed Bio Gas** in all parts of the country to replace the petroleum gases and CNG, and they can take up these on priority.

World Ocean Day is celebrated on the 8th of June and we can be proud about our ocean wealth as we are covered by Ocean and Sea on all three sides providing lot of opportunities for fishing and salt making and as a source for producing purified water for all purposes including drinking water.

We thank all those members who have helped us by participating in the advertisement appearing for the issue May 2019 – Dehn India Pvt. Ltd., Elecspo, Galaxy Earthing Electrodes Pvt. Ltd., Indo Swiss, Power Square Engineers (Indotech Transformers Ltd.), Supreme Power Equipment Pvt. Ltd., Visewham Electricals.

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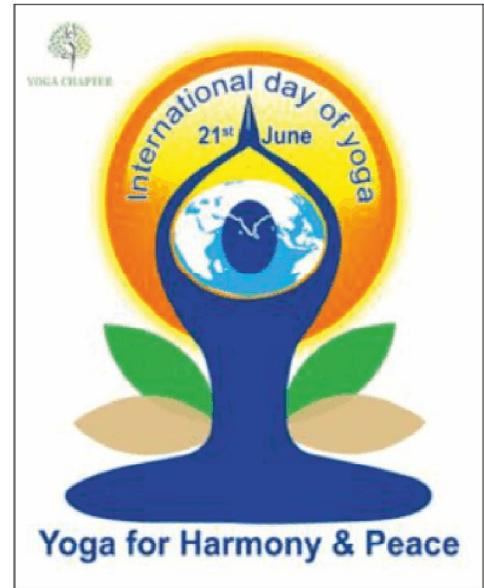
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4th INTERNATIONAL YOGA DAY CELEBRATION - 21.06.2019

We can all certainly feel proud that one of the ancient Practice of India has got International recognition now with UN Declaring 21st June every Year as International Yoga Day. This celebration is meant for creating an awareness of “YOGA” among all people of the World.

Yoga has to do with conditioning of both Mind and Body and it is recommended that proper training must be taken from a Knowledgeable “Guru” We are giving below select Messages given for the occasion bringing out the Power and Various dimensions of Yoga.

Yoga is the best fitness regime for your body, heart and mind, Yoga is the best therapy to keep your mind and body calm. Nothing else would help you calm your mind and heart as Yoga does when you are suffering stress and anxiety. Yoga is the practice for a healthy body, mind, soul and heart. So this International Yoga Day 2019, promote Yoga with Yoga Day Messages...



1. 'You cannot Always Control what goes on Outside,
But you can Always Control what goes on inside...'
Best Wishes for International Yoga Day
2. Yoga Teaches us to cure what need not be Endured and Endure what cannot be cured.
3. Yoga is Like Music.
The Rhythm of the Body,
The Melody of the Mind and
Harmony of the Soul Creates the Symphony of Life.
4. Yoga Allows You to Rediscover a Sense of Wholeness on Your Life, Where you do not Feel like You are Constantly Trying to Fit Broken Pieces Together.
5. Laughter Yoga Combines Laughter with Yoga Breathing Exercises
It is Perfect Way to Laugh and get Exercise at the Same Time.
It Approaches Laughter as Body Exercise so It's Easy to Laugh even you are Depressed or in a Bad Mood.
6. Yoga is the Setting of the Mind into Silence. When the Mind has Settled, we are established in Our Essential Nature, Which is Unbounded Consciousness.
Our Essential Nature is Usually Overshadowed by the Activity of the Mind.
7. When the Breath Wanders the Mind also is Unsteady but when the Breath is Calmed the Mind Too will be still, and the Yogi Achieves Long Life, Therefore, one should learn to Control the Breath.
8. A photographer gets people to pose for him. A yoga instructor gets people to pose for themselves.
9. Yoga is about awakening.
Yoga is about creating a life that brings more beauty and More love into the world!!
Make your life Beautiful on this International Yoga Day!!
10. Sun salutations can energize and warm you, Even on the darkest, Coldest winter day.

*****Let this Yoga Day energize your life throughout the year*****

WORLD ENVIRONMENT DAY - 5 JUNE 2019

Overview

A platform for action World Environment Day is the United Nations day for encouraging worldwide awareness and action to protect our environment. Since it began in 1974, the event has grown to become a global platform for public outreach that is widely celebrated in over 100 countries.

The people's day Above all, World Environment Day is the "people's day" for doing something to take care of the Earth. That "something" can be local, national or global. It can be a solo action or involve a crowd. Everyone is free to choose.

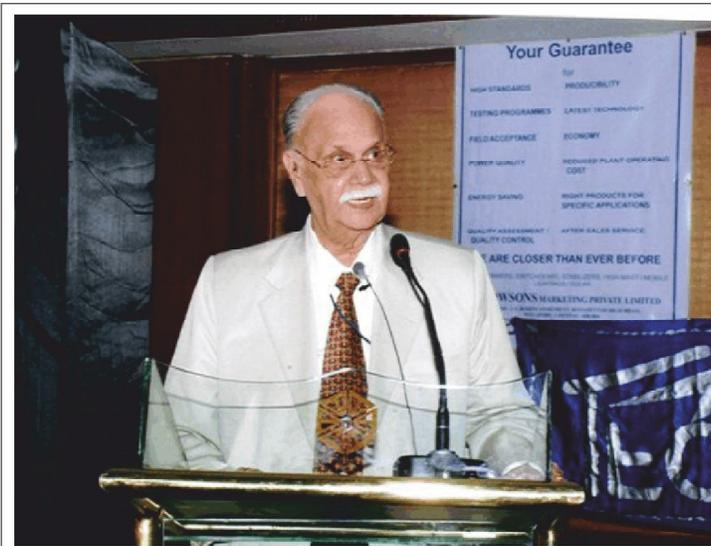
The theme Each World Environment Day is organized around a theme that draws attention to a particularly pressing environmental concern. The theme for 2019 is "**Air pollution**".

The host Every World Environment Day has a different host country, where the official celebrations take place. The focus on the host country helps highlight the environmental challenges it faces and supports worldwide efforts to address them. This year's host is China.

Registration In recent years, millions of people have taken part in thousands of registered activities worldwide.

OBITUARY

Dr. G.V. Rao, Ph.D., Senior Member, IEEE- IAS/PES has held responsible positions in G.E.C of India Ltd, started his own business in 1983, and is currently the Chairman/Managing Director of Rowsons Marketing Pvt Ltd, marketing all types of Transformers, Unitised Sub-stations etc. He has published a manual on Transformers, in the form of Question and Answers, and booklets on Capacitors, Resin Cast Transformers, Voltage Controllers etc.. He has conducted Technical seminars on Power & Distribution Transformers, Industrial Servo Voltage Controllers, Mobile Sub-stations, Fire Prevention Systems for Power & Distribution Transformers, Capacitors, Resin Cast Dry Type Maintenance Free Transformers, Unitised Package Sub-stations, Ventilation systems etc. He has produced his own video cassette & CD-ROM for Unitised Package Sub-station arrangements. Er. Rao's entrepreneurial spirit and appeal continue to proliferate as he has over 53 years' professional experience. We are proud of his accomplishments, in his profession and in our society.



List of Contributions to IEEE:

Er.G.V.Rao was PES Madras Chapter's Treasurer in 1999 & 2000 and Chapter Vice Chairman-II in 2001 subsequently elevated to Chapter chair from 2003 to April 2006. He has given six Technical presentations at the local PES workshops and seminars and presided over the PES meetings when the Chapter Chairman was away in U.S. during January and February 2001.

Awards:

He was awarded IEEE PES Outstanding Chapter Engineer Award in a grand manner at Hotel Savera, Madras. The Great Chatrpathi Marata Life Time Achievement Award for the year 2003.

Doctorate conferment of Doctor of Philosophy in Marketing Management from the Inter American University of Humanistic Studies, Florida, USA, IEEE – PES Madras chapter was proud enough in obtaining high performance Chapter Award for the year 2002 & 2004, under his able leadership.

KNOW THY POWER NETWORK – 141

ELECTRICAL POWER QUALITY – SOME INTERESTING ISSUES

Having made the journey through the power network so far, you may be interested to learn some interesting issues of its main product viz. “Electrical Power Quality”. Power Quality is nothing but the preset or standardized features of the electrical energy waves that are being delivered at your premises. You may be aware that this electrical energy acts only as a carrying agent/transporting agent of other energy forms since it brings energy from all kinds of energy sources like coal, wind and water to your premises. To cite an example, in a thermal power station the energy stored in the coal/oil is being extracted and transmitted to the consumers ends with the aid of electrons for further conversion to other energy forms like Heat, Mechanical and Chemical energies at the consumer’s end.

Now the question arises about the quality of the “Energy Waves” brought by these electrons. Do you know what is meant by power quality? Where does it occur i.e. at generators/grid ends or at the transmission level or at the distribution network level. To move further, in the instant case, do the producers (State Electricity Boards) and Independent Power Producers know precisely the quality of their end product? Or else do we, the consumers / users take the pain to know the exact quality of the product received by us? To all these questions, the expected answer is a “simple No”. The producers as well as the users do not show keen interest in the quality of the product, they produced/use. It is the present status of this matter, viz. quality of the power produce/generated/received is not at all focused.

Power quality issue arises only when the products reach the consumer’s ends (Distribution Network) and not at the Generation grid, Connectivity Areas or Transmission networks. At these sectors, there are many other important issues that need attention. Significant among them are Grid stability, the synchronous running of generating machines and the power flow through various transmission circuits/Tie lines. With all these issues on hand, the agencies concerned have little time to look at the “Power Quality Issues”.

Being the end users, now there is an urgent need for us to turn our attention on power quality. It is concerned mainly about the

- (i) Continuous flow of electrons without any interruption (micro short, long or major)
- (ii) In a preset track of pure sine wave (Distortions-free sinusoidal wave)
- (iii) With a preset or stipulated amplitudes of voltage and current waves within the permissible tolerance levels (e.g.) $(230V \pm 5\%)$
- (iv) With a frequency of 50 Hz with the tolerance of $\pm 5\%$.

In sum, a quality electrical power maintains its frequency, waveform, continuity and amplitude (magnitude within its permissible/assigned levels). To repeat or put it in simple terms, a quality power on the LT network that supplies power to your premises should conform to be stipulations made here under. (Figure 1)

1. Continuous – [interruption free]
2. Amplitude $(230V \pm 5\%)$
3. Pure sinusoidal wave form
4. Frequency of 50Hz

(Kindly measure, check, visualize and compare, the power received at your premises with the bench mark set by Indian Electricity Rules 1956 and understand the present state of supply. By this exercise, you can note that it never meets/satisfies the prescribed quality benchmarks).

I think by now you are inclined to learn more about power quality issues, the impacting factors responsible for its poor quality and the latest one brought by modern devices like LED lamps (flickering of light) on our health and on the life span of our electrical equipment and devices.

The main point to be noted in this regard is that both the supplier and the consumers are responsible for the present poor condition of the power delivered at our premises. (i.e.) both are equally responsible for this sorry state of affairs. Poor understanding, ignorance or non-awareness of the issues involved and the required corrective measures are the main impacting/influencing factors of the present state. So in a way useful information on this issue will be of much help. Please note that more we discuss and read the issues concerned with power quality, the better we are able to understand its present state and take correct/right decisions.

In sum, the deviations from the prescribed quality levels will make the electrical power received to cause adverse impact on the end user's equipment/devices and lead to undesirable technical and financial losses.

I. COMPONENTS OF QUALITY POWER SUPPLY

- i) Supply reliability
- ii) Voltage quality followed by Current quality
- iii) Minimum frequency deviations.

Though all the end users require quality power for their use, a set of consumers as listed below have preference over others.

It is because of the severity of the adverse impacts of poor quality power faced by them.

II. LIST OF CONSUMER'S PREMISES WHICH ESSENTIALLY REQUIRE QUALITY POWER ARE

- Software parks
- Electronic data processing centres
- Modern production process
- Automation in industries
- Energy efficient motors, costly medical equipment/devices have conditioning systems.

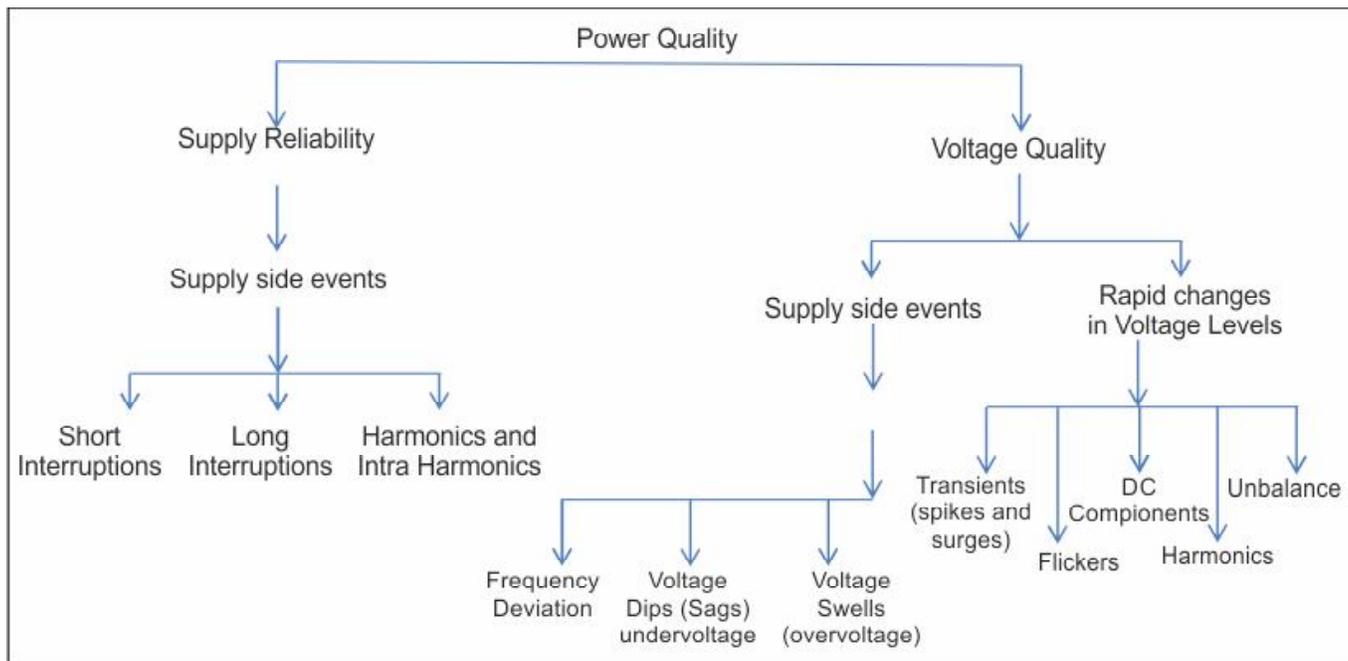
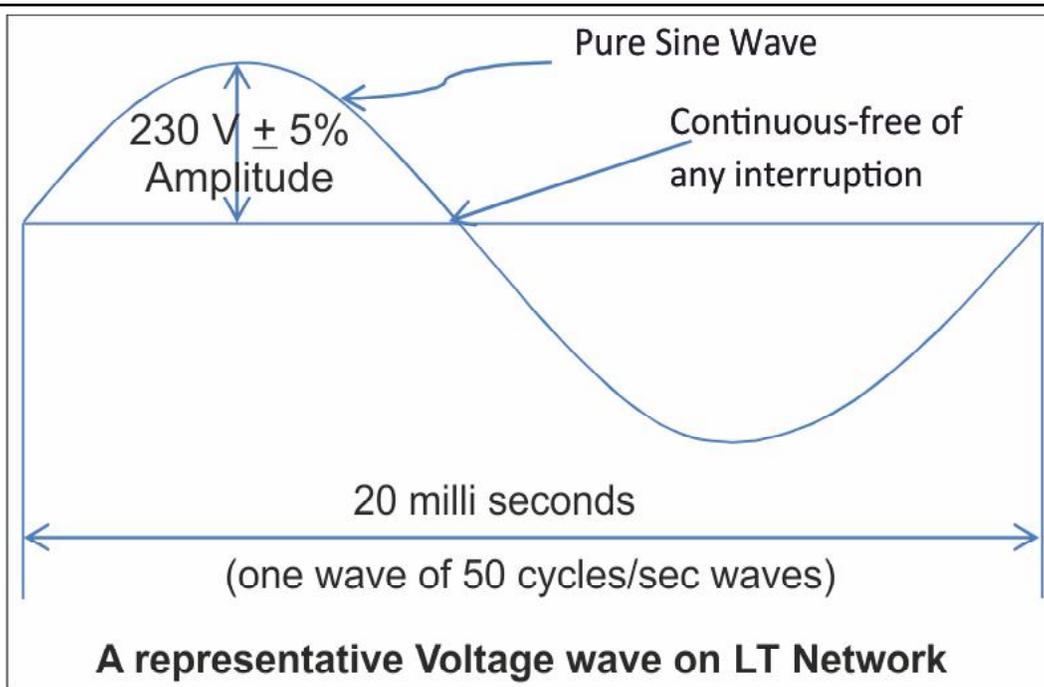
III. CHARACTERISTICS OF POWER QUALITY

Diagram Next page

IV. QUALITY ATTRIBUTES THAT REQUIRE ATTENTION

- Disruptions in power supply
- Voltage variations
- Frequency fluctuations
- Harmonics

These issues especially harmonics will be dealt with in the forth coming issues. Now I would like to focus more on the LED lamps which is being tutored as the panacea for all the issues connected with energy efficiency and higher energy losses in the network. It seems that till now that none of the stake holders (Government/LED bulb manufacturers /end users) take care about this issue viz. downside of LED lamps.



Spending long hours under LED lights and bulbs can lead to serious health implications such as migraine headaches (Reference – Times of India – Chennai Times – 3rd May issue [Friday] Page 4). Now it is time for me to sign off.

Kindly stay tuned till I meet you again in next month. Then I shall list out what are all the topics I have planned to share with you in future issues.

(To be continued...)



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“The greatest leader is not necessarily the one who does the greatest things. He is the one that gets the people to do the greatest things.” – RONALD REAGAN

FIRE SAFETY

Ordinary Combustibles

“Ordinary combustible” fires are the most common type of fire, and are designated *Class A* under both systems. These occur when a solid, organic material such as wood, cloth, rubber, or some plastics become heated to their ignition point. At this point the material undergoes combustion and will continue burning as long as the four components of the fire tetrahedron (heat, fuel, oxygen, and the sustaining chemical reaction) are available.

This class of fire is commonly used in controlled circumstances, such as a campfire, match or wood-burning stove. To use the campfire as an example, it has a fire tetrahedron—the heat is provided by another fire (such as a match or lighter), the fuel is the wood, the oxygen is naturally available in the open-air environment of a forest, and the chemical reaction links the three other facets. This fire is not



dangerous, because the fire is contained to the wood alone and is usually isolated from other flammable materials, for example by bare ground and rocks. However, when a class-A fire burns in a less-restricted environment the fire can quickly grow out of control and become a wildfire. This is the case when firefighting and fire control techniques are required.

This class of fire is fairly simple to fight and contain—by simply removing the heat, oxygen, or fuel, or by suppressing the underlying chemical reaction, the fire tetrahedron collapses and the fire dies out. The most common way to do this is by removing heat by spraying the burning material with water; oxygen can be removed by smothering the fire with foam from a fire extinguisher; forest fires are often fought by removing fuel by backburning; and an ammonium phosphate dry chemical powder fire extinguisher (but not sodium bicarbonate or potassium bicarbonate both of which are rated for B-class fires) breaks the fire’s underlying chemical reaction.

As these fires are the most commonly encountered, most fire departments have equipment to handle them specifically. While this is acceptable for most ordinary conditions, most firefighters find themselves having to call for special equipment such as foam in the case of other fire.

Flammable liquid and gas

These are fires whose fuel is flammable or combustible liquid or gas. The US system designates all such fires “Class B”. In the European/Australian system, flammable liquids are designated “Class B”, while burning gases are separately designated “Class C”. These fires follow the same basic fire tetrahedron (heat, fuel, oxygen, chemical reaction) as ordinary combustible fires, except that the fuel in question is a flammable liquid such as gasoline, or gas such as natural gas. A solid stream of water should never be used to extinguish this type because it can cause the fuel to scatter, spreading the flames. The most effective way to extinguish a liquid or gas fueled fire is by inhibiting the chemical chain reaction of the fire, which is done by dry chemical and Halon extinguishing agents, although smothering with CO₂ or, for liquids, foam is also effective. Halon has fallen out of favor in recent times because it is an ozone-depleting material; the Montreal Protocol declares that Halon should no longer be used. Chemicals such as FM-200 are now the recommended halogenated suppressant. Some newer clean agents designed to replace halon work by cooling the liquid below its flash point, but these have limited class B^[clarification needed] effect.

Electrical

Electrical fires are fires involving potentially energized electrical equipment. The US system designates these “Class C”; the Australian system designates them “Class E”. This sort of fire may be caused by short-circuiting machinery or overloaded electrical cables. These fires can be a severe hazard to firefighters using water or

other conductive agents: Electricity may be conducted from the fire, through water, the firefighter's body, and then earth. Electrical shocks have caused many firefighter deaths.

Electrical fire may be fought in the same way as an ordinary combustible fire, but water, foam, and other conductive agents are not to be used. While the fire is or possibly could be electrically energized, it can be fought with any extinguishing agent rated for electrical fire. Carbon dioxide CO₂, FM-200 and dry chemical powder extinguishers such as PKP and even baking soda are especially suited to extinguishing this sort of fire. PKP should be a last resort solution to extinguishing the fire due to its corrosive tendencies. Once electricity is shut off to the equipment involved, it will generally become an ordinary combustible fire.

Metal

Certain metals are flammable or combustible. Fires involving such are designated "Class D" in both systems. Examples of such metals include sodium, titanium, magnesium, potassium, uranium, lithium, plutonium, and calcium. Magnesium and titanium fires are common. When one of these combustible metals ignites, it can easily and rapidly spread to surrounding ordinary combustible materials.

With the exception of the metals that burn in contact with air or water (for example, sodium), masses of combustible metals do not represent unusual fire risks because they have the ability to conduct heat away from hot spots so efficiently that the heat of combustion cannot be maintained—this means that it will require a lot of heat to ignite a mass of combustible metal. Generally, metal fire risks exist when sawdust,

machine shavings and other metal 'fines' are present. Generally, these fires can be ignited by the same types of ignition sources that would start other common fires.

Water and other common firefighting materials can excite metal fires and make them worse. The NFPA recommends that metal fires be fought with "dry powder" extinguishing agents. Dry powder agents work by smothering and heat absorption. The most common of these agents are sodium chloride granules and graphite powder. In recent years powdered copper has also come into use.

Some extinguishers are labeled as containing *dry chemical* extinguishing agents. This may be confused with *dry powder*. The two are not the same. Using one of these extinguishers in error, in place of dry powder, can be ineffective or actually increase the intensity of a metal fire.

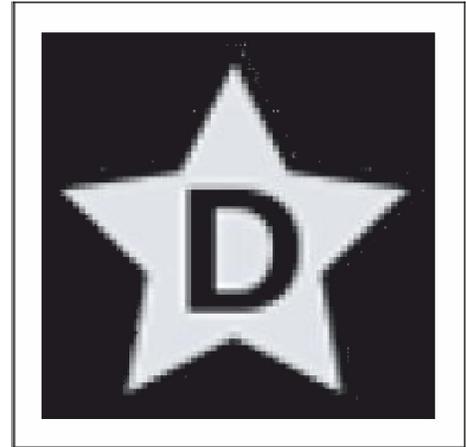
Metal fires represent a unique hazard because people are often not aware of the characteristics of these fires and are not properly prepared to fight them. Therefore, even a small metal fire can spread and become a larger fire in the surrounding ordinary combustible materials.

Cooking oils and fats (kitchen fires)

Fires that involve cooking oils or fats are designated "Class K" under the American system, and "Class F" under the European/Australasian systems. Though such fires are technically a subclass of the flammable liquid/gas class, the special characteristics of these types of fires are considered important enough to recognize separately. Saponification can be used to extinguish such fires. Appropriate fire extinguishers may also have hoods over them that help extinguish the fire.

Each fire extinguisher has its own symbolic notation, that is a special geometric symbol to make it easier for you to identify the extinguisher type. They also have some additional information necessary in case of this or that class of fire fighting.

- **Class A fire extinguishers**, for example, have the green triangle on them and also the special numerical rating, showing the amount of water this extinguisher holds and the amount of fire it is able to extinguish.
- **Class B fire extinguishers** are marked with the red square and have the numerical rating indicating the approximate area of fire (in square feet) it is able to extinguish.



- **Class C fire extinguishers** are marked with the blue circle, but they don't have any numerical rating. As a rule they contain the non-conductive extinguishing agent, because they are often used for electrical fire fighting.
- **Class D fire extinguishers** have the yellow decagon on them and are mostly regarded as the part of chemical laboratory firefighting equipment. They also don't have any numerical rating on them. There are also class K fire extinguishers, marked with the black hexagon. They are intended for the fighting the fire, caused by any cooking oils, fats or trans-fats combustion and are highly recommended for restaurant or cafeteria kitchens.

Fire Extinguisher Chart

Extinguisher		Type of Fire				
Colour	Type	Solids (wood, paper, cloth, etc)	Flammable Liquids	Flammable Gasses	Electrical Equipment	Cooking Oils & Fats
	Water	✓ Yes	✗ No	✗ No	✗ No	✗ No
	Foam	✓ Yes	✓ Yes	✗ No	✗ No	✓ Yes
	Dry Powder	✓ Yes	✓ Yes	✓ Yes	✓ Yes	✗ No
	Carbon Dioxide (CO ₂)	✗ No	✓ Yes	✗ No	✓ Yes	✓ Yes

- **Water or APW (Air pressurized water) fire extinguishers** are as a rule recommended for class A fire fighting and are effective in case of wood, paper or plastic ignition. Their operation principle is based on the reducing the temperature of the burning materials below their ignition temperature. The APW units, available in the USA, as a rule, are made of stainless steel and contain 2.5 gallons (9 litres) of water. Their main advantage is their price and their harmlessness. As for the disadvantages... Well, they cannot be used in case of class B fires or electrical fires, and mostly are recommended for the class A fire fighting only. There are also Water Mist fire extinguishers, very popular in hospitals. These harmless and non-contaminant fire extinguishers contain 1.75 or 2.5 gallons of water and can be used both for class A and class C fires

fighting. Foam fire extinguishers are as a rule used in case of class B fires. The foam, contained in them, reduces the oxygen around the fire. They are able to progressively put out the fire without any flashback. Depending on their contents there are AFFF (aqueous film forming foam), AR-AFFF (Alcohol-resistant aqueous film forming foams), FFFP (film forming fluoroprotein), CAFS (compressed air foam system), Arctic Fire and FireAde fire extinguishers. AFFF units are portable foam extinguishers, used for class A and class B fires fighting as well as for vapor suppression. AR-AFFF units are used in case when fuel, having caused the fire, contains alcohol, and are able to create the alcohol-resistant foam blanket. FFFP fire extinguishers are very at hand in case of alcohol-based liquids ignition, as they are able to create the heat resistant foam blanket and thus effectively put out the class C fire. CAFS, containing the special foam solution at high air pressure, are mostly used for water supply extension or (in case of A class fire or, if with the very dry foam contents, in case of B class fire) for vapour suppression. Arctic Fire extinguishers are very interesting and effective firefighting equipment solution, as they contain the special agent, able to cool and emulsify the heated and ignited materials faster than any water or foam fire extinguisher does. They are highly recommended for use in case of class A, B or D fires. FireAde extinguishers have something in common with Arctic Fire units, as they operate on the same principle, turning the ignited liquids into non-inflammable ones thanks to their special temperature reducing agent. But unlike Arctic Fire units, these ones are recommended for use in case of class A or class B fire only.

- ▶ **Dry powder fire extinguishers** as a rule contain some powder based agent, able to break the chemical chain reaction, sustaining the fire. There are monoammonium phosphate (“tri-class” or “multipurpose”) units, belonging to this group, that are recommended for use in case of class A, B, and C fires, sodium bicarbonate fire extinguishers, that prevent the oxygen reaching to the fire, discharging the carbon dioxide and are used on class B and C fires, or potassium bicarbonate (also famous as aka Purple-K) extinguishers, popular in oil and gas industry for their powerful effect in case of class B or C fires. The dry powder fire extinguishers also include Potassium bicarbonate & Urea Complex units, effective on Class B and C fires thanks to their agents ability for decrepitation and inhibition of fire sustaining free-radicals production on large surface areas, then Potassium Chloride, or Super-K units, containing protein-foam compatible dry chemical, very effective in case of class B or C fires, or Foam-Compatible units, containing sodium bicarbonate based dry chemical, effective on class B or C fires and using silicone as a waterproofing agent, what makes them compatible with most of synthetic foam fire extinguishers. One of the most special dry powder fire extinguishers kinds is the MET-L-KYL / PYROKYL units, contains silica gel particles, preventing the unburned fuel contact with air. It makes this type of fire extinguishers irreplaceable in case of pyrophoric liquid fires, as well as in case of any other class B fires. The dry-powder fire extinguishers are very effective and popular in many industries as the reliable fire equipment, but the disadvantage of some of them is that some of the agents they contain turn to be rather corrosive and thus must be quickly removed from the surface.
- ▶ **Carbon dioxide(CO₂) and other clean agents containing fire extinguishers** operate almost on the same principle that the dry-powder extinguishers do. They inhibit the chemical chain reaction, sustaining the fire, but have one great advantage here – they don’t leave any residue after the discharge, what makes them invaluable as the part of firefighting equipment for offices. The fire extinguishers of this type as a rule contain halon (a gaseous agent, inhibiting the chemical reaction of fire and effective in case of class B or C fires) or CO₂, able to reduce the oxygen around the fire area. They can also contain the mixtures of inert gases, like Inergen and Argonite. There are Novec 1230 fluid units, containing fluoronated ketone. These ones are able to cool the surfaces and objects on fire very fast and effectively. Sorry to say, portable Novec 1230 fluid extinguishers are not available in the US, but their special clean agent is used in fixed firefighting systems, already available in America.

“There is no investment you can make which will pay you so well as the effort to scatter sunshine and good cheer through your establishment.”

- ORISON SWETT MARDEN

AUDI OPENS BATTERY STORAGE UNIT IN BERLIN

Audi has opened up Germany's largest multi-use storage unit on the EUREF Campus. The storage unit has a capacity of 1.9 MWh and uses used lithium-ion batteries from development vehicles to test various interaction scenarios between electric cars and the power grid. The objective: Intelligent networking to promote the energy transition. For more information see the IDTechEx report on Second Life Electric Vehicle Batteries 2019-2029. Audi has committed to emissions-free mobility and set clear goals on the way to this vision: As early as 2025, around 40 percent of all newly sold Audi models are to be equipped with an electrified drive. By the middle of the coming decade, this is equivalent to roughly one million electrified cars per year. As the number of electric models rises, a huge mobile energy storage unit is growing with it. It carries a great deal of potential, provided that intelligent use is made of the storage capacity. It is therefore particularly important to integrate electric vehicles into the energy industry. If one in ten passenger cars in Germany were electric, this would correspond to a flexible energy storage unit with a capacity of almost 200 GWh. Connecting electric cars with renewable energies in an intelligent way can have a positive effect on the energy transition. This would allow charging with solar or wind power, depending on what is available. Further, it would potentially allow flexible reactions to short-term power fluctuations in the grid. Audi is cooperating with partners from the energy industry (e.g. The Mobility House) to turn this vision into reality.



The storage unit on the EUREF Campus that is testing this concrete use case spans an area of around 110 square meters (1,184.0 sq ft) and serves as a real-life laboratory for further applications. It is connected to Berlin's medium-voltage power grid with one megawatt of power, which corresponds to the average charging requirement of around 200 electric cars. With its capacity of 1.9 MWh, the storage unit could supply the entire 5.5 hectare office and science campus with electricity independently for just under two hours. Rapid-charging stations in the immediate vicinity, where electric cars can charge with up to 175 kW, are a further use case. To

ensure that the high electricity requirement is covered in the most cost-efficient way possible and the local power grid is not put under excessive strain, the battery storage unit functions as a buffer here, too. Intelligent integration into the power grid allows the energy reservoir to absorb excess electricity from wind power and photovoltaic systems or the campus's own combined heat and power plant. This compensates for fluctuations in the grid, counteracts local peak demands, and helps prevent blackouts by stabilizing the transmission network. Smoothing load peaks and compensating for frequency fluctuations in this way reduces energy costs thanks to high levels of efficiency and fast response times. In addition, the power supply is optimized in terms of its CO₂ neutrality.

Due to the large portion of renewable energies with varying electricity generation in the surrounding area, Berlin offers ideal conditions for the development of intelligent charging control that may be expanded to include a growing number of electric cars as buffer storage in the future. The project partners intend to conduct a model experiment with wind farms in Brandenburg and Mecklenburg-West Pomerania to show how excess green electricity can be buffered on the EUREF Campus in a targeted manner. Wind turbines would no longer have to be taken off the grid in the event of temporary excess electricity production. It is a small building block for a sustainable world of energy and an addition to the industrial storage of large volumes of excess electricity that Audi has been practicing with its power-to-gas plant in Werlte since 2013. Aside from research on interfaces for intelligent integration into the power grid of the future, the battery storage unit on the EUREF Campus provides further insights that will be incorporated into future projects. Audi engineers are testing the use of stationary energy storage units in the power grid, thereby creating a way to reuse used batteries from electric cars—a sensible and resource-conserving application since batteries retain the majority of their capacity after being used in cars. In addition, Audi is developing concepts for an effective way to recycle batteries from used modules.

Read more at:

<https://www.offgridenergyindependence.com/articles/17325/audi-opens-battery-storage-unit-in-berlin>

5 REASONS WHY CHINA IS THE WORLD'S SUSTAINABLE DEVELOPMENT SUPERPOWER

As the world gets caught up in the looming US-China trade war set to shake up the capital markets, a shadow has been cast over what is arguably the bigger, more important story of our times—China's role in the sustainable development of our planet.

When I began my professional career in China 15 years ago, evidence of business activity impacting the environment and society was already gaining prominence. What were deemed as quality control problems and shoddy health and safety practices ballooned into crises of epic proportions. Major scandals rooted in corruption and gross negligence were aplenty, and air pollution levels across the manufacturing zones where major cities were located was averaging hazardous levels for weeks on end.

While the country is not short of critics – be it ethics and corruption, human rights, environmental management, or labour standards – there are many reasons why China's role in sustainable development should be taken seriously. Here are five:

1. What China has done for the poor, no other nation in human history has made possible

China is reducing poverty at a rate unparalleled in human history. Since the country started its reforms four decades ago, the government has successfully lifted 800 million people out of poverty, accounting for nearly 70 per cent of the world's poverty reduction. Poverty eradication continues to be the Chinese government's key focus in its 2020 Plan, and while the scale of the programme's success speaks for itself, many social issues such as skills development, community governance and protection of "left-behind" children remain high priority.

2. China's war against pollution is showing effects

For years, China's cities connote images of choking smog, impossible traffic and polluted waterways. Mainstream media seem to jump at every opportunity to plaster what have become stock images of China's dirty past to

represent its impending future. Today, people based in China will tell you something different. Keeping in mind the scale of China, its major cities and hubs have become successful testbeds for green solutions on every possible front – from sustainable city planning to forestry management, electric vehicles (EV) to “blue sky battles”. China accounted for half of EV sales worldwide; nearly all of the world’s electric buses are currently operating in China. In fact, the country – along with India - is behind the significant increase in green foliage that our planet is seeing from space.

China’s stringent environmental measures have already had significant impact on both local and foreign industries operating in China. Over the past five years, the Chinese government issued - the “Air Ten”, “Water Ten” and “Soil Ten” policy measures one after another, making it clear that it was serious about fighting pollution on all fronts. Vexing as it may be for operations heavily dependent on their China-based suppliers, many companies are acknowledging the need to bite the bullet and accept that these measures are becoming China’s new normal.

3. China’s energy mix cannot be fixed overnight

China’s reliance on coal has long been a pain point in the world’s fight against global warming. After all, the country is responsible for more than one quarter of all global carbon emissions—more than the United States and the European Union combined. Yet, despite being the poster child for dirty air and industrial pollution, China has done more in a decade than any country in the world to transition from fossil fuels. While news of coal-funded projects continue to surface even in 2019 as China balances this transition with the heavy burden of potentially stranded coal assets (not forgetting the millions of coal workers out of work), the country deserves recognition for its commitment to investing billions more in low-carbon power generation and other clean energy technologies.

4. China is arguably already the leader of the next industrial revolution

After a century of civil turmoil, China’s four decades of economic momentum has allowed the country to leapfrog the rest of the world in terms of technological advancements. Already widely accepted as a leader in artificial intelligence, 5G telecoms, the internet of things, electric vehicles and battery technology, China’s hand in the tech game is not only extremely valuable for sustainable development, the world’s most pressing issues of food security, climate change and pollution would benefit greatly from such advancements. Chinese tech companies will no doubt be formidable players, helping the world integrate sustainable projects with advanced digitalisation.

5. China’s global alliance from the Belt & Road Initiative is a real opportunity to fight poverty

Critics of the China-led Belt & Road Initiative (BRI), such as the United States, have been quick to pass judgement on China’s diplomatic intentions with debt-stricken countries. Yet, given the scale of the project to date, and the number of members from developing and developed nations alike in support of the BRI, there is a convincing argument for helping the poorer nations move up the value chain through market access and infrastructural development. In last month’s Belt Road Forum, Premier Xi Jinping emphasised the need to ensure that the project is green and sustainable. As the British finance minister Philip Hammond remarked, “The BRI is an extraordinarily ambitious vision. To turn that vision into a sustainable reality, it must work for everyone involved.” China’s engagement with member states will be a true test of its will and ambition to build a better tomorrow.

The climate emergency the world faces is real and threatens all of us. Rather than looking through a filtered lens depicting a new global leader challenging the status quo, it is time for us to acknowledge that China is doing its part as a sovereign state to address the serious threat looming on the horizon.

Opportunities abound for businesses and governments alike to work with China to fulfill its environmental targets. China’s door is open. *Let’s cast aside our fears and prejudices, and focus on the real issue at hand to give future generations their very best shot at survival.*

Courtesy : Eco Business

NEW CELL EFFICIENCY RECORDS FOR TRINA AND CANADIAN SOLAR

Trina Solar today announced it has achieved a world record efficiency of 24.58% for its n-type monocrystalline tunnel oxide passivated contact (TOPCon) cell technology. The record was achieved at Trina's State Key Laboratory for PV Science and Technology in China and has been independently confirmed by the Institute for Solar Energy Research in Hamelin (ISFH), Germany.



According to Trina, the record was achieved on a wafer measuring 244.62 cm² using a low cost industrial process with a boron emitter and full area rear passivating contact. The cell is bifacial, though the efficiency record here only takes into account the full area front side efficiency.

The new record supplants JinkoSolar's achievement of 24.2% for an n-type TOPCon cell, set in January. TOPCon technology has generated much interest among manufacturers thanks to its potential to achieve higher efficiencies using similar processes and equipment to PERC [passivated emitter rear contact] production, enabling manufacturers to compete on efficiency with newer technologies such as IBC or heterojunction cells whilst avoiding the need to invest in entirely new production lines.

New record for cast mono

Canadian Solar also announced a new efficiency record today, for its P5 cast mono technology. The company reached 22.28% efficiency using a P5 wafer with other technologies including selective emitter, silicon oxide passivation, multi-layer anti reflection coating, aluminum oxide back side passivation and advanced metallization, as well as a metal catalyzed chemical etching – or 'black silicon' process. Canadian Solar's efficiency record has been confirmed by Fraunhofer ISE.

With multicrystalline products rapidly losing share to higher efficiency monocrystalline rivals in recent years, manufacturers with large multi capacities are working to perfect the cast mono process, which allows them to produce ‘mono like’ wafer material using a modified multicrystalline furnace, avoiding costly investment in ingot pulling machinery.

GCL Systems Integration has already introduced modules based on the technology to market and exhibited a cast mono module with 18.9% efficiency at the recent Intersolar Europe show in Munich. As more manufacturers improve on the process and bring products to market, the technology could represent a significant shift in the years ahead.

“We are pleased to see Canadian Solar P5 technology set a new world record,” said company CEO Shawn Qu. “This shows that our multicrystalline technology can achieve higher efficiencies while still [enjoying a] cost advantage.”

RESEARCHERS GAIN KEY INSIGHT INTO SOLAR MATERIAL’S SOARING EFFICIENCY

Over the last decade, Colorado State University researchers have led pioneering studies into improving the performance and cost of solar energy by fabricating and testing new materials that extend beyond the capabilities of silicon. They have focused on a material that shows promise for replacing silicon, called cadmium telluride.

In collaboration with partners at Loughborough University in the United Kingdom, researchers at CSU’s National Science Foundation-supported Next Generation Photovoltaics Center have reported a key breakthrough in how the performance of cadmium telluride thin-film solar cells is improved even further by the addition of another material, selenium. Their results were published in the journal *Nature Energy* earlier this month and are the subject of a “News and Views” article.

“Our paper goes right to the fundamental understanding of what happens when we alloy selenium to cadmium telluride,” said Kurt Barth, a director of the Next Generation Photovoltaics Center and an associate research professor in the Department of Mechanical Engineering.

Until now, it was not well understood why the addition of selenium has clocked record-breaking cadmium telluride solar cell efficiency — the ratio of energy output to light input — of just over 22 percent. Together with CSU collaborators W.S. Sampath and Amit Munshi, Barth and an international team have solved that mystery. Their experiments revealed that selenium overcomes the effects of atomic-scale defects in cadmium telluride crystals, providing a new path for more widespread, less expensive solar-generated electricity.

The cadmium telluride thin films that the CSU team makes in the lab use 100 times less material than conventional silicon solar panels. They are thus easier to manufacture, and they absorb sunlight at nearly the ideal wavelength. Electricity produced by cadmium telluride photovoltaic cells is the lowest-cost available in the solar industry, undercutting fossil fuel-based sources in many regions of the world.

According to the paper, electrons generated when sunlight hits the selenium-treated solar panel are less likely to be trapped and lost at the material’s defects, located at the boundaries between crystal grains as they are grown. This increases the amount of power extracted from each solar cell. Working with materials fabricated at CSU via advanced deposition methods, the team discovered this unexpected behavior by measuring how much light is emitted from selenium-containing panels.

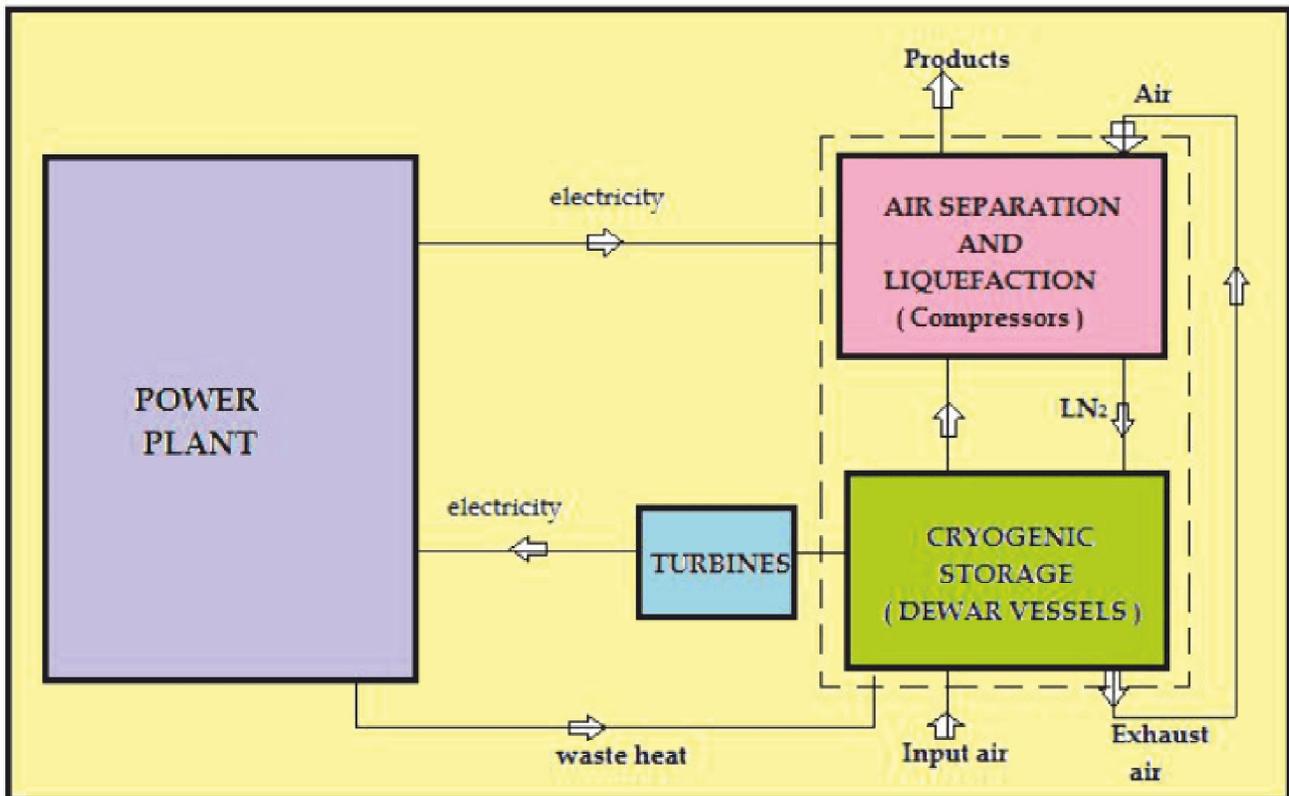
As selenium is not evenly distributed across the panels, they compared luminescence emitted from areas where there was little-to-no selenium present and areas where the selenium was very concentrated. “Good solar cell material that is defect-free is very efficient at emitting light, and so luminesces strongly,” said Tom Fiducia, the paper’s lead author and a Ph.D. student at the University of Loughborough, working with Professor Michael Walls. “It is strikingly obvious when you see the data that selenium-rich regions luminesce much more brightly than the pure cadmium telluride, and the effect is remarkably strong.”

“A leader is one who knows the way, goes the way, and shows the way.”

– JOHN C. MAXWELL

HIGHVIEW POWER TO BRING GIGA-SCALE CRYOGENIC ENERGY STORAGE TO CHILE

Dr. Javier Cavada, CEO of Highview Power, the global leader in long-duration energy storage solutions and developer of the patented giga-scale cryogenic energy storage solution, will be meeting with the Hon. Susana Jiménez Schuster, Minister of Energy. During his visit, Dr. Cavada will discuss the company's ambitious expansion strategy into the Chilean market, and encourage the government to increase its 2050 renewable energy goals to 100% before UN climate talks, COP205, which will be located in Santiago in December of 2019. For more information see the IDTechEx report on Distributed Generation: Minigrad Microgrid Zero Emission 2018-2038.



Highview Power's expansion into Chile comes at a crucial time for the country as growing energy demand, high electricity costs, and changing consumption patterns require energy solutions that are clean, reliable and cost-efficient while supporting the nation's grid, providing critical backup power during power outages and natural disasters and solving problems for key industries, like mining.

Highview Power's cryogenic systems are the only long-duration energy storage solution available today that are locatable and operate at giga-scale for long duration - meaning they offer multiple gigawatt-hours of storage for weeks, not just hours or days. Highview is proving that with the right technology and solutions, renewables can meet baseload (24-hour per day) demand and complement and ultimately replace thermal and nuclear baseload, in addition to supporting the electricity transmission and distribution systems while providing additional security of supply. Chile is ideal for baseload renewable energy due to its rapidly growing solar market, which made up 9.4% share of Chile's power generation in 2019.

More grid operators are turning to long-duration energy storage to help improve power generation economics, balance the grid and increase reliability. Energy is Key to Economic Development and Foreign Investment Mining - particularly copper mining - dominates energy consumption in the country, but high energy costs are hindering economic development and international investment. While the existing grid is strong, Chile needs an additional capacity of 8,000 megawatts by 2020 just to meet the mining sector's rising demand, a challenge that is further compounded by the lack of new energy facilities coming online.

Highview Power's expansion into Chile will help replace expensive diesel backup generators - which are both expensive and difficult to transport to remote mining area - with cryogenic energy storage plants that are locatable anywhere. As markets around the world focus on drastically reducing carbon dioxide emissions, there is an accelerated shutdown of traditional coal-fired power stations and massive deployment of intermittent renewable energy plants (mostly solar PV and wind). This is causing grid reliability issues that are dependent on weather conditions, which drives demand of long-duration energy storage to ensure a stable and reliable grid.



Cryogenic energy storage plants - besides being the most suitable solution to balance renewables and enable reliable renewable baseload power - support and accelerate the energy transition when combined with traditional thermal power plants. The plants can optimize operations utilizing waste heat and cold into their process which enables even more affordable and sustainable power production. When shutting down and dismantling old power stations, the existing infrastructure and connections left behind become the perfect location to install cryogenic energy storage plants, solving the challenge of integrating massive amounts of renewables while retiring traditional assets.

Highview Power's Cryogenic Energy Storage - Cool Air Technology for a Cooler Planet. The benefits of cryogenic energy storage technology could solve a host of energy challenges for Chile and other countries in the region, as the international community advances toward a 100% renewable energy future. Highview Power's cryogenic energy storage systems have pumped-hydro capacity without any geographic constraints. Its proprietary technology uses liquid air as the storage medium and can deliver anywhere from 20 MW/80 MWh to more than 200 MW/1.2 GWh of energy, has a lifetime of 30 to 40 years, and can easily be decommissioned and recycled at the end of life.

Highview Power enables critical operations for utilities and independent power producers by delivering the lowest cost clean energy solution for large scale, long-duration applications. Best of all, Highview Power's patented cryogenic energy technology uses only benign materials and has zero emissions to deliver the cleanest solution for storing energy - nothing but fresh air in, fresh air out - making it the best energy storage choice for our planet.

Source: Highview Power

UNITI ONE ELECTRIC CITY CAR HITS THE STREETS FOR THE FIRST TIME

The One electric city car from team Uniti has spent much of its testing time indoors so far, but the company recently decided to take advantage of the glorious (northern) summer sunshine and take the electric micro car for a spin around southern Sweden.

Where Renault's similarly-sized Twizy quadricycle has a maximum range of 100 km, the One is promised to roll for 300 km (186 mi) before needing a recharge of its relatively small 22 kWh battery pack. That's almost in Nissan Leaf territory and claimed possible thanks to the vehicle's lightweight and energy-efficient design. A removable auxiliary battery unit can be charged up at home or in the office for an additional 30 km of range.

The two-seater is expected to be just 2.91 m (9.5 ft) long, 1.275 m (4.1 ft) wide and 1.428 m (4.6 ft) high and have a dry weight of 450 kg (990 lb). It will go from standstill to 80 km/h in 3.5 seconds, on its way to a top speed of 130 km/h (80 mph), which again trumps the Twizy.

The passenger is seated behind the driver, who faces a tablet-like display in the middle of twin joystick handlebar steering controls and enjoys good visibility thanks to a relatively large windshield. A full suite of safety sensors for such things as collision avoidance will also feature.

The successfully crowd funded Uniti One is expected to go on sale next year for a starting price of €14,900 (about US\$17,300).

Target Specifications*

- .. 240km range
- .. 130km/h top speed
- .. Rear wheel drive
- .. Dual motors output of 120kW
- .. 26kWh battery pack, DC fast charging
- .. 25min from 20-80% on standard charge
- .. 900kg gross weight

A FIRST-OF-ITS-KIND PORTABLE LOW-PRESSURE SOLAR-STEAMING-COLLECTION SYSTEM PRODUCES REALLY CHEAP CLEAN WATER

A team led by associate professor Donglei (Emma) Fan in the Cockrell School of Engineering's Walker Department of Mechanical Engineering developed a new approach to solar steaming for water production – a technique that uses energy from sunlight to separate salt and other impurities from water through evaporation. In a paper published in the most recent issue of the journal *Advanced Materials*, the authors outline how an origami rose provided the inspiration for developing a new kind of solar-steaming system made from layered, black paper sheets shaped into petals. Attached to a stem-like tube that collects untreated water from any water source, the 3D rose shape makes it easier for the structure to collect and retain more liquid.

Current solar-steaming technologies are usually expensive, bulky and produce limited results. The team's method uses inexpensive materials that are portable and lightweight. Oh, and it also looks just like a black-petaled rose in a glass jar. Those in the know would more accurately describe it as a portable low-pressure controlled solar-steaming-collection "unisystem." But its resemblance to a flower is no coincidence.

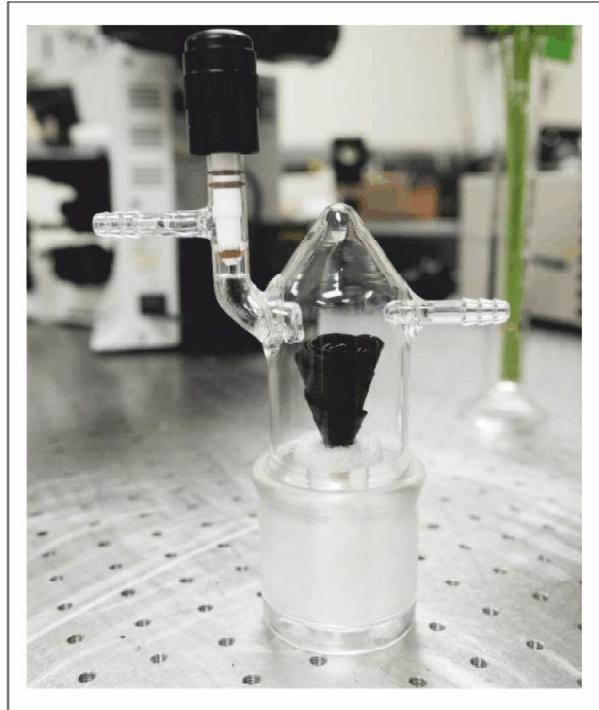
"We were searching for more efficient ways to apply the solar-steaming technique for water production by using black filtered paper coated with a special type of polymer, known as polypyrrole," Fan said. Polypyrrole is a material known for its photothermal properties, meaning it's particularly good at converting solar light into thermal heat.

Fan and her team experimented with a number of different ways to shape the paper to see what was best for achieving optimal water retention levels. They began by placing single, round layers of the coated paper flat on the ground under direct sunlight. The single sheets showed promise as water collectors but not in sufficient amounts. After toying with a few other shapes, Fan was inspired by a book she read in high school. Although not about roses per se, "The Black Tulip" by Alexandre Dumas gave her the idea to try using a flower-like shape, and she discovered the rose to be ideal. Its structure allowed more direct sunlight to hit the photothermic material – with more internal reflections – than other floral shapes and also provided enlarged surface area for water vapour to dissipate from the material. The device collects water through its stem-like tube – feeding it to the flower-shaped structure on top. It can also collect rain drops coming from above. Water finds its way to the petals where the polypyrrole material coating the flower turns the water into steam. Impurities naturally separate from water when condensed in this way.

"We designed the purification-collection unisystem to include a connection point for a low-pressure pump to help condense the water more effectively," said Weigu Li, a Ph.D. candidate in Fan's lab and lead author on the paper. "Once it is condensed, the glass jar is designed to be compact, sturdy and secure for storing clean water."

The device removes any contamination from heavy metals and bacteria, and it removes salt from seawater, producing clean water that meets drinking standard requirements set by the World Health Organization.

"Our rational design and low-cost fabrication of 3D origami photothermal materials represents a first-of-its-kind portable low-pressure solar-steaming-collection system," Li said. "This could inspire new paradigms of solar-steaming technologies in clean water production for individuals and homes."



ENGINEERED BACTERIA COULD BE MISSING LINK IN ENERGY STORAGE

Engineered electroactive microbes could be part of the solution; these microbes are capable of borrowing an electron from solar or wind electricity and using the energy to break apart carbon dioxide molecules from the air. The microbes can then take the carbon atoms to make biofuels, such as isobutanol or propanol, that could be burned in a generator or added to gasoline, for example.

“We think biology plays a significant role in creating a sustainable energy infrastructure,” said Buz Barstow, assistant professor of biological and environmental engineering at Cornell University. “Some roles will be supporting roles and some will be major roles, and we’re trying to find all of those places where biology can work.” Barstow is the senior author of “Electrical Energy Storage With Engineered Biological Systems,” published in the Journal of Biological Engineering.

Adding electrically engineered (synthetic or non-biological) elements could make this approach even more productive and efficient than microbes alone. At the same time, having many options also creates too many engineering choices. The study supplies information to determine the best design based on needs. “We are suggesting a new approach where we stitch together biological and non-biological electrochemical engineering to create a new method to store energy,” said Farshid Salimijazi, a graduate student in Barstow’s lab and the paper’s first author.

Natural photosynthesis already offers an example for storing solar energy at a huge scale, and turning it into biofuels in a closed carbon loop. It captures about six times as much solar energy in a year as all civilization uses over the same time. But, photosynthesis is really inefficient at harvesting sunlight, absorbing less than one percent of the energy that hits photosynthesizing cells. Electroactive microbes let us replace biological light harvesting with photovoltaics. These microbes can absorb electricity into their metabolism and use this energy to convert CO₂ to biofuels. The approach shows a lot of promise for making biofuels at higher efficiencies.

Electroactive microbes also allow for the use of other types of renewable electricity, not just solar electricity, to power these conversions. Also, some species of engineered microbes may create bioplastics that could be buried, thereby removing carbon dioxide (a greenhouse gas) from the air and sequestering it in the ground. Bacteria could be engineered to reverse the process, by converting a bioplastic or biofuel back to electricity. These interactions can all occur at room temperature and pressure, which is important for efficiency.

The authors point out that non-biological methods for using electricity for carbon fixation (assimilating carbon from CO₂ into organic compounds, such as biofuels) are starting to match and even exceed microbes’ abilities. However, electrochemical technologies are not good at creating the kinds of complex molecules necessary for biofuels and polymers. Engineered electroactive microbes could be designed to convert these simple molecules into much more complicated ones.

Combinations of engineered microbes and electrochemical systems could greatly exceed the efficiency of photosynthesis. For these reasons, a design that marries the two systems offers the most promising solution for energy storage, according to the authors. “From the calculations that we have done, we think it’s definitely possible,” Salimijazi said.

The paper includes performance data on biological and electrochemical designs for carbon fixation. The current study is “the first time that anybody has gathered in one place all of the data that you need to make an apples-to-apples comparison of the efficiency of all these different modes of carbon fixation,” Barstow said. In the future, the researchers plan to use the data they have assembled to test out all possible combinations of electrochemical and biological components, and find the best combinations out of so many choices.

The study was supported by Cornell and the Burroughs-Wellcome Fund.

“Before you are a leader, success is all about growing yourself. When you become a leader, success is all about growing others.” – JACK WELCH

MYSURU PROFESSOR STARTS WORK TO TRANSFORM USED COOKING OIL TO BIOFUEL

The hazards of eating at roadside eateries cannot be overstated: From the lack of basic sanitary equipment to the dusty surroundings, consuming food prepared at these humble outlets makes one vulnerable to a host of diseases. However, the one aspect that is often overlooked while one digs into the delicacies prepared at such eateries is the source of raw material used in cooking. Owners of many roadside eateries procure used cooking oil from big restaurants, and consumption of food prepared using this oil can lead to severe health complications. However, a professor at the National Institute of Engineering, Mysuru has managed to find another use for the used cooking oil, an innovation that augurs well for the health of both human beings, and the environment.

Shamsundar S, an associate professor at NIE, started work on a device that could transform used cooking oil into a biofuel that could power automobiles. What is more, Shamsundar tested the biofuel that he derived on his car. The result: Besides the marked decline in the pollutants emitted by the car, the vehicle's mileage saw a corresponding rise.

A survey he conducted made him aware that roadside eateries across the city cumulatively used 20,000 to 30,000 litres of used oil every day, and Shamsundar was determined to put this fuel to more productive use. He started by developing a device that could convert 50 litres of cooking oil into biofuel in one turn.

Shamsundar, however, is modest about the whole endeavour. Quick to point out that this is not a first-of-its-kind project, the NIE professor said that the same procedure had been tried before, albeit with inedible oil seeds. "I thought of doing the same thing but with used cooking oil. We initially tried the experiment with cooking oil we obtained from our college cafeteria, and converted it into bio-diesel through a process called transesterification," Shamsundar told TOI.

The experiment was conducted only after a careful examination of the properties of the cooking oil. Use of bio-diesel to operate an engine at college encouraged Shamsundar to test it on his car, and he had every reason to smile once he saw a surge in its mileage. The biofuel is a mixture of regular diesel with cooking oil. The fuel contains 70% diesel and 30% biofuel extracted from cooking oil. "Emission levels witnessed a drastic reduction, and the mileage, which was initially 10kmpl increased to 11kmpl," he added.

A meeting with Giridhar, managing partner of a chain of restaurants in the city, helped Shamsundar in procuring copious amounts of used cooking oil for his experiment. In an interesting gesture of appreciation, Shamsundar gave the biofuel obtained by processing the cooking oil from the restaurants back to Giridhar, who used it to operate the generators and vehicles of his many establishments.

Bigger plans

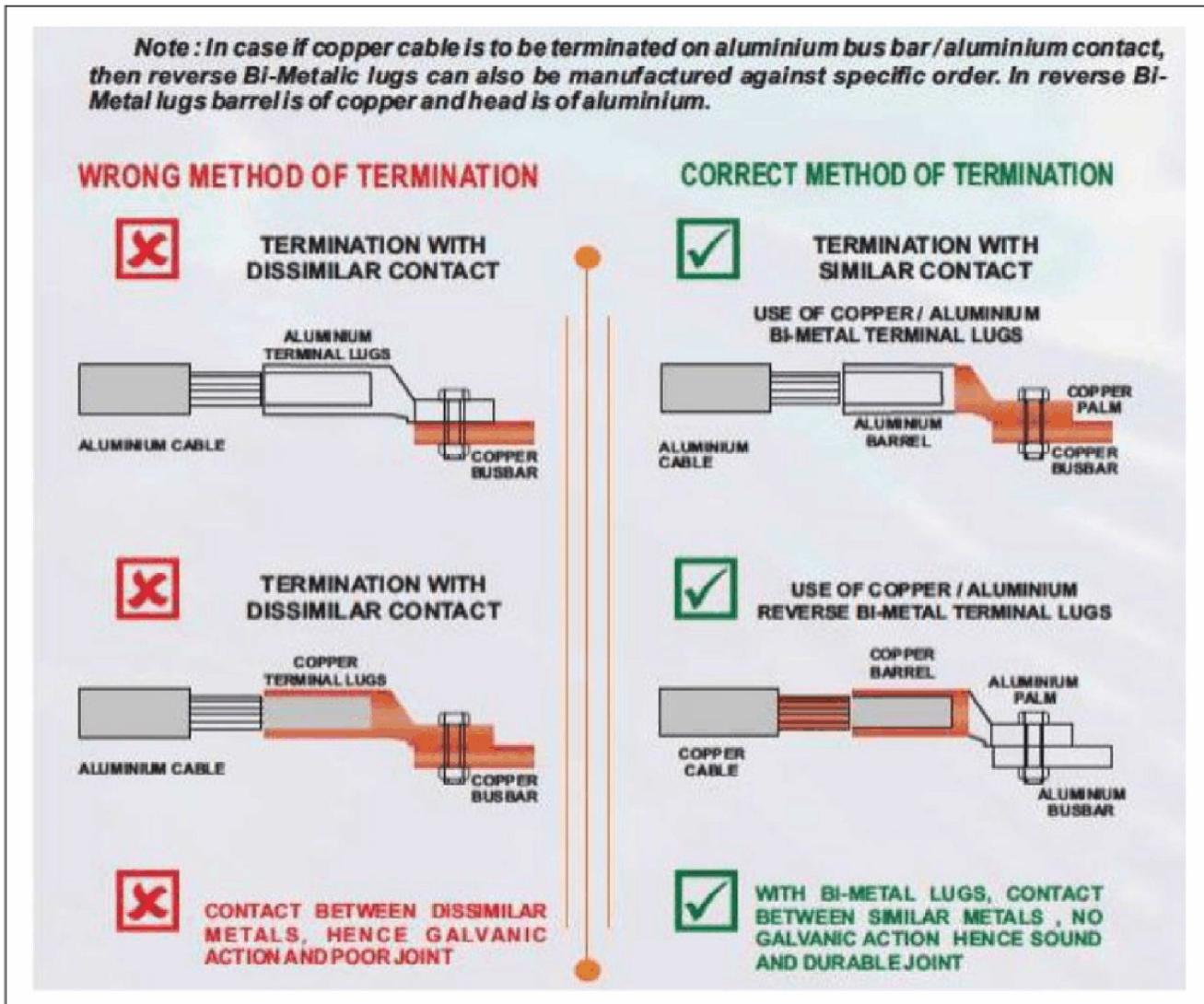
Shamsundar has now approached the Mysuru City Corporation (MCC) seeking their assistance in collecting 20,000 litres of used cooking oil in one location to facilitate mass production of the biofuel. "We are ready to share the technology with MCC under a public private partnership (PPP) model. This will help curb adulteration of cooking substance and reduce dependence on petroleum products, which will in turn decrease our reliance on imports," said the NIE professor, making an impassioned plea for a centralised unit where biofuel could be produced in massive volumes. NIE University chancellor DA Prasanna said that sinking one's teeth into fried delicacies one procures at roadside eateries might delight the tastebuds momentarily, but led to severe health complications later. Expressing pleasure with Shamsundar's initiative, which addressed several problems at once, Prasanna added, "Along with his team, Shamsundar found that the oil was carcinogenic, and decided to put it to better use. I am proud of their work."

Courtesy : Energy World

***"I've learned that people will forget what you said,
people will forget what you did, but people will never forget
how you made them feel." – MAYA ANGELOU***

BI METAL TERMINAL LUGS AND CONNECTORS

Whenever aluminium cable is to be terminated on copper bus bar or copper contact, if aluminium lug is used then contact between terminal lug and copper bus bar being of dissimilar metals, galvanic action takes place. Also if copper lug is used then contact between aluminium cable and barrel of copper terminal lug is of dissimilar metal and hence the galvanic action takes place. In order to prevent dissimilar contact and to avoid galvanic action it is always advisable to use copper aluminium Bi-Metal lugs.



In Bi-Metal lugs barrel of the lug is of aluminium and the head or palm of the lug is of copper. This ensures contact between aluminium cable to terminal lug is of aluminium and contact between terminal lug to copper bus bar or contact is of copper. Thus contact between dissimilar metal is avoided and contact between similar metal is established. Thus Bi-Metallic or galvanic action is completely eliminated and hence technically sound and durable joint is achieved.

Electrolytic copper head / palm is friction welded to electrolytic aluminium barrel. At the interface, copper molecules and aluminium molecules intermingles with each other and form durable bond. Similarly if aluminium cable is to be joined with copper cable then Bi-Metal in line connectors are to be used. Here for aluminium cable aluminium barrel is provided and for copper cable copper

barrel is provided. Copper and aluminium barrels are friction welded. Depending upon application Bi-Metal terminals, in line connectors, pin type connectors etc are manufactured.

JOINTWELL is a renowned player in this field since 1995. First time in India, Jointwell started manufacturing Copper Aluminum Bi-Metal Lugs and Connectors (links). Bi-Metal Lugs are Manufactured by Process known as Friction Welding. Also the first manufacturer who had introduced concept of Reverse Bi-Metallic Lugs. From India first time such Reverse Bi-Metal lugs was manufactured and exported.

COPPER ALUMINIUM BI METAL LUGS

CONDUCTIVE MATERIAL :

Aluminium Barrel : 99.6%

Copper Palm : 99.95%

Final Metal State : Fully Annealed, Including Joint.

Joining Method : Friction Welding, Welding Area More Than Nominal Conductor Area.

Finish : Natural.

Conductivity :

Aluminium 61.8% Iacs (Min)

Copper 99.7% Iacs

Aluminium Barrel are chemically treated to reduce contact resistance and corrosion and are filled electrically conductive corrosion inhabitant with a jointing compound and capped.



REVERSE BI METALLIC LUGS

Disclaimer : This article has been published in the interest of Electrical fraternity Editor or TNEIEA is no way promoting or vouch for this product / brand



SCHNEIDER ELECTRIC PUTS THE CONTROL OF POWER DISTRIBUTION IN YOUR DIGITAL DEVICE; LAUNCHES MASTERPACT MTZ IN INDIA

Strengthens its Industry 4.0 play with this next generation product aimed at efficient power for critical industrial buildings and plants. An industry first, made in India product, with embedded Class 1 metering, which saves time and energy.

Hyderabad, India- February 15, 2019 – Schneider Electric, the global leader in digital transformation of energy management and automation, today announced the launch of Masterpact MTZ, the next generation of high power low voltage circuit breakers, combining the company's legendary performance and reliability with new digital capabilities. Assembled in India, for India, and for the world, Masterpact MTZ is a first-of-its-kind air circuit breaker in the market that provides the customer with multiple benefits of enhanced performance, increased reliability and safety. It is a future ready product that seamlessly integrates within the Smart Panel architecture, and can be remotely monitored and controlled with any supervision system to carry out predictive and preventive maintenance, and asset and energy management.



The world is witnessing a paradigm shift in energy production and management trends, and this has paved the way for the fourth Industrial Revolution. Backed by the technological advancements, it is an industrial era that is focused at enabling faster, more flexible, and more efficient processes to produce higher-quality goods at reduced costs. Being the global leader, Schneider Electric is committed to investing and creating innovative, compliant and future ready products that can meet the needs of Industry 4.0.

Commenting on the new launch, Shrinivas Chebbi, President Buildings Business, Schneider Electric India said, “We at Schneider Electric, are heavily reliant on digitisation to achieve our digital and sustainability goals while continuously improvising on our product line and services to help our customers maximise their operations and become energy efficient. Masterpact MTZ is a pioneering product in the category that is compliant with our energy management goals. Masterpact’s connectivity, digital capabilities and ability to be seamlessly integrate into our EcoStruxure Power architecture will deliver significant benefits for end users, specifiers, panelbuilders and contractors requiring high power breakers as part of low-voltage solutions for industrial sites, critical applications and buildings. Most importantly, Masterpact MTZ will ensure End to End Digital Customer Experience for all the stakeholders throughout project lifecycle, improving operational efficiency and safety”

Speaking at the occasion Anil Chaudhry, Zone President and Managing Director, Schneider Electric India said, “Masterpact MTZ represents for us a next step in our effort towards digitisation of power distribution, adding to our commitment to a sustainable circular economy.”

Schneider Electric’s EcoStruxure Power, is a unified platform that brings together the company’s industry leading connected products, edge control, apps, analytics and services into a connected and integrated

framework for all areas of the power distribution and management chains. The Masterpact MTZ a digital product that is part of the base layer of connected products in the EcoStruxure architecture.

Product highlights:

The new product analyses energy usage efficiently, thus optimising performance and efficiency.

Building on its strengths, the Masterpact MTZ will offer the same ratings, the same tripping performance and the same footprint for seamless, quick integration and retrofitting in switchboards as the current Masterpact range. In addition, the product offers easy integration in Smart Panels and connection to management systems with native embedded Ethernet connection.

Masterpact MTZ protects equipment and activity against cable overloads, short circuits and insulation faults. Customizing Masterpact MTZ with digital modules can also be achieved anytime, anywhere..

Masterpact MTZ also allows for better safety and reliability, the interactive smart HMI reduces safety risk for local maintenance as no direct contact is required for quick analysis and action through a secure Bluetooth connection. In case of power outage, customers can minimise downtime and restore power quickly and safely using their smart phone. Key data is saved before tripping (measures, protection settings) and even without power.

For more information on Masterpact MTZ, please visit <http://masterpactmtz.schneider-electric.com>

FUEL CELL FORKLIFTS POWERED WITH SOLAR HYDROGEN ENERGY

Toshiba Energy Systems & Solutions Corporation (Toshiba ESS) announced that the newly installed Toshiba ESS “H2PLAZA,” a facility that produces and supplies hydrogen with renewable energy for fuel-cell forklifts, is now supplying hydrogen at Toyota Industries Corporation’s Takahama plant in Aichi Prefecture. For more information see the IDTechEx report on Fuel Cell Vehicles 2019-2029. The facility supplies hydrogen made from solar power panels to 13 fuel-cell forklifts used at the plant which control the amounts of hydrogen produced and compressed by Toshiba ESS’s hydrogen energy management system, which allows more efficient use of energy to monitor the amounts of hydrogen produced and the storage amounts for each fuel-cell forklift in real time. Toshiba ESS has a wide range of hydrogen-related solutions such as “H2One™,” a hydrogen-based autonomous energy supply system with using renewable energy to fuel cell vehicles and fuel-cell forklifts.



HOW PAPER BATTERIES CHARGED BY BACTERIA COULD POWER THE INTERNET OF THINGS

The explosive growth of miniaturized electronics and batteries to power everything from ingestible health care devices to sensors for intelligent transportation is driving innovation in how those devices are designed and raising concerns over their environmental impact.



Enter papertronics, which offer electronics engineers the benefits of flexibility, sustainability, eco-friendliness, and low cost, as well as useful mechanical, dielectrical, and fluidic properties.

Seokheun Choi, associate professor in the department of electrical and computer engineering at the State University of New York at Binghamton, and his colleagues have created a paper-based, single-use battery that relies on bacteria both to generate an electric current and also to devour the battery at the end of its useful life.

In a paper published in the journal *Advanced Sustainable Systems*, the authors write that lithium-ion batteries and supercapacitors offer a high energy density, are lightweight and are capable of being integrated into flexible substrates. But they point out that Li-ion batteries also are made with nonbiodegradable and often toxic materials that often require energy-intensive and potentially environmentally damaging manufacturing processes.

Alternative energy harvesting techniques such as solar cells, nanogenerators, and thermoelectric generators contain large amounts of nonrenewable and nonbiodegradable heavy metals and polymers.

Good-old-fashioned office paper may offer a more sustainable option, Choi argues, once some sophisticated engineering is applied. Innovative engineering techniques can be used to manipulate the diameter of paper's cellulose fibers, smoothing out roughness and controlling transparency to enable a number of applications. Combining paper with organic, inorganic, and biological entities widens the range of engineering possibilities and makes paper a viable platform for next-generation electronics.

In the lab, the bacteria-based battery uses respiration to convert the biochemical energy stored in organic matter into biological energy. The process involves a cascade of reactions through a system of electron-carrier biomolecules which transfers electrons to a terminal electron acceptor, an anode.

To create the battery, the research team placed freeze-dried "exoelectrogens" on paper. They explain that exoelectrogens are a type of bacteria that can transfer electrons outside of their cells. The electrons pass through the cell membrane and make contact with external electrodes to power the battery.

To activate the battery, the researchers added water or saliva, both of which revived the bacteria. In the lab, the microbial battery produced a maximum power of 4 $\mu\text{W}/\text{cm}^2$ and a current density of 26 $\mu\text{A}/\text{cm}^2$, which Choi says are "significantly higher" than previous paper-based microbial batteries. Even so, the power performance is "very low," limiting their application, at least for now. To be viable for commercial use, the power/current density must be improved by a factor of around 1,000, Choi says.

"The beauty of using paper as a device substrate is that you can simply stack or fold them for serial or parallel connection," Choi says. Origami techniques may be particularly useful.

The paper battery currently has a shelf life of about four months. Choi says that his latest hybrid paper-polymer biobattery readily decomposes in water.

Choi and his colleagues are not alone in working on paper-based batteries. In 2017, a metal-free and biodegradable redox flow battery for portable single-use applications was described by researchers from Spain, Canada, and the U.S. After their cellulose-based battery operated for 100 minutes, it was disposed of in soil by microorganisms, similar to the way a backyard compost pile works. Choi says that a potential drawback to that approach is that the battery's biodegradability depends on favorable landfill conditions. Choi is working on conditions to improve the survival and performance of the freeze-dried bacteria, enabling a longer shelf life. He also has applied for a patent for the battery and is seeking industry partners for commercialization.

NICE LINE FROM RATAN TATA'S LECTURE IN LONDON

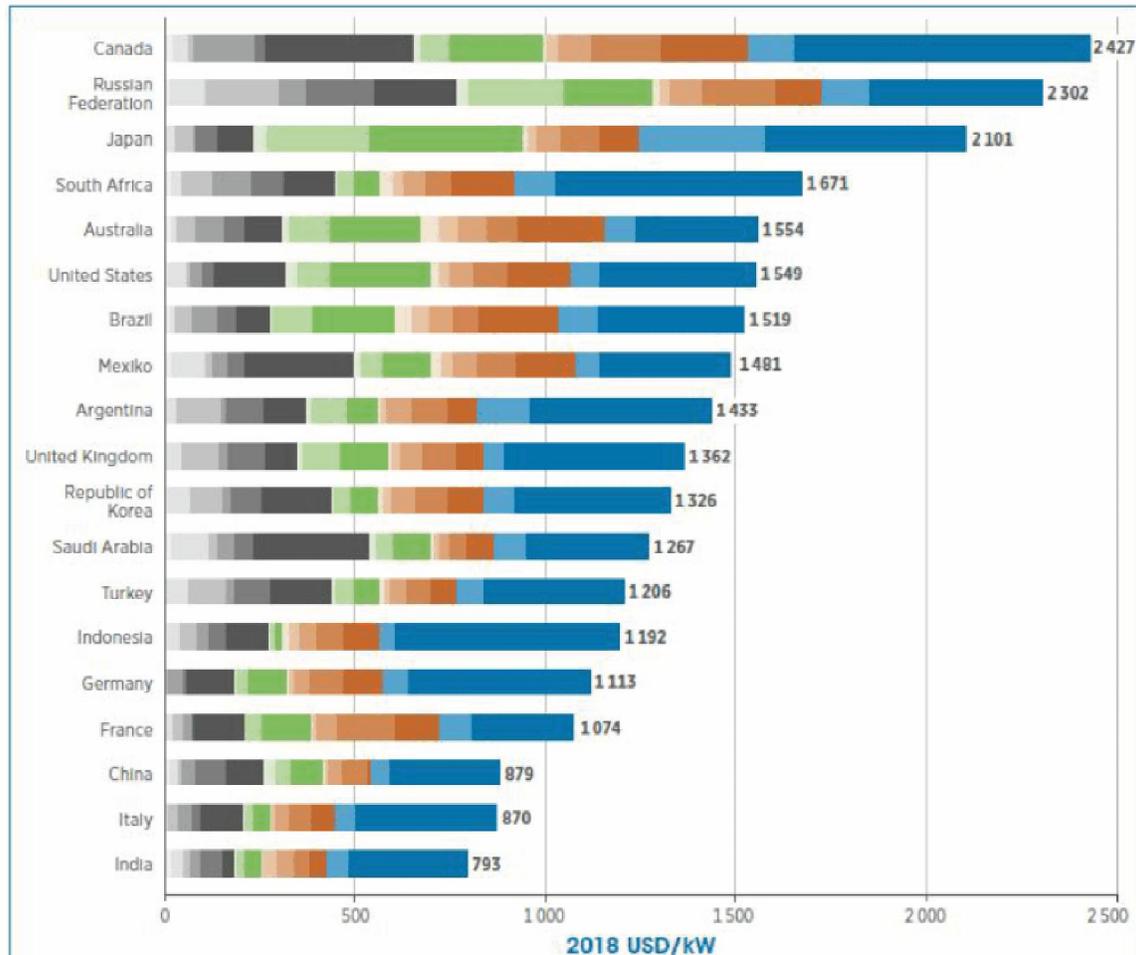
- Don't educate your children to be rich.
Educate them to be Happy.
So when they grow up they will know the value of things not the price.
- "Eat your food as your medicines.
Otherwise you have to eat medicines as your food."
- The One who loves you will never leave you because even if there are 100 reasons to give up he/she will find one reason to hold on.
- There is a lot of difference between human being and being human. A Few understand it.
- You are loved when you are born.
You will be loved when you die.
In between You have to manage...!
- If u want to Walk Fast, Walk Alone..!
But if u want to Walk Far, Walk Together..!!

- Six Best Doctors in the World-
 1. Sunlight
 2. Rest
 3. Exercise
 4. Diet
 5. Self Confidence &
 6. Friends
 Maintain them in all stages of Life and enjoy healthy life
- If you see the moon
You see the beauty of God
- If you see the Sun
- You see the power of God
- And If you see
the Mirror You see the best Creation of GOD.
So Believe in YOURSELF.

INDIA BECOMES LOWEST-COST PRODUCER OF SOLAR POWER

India has finally bagged the tag of the lowest cost producer of solar power globally. The country-wise average for the total installed costs of utility scale solar PV in 2018 ranged from a low of \$793 per Kilowatt (Kw) – around Rs 5.5 crore per Megawatt — in India to a high of \$2,427 per Kw in Canada, the International Renewable Energy Agency (IRENA) said today.

Figure 2.4 Detailed breakdown of utility-scale solar PV total installed costs in G20 countries, 2018



“India was estimated to have the lowest total installed costs for new utility-scale solar PV projects that were commissioned in 2018 at \$793 per Kw, 27 per cent lower than for projects commissioned in 2017,” IRENA said in a detailed report titled “Renewable Power Generation Costs in 2018” released today.

Further, IRENA conducted an analysis of the decline in the cost of setting up solar PV projects between 2010 and 2018 across eight major markets including China, France, Germany, India, Italy, Japan, UK and the US. The costs were found to have dropped at the fastest pace – 80 per cent – in India.

Typically, the cost of hardware — including modules, inverters and racking and mounting — account for more than a half of the total cost of setting up a solar PV project in India while installation and soft costs like financing and system design account for the rest. In 2018, 94 Gigawatt of new solar PV capacity was added globally, accounting for 55 per cent of the total new renewable power generation capacity additions. The largest markets for new capacity additions in 2018 were China (44 GW), India (9 GW), the United States (8 GW), Japan (6 GW), Australia and Germany (4 GW), and the Republic of Korea, Mexico and Turkey (around 2 GW each).

The report said the sustained and dramatic decline in the cost of electricity from utility-scale solar PV continued in 2018, with a fall in the global weighted-average Levelised Cost of Electricity (LCOE) of solar PV to \$0.085 per Kilowatt Hour (kWh) – 13 per cent lower than for projects commissioned in 2017.

The country-specific LCOE of utility-scale solar PV declined by between 62 per cent in Japan and 80 per cent in Italy between 2010 and 2018. “The year-on-year reduction in the LCOE in 2018 ranged from 21 per cent in India to a low of 1 per cent in Japan,” IRENA said.

The cost reductions in 2018 were supported by crystalline silicon module price declines of between 26 per cent and 32 per cent, between December 2017 and December 2018, after modest declines of between 1 per cent and 7 per cent for the 12 months from December 2016 to December 2017.

Experts attribute India’s status of lowest-cost producer of solar power to multiple reasons including high solar potential that leads to improved asset utilization and lower cost of modules sourced from China. “Also, from a regulatory standpoint, utilities solar PV procurement is price driven. That means developers bring in maximum efficiency in procurement of equipment and financing costs. In addition, the cost of land and labour is cheaper than rest of the world,” said Debasish Mishra, Partner at consultancy firm Deloitte Touche Tohmatsu.

A MONK - INTERVIEWED BY A JOURNALIST

A Monk of the RamaKrishna Mission was being interviewed by a journalist from NY. The journalist started interviewing the Monk as planned earlier.

Journalist - “Sir, in your last lecture, you told us about Jogajog (contact) & Sanjog (connection). It’s really confusing. Can you explain ? “

The Monk smiled and apparently deviating from the question asked the journalist: “Are you from New York?”

Journalist - “Yeh..”

Monk - “Who are there at home ? “

The Journalist felt that the Monk was trying to avoid answering his question since this was a very personal and unwarranted question. Yet the journalist said: “Mother has expired. Father is there. Three brothers and one sister. All married...”

The Monk, with a smile on his face, asked again: - “Do you talk to your father?”

The journalist looked visibly annoyed...

The Monk- “When did you talk to him last?”

The journalist, suppressing his annoyance said: “May be a month ago.”

The Monk: “Do you brothers and sisters meet often ? When did you meet last as a family gathering?”

At this point, sweat appeared on the forehead of the journalist. Now who is conducting the interview, the Monk or the Journalist.

It seemed that the Monk was interviewing the Journalist.

With a sigh, the Journalist said: “We met last at Christmas two years ago.”

The Monk: “How many days did you all stay together?”

The Journalist (wiping the sweat on his brow) said : “Three days...”

Monk: “How much time did you spend with your Father, sitting right beside him?”

The journalist looking perplexed and embarrassed and started scribbling something on a paper...

The Monk: “Did you have breakfast, lunch or dinner together? Did you ask how he was? Did you ask how his days are passing after your mother’s death?”

Drops of tears coming out started to flow from the eyes of the journalist.

The Monk held the hand of the journalist and said:

“Don’t be embarrassed, upset or sad. I am sorry if I have hurt you unknowingly...”

But this is basically the answer to your question about “contact and connection (Jogajog and Sanjog)”. You have ‘contact’ with your father but you don’t have ‘connection’ with him. You are not connected to him. Connection is between heart and heart... sitting together, sharing meals and caring for each other ; touching, shaking hands, having eye contact, spending some time together... You brothers and sisters have ‘contact’ but you have no ‘connection’ with each other...”

The journalist wiped his eyes and said : “Thanks for teaching me a fine and unforgettable lesson”

This is the reality today. Whether at home or in the society everybody has lots of contacts but there is no connection. No communication... . Everybody is in his or her own world.

Let us not maintain just “contacts” but let us remain “connected” ; caring, sharing and spending time with all our dear ones.

The Monk was none other than **SWAMI VIVEKANANDA**

ENERGY, ELECTRICAL ENERGY AND RENEWABLE ENERGY – 21

Sustainable Growth, Sustainable Electrical Energy and Renewable Energy

Bio Oil or Bio Crude - Technology & the process

Bio Oil or Pyro Oil (Continued)

As we have seen briefly in earlier parts, Bio Oil from Biomass is lighter than Petroleum Crude and possesses only a Calorific Value of 5,500 K Cal per Kg which is about half of the calorific value of crude. Researches and trials are on to use the Bio Oil directly in IC Engines etc and the results are encouraging. As done in some of the countries like Canada, the Bio Oil is mixed along with the Petroleum crude in the pipelines and processed to produce Petrol and Diesel etc.

Bio Oil uses include Gensets apart from uses like fuel for process and other boilers, Process heat for factories and processes using Furnace oil and so on.

In brief the Bio Oil can be a very valuable boon for country like India as we certainly have large quantities of surplus and waste Biomass which can all be utilized to produce Bio Oil, involving conversion of low value Biomass to high value Bio Oil. As the results show, about 60% to 70% oil is obtained from the 'Bone Dry Weight' of Biomass after deducting the moisture %.

E G – 1 Ton of Sugar cane waste has 15% moisture.

Bone dry weight is 850 Kgs

Bio Oil Potential is about 550 Kgs.

Apart from sugarcane trash and tops, other plantation wastes from coconut and paimurah trees can all be substantial in our country.

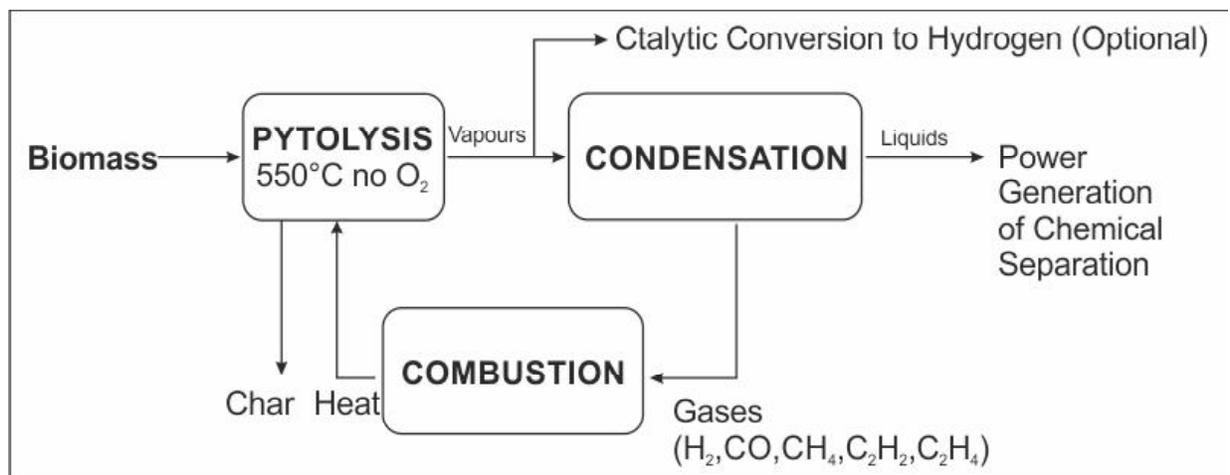
India in general and Tamilnadu in particular can focus on working on Bio Oil Plants by getting and suitably adopting the technology to the local conditions which should not be difficult. As going to be seen in the later part of this article, plants to handle lower tonnages and preferably mobile type can help address the issues and opportunities suitably.

Lot of work is done with regard to perfecting and commercializing this technology in Europe and other countries like Canada (Europe has worked on economics even importing sugarcane trash and tops from Brazil which is a large sugarcane country)

A Mobile type Bio Oil Plant to handle about 10 Tons of Biomass per day is developed in Canada about which more details are presented.

A Mobile Type can be very useful as we can take the Plant itself to the place of Biomass generation and we will not have to transport the Biomass and will have to transport only the Bio Oil. (The Char can either be collected and taken or left in the field) itself if required). Sugarcane fields and the situation after cutting and transporting away the cane, can easily be visualized to see how a mobile plant can be useful.

Pyrolysis Process



Biomass needs preparation of cutting to size to feed to the Plant

Mobile Plant shown below is one of the 2/3 sizes developed by a Canadian Company and this has a Capacity of 10 Tons per day, capable of producing about 5.5 Tons of oil and 2 Tons of Char. The feeding rate can be of the order of 2 Tons per hour.

The Reactor is a “Fluidized Bed Type” and the reactor produces condensable gases (Oil) and non- condensable gases (used as heat provider for the reactor) and Char. It is found to be self-sustaining due to availability of gases for producing necessary heat for the process. The Process cycle is shown above which illustrates the outputs and the surplus gas being used in the process.



Mobile Bio Oil Plant with the Reactor and all other components mounted on Trailer

In summary, the present levels of interest in this technology is low, but it is time large scale work is done in this area on priority particularly in view of Energy Security problems cropping up. It is suggested that work can be focused to Sugarcane trashes and tops all over the country, as we are the 2nd largest producers of sugarcane after Brazil. We produce about 350 Million Tons per annum and trashes and tops is accounted about 14% of 350 Million Tons which will make a huge quantity.



(To be continued)
S. Mahadevan, B.E., F.I.E., M.B.A.,
Consultant, Energy and Energy Efficiency,
Mobile: 98401 55209



MAKRAND APPALWAR
Emmbi Industries Ltd



Makrand Appalwar, CMD Emmbi Industries Ltd, Wants to Dispel the notion that, Jute and Paper Bags are more Ecofriendly that plastic ones.

As a first generation entrepreneur who set up Emmbi Industries Ltd. in 1994, Makrand Appalwar is courage and excellence personified. In a span not too big Appalwar had made Emmbi Industries Ltd. reach dizzy

heights. It is envisioning a global leadership. The journey of Emmbi began with two people and limited capital. The company took a quantum leap from small trading house to leading manufacturer and trader of a wide range of woven polymer based product, such as FIBC (jumbo Bags) and geotextile, canal liners, Flexible Water Tanks, woven sacks, with remarkable success. Appalwar believes hard work, sincerity and confidence drives you towards achieving results and success. A graduate in Engineering and Polymer Technologies, Appalwar is actively involved in the decision making process of every operation. He is ably supported by his wife Rinku Appalwar who is an MBA and dons the chair of Director (Finance). From Zero to dominant position, the company today, has a turnover of 149 crores and has an established customer base in about 45 countries in five continents. It is ranked among the top three exporters of products based on woven textile from India. Current employee strength stands at 800 employees. With awards such as "CorpEXCEL 2008 National Excellence Awards" for MSME & Emerging Corporate and "Udyog Ratna" award by the Institute of Economic Studies New Delhi in 2007 in its kitty, the company has truly proved its mettle. Emmbi was one of the first companies for woven Polyethylene and Polypropylene industries in India to get ISO 9002 Certified way back in 1999. Emmbi Industries Ltd. has a track record of 17 years of business in the field of Flexible Intermediate Bulk Container (FIBC), Bulk Container Liners, Canal Liners, Productive irrigation Systems, Flexible Water Tanks, Car Covers and Geotextiles, which find large scale application in segments like cement, Bulk Chemicals, Agriculture, Water Conservation and Infrastructure. Emmbi Industries Ltd. is a pioneer in the production of Flexible Water Tanks and Woven Geotextiles in India.

HUMOUR

Why did the computer go to the dentist?
Because it had Bluetooth.

What do you call an iPhone that isn't kidding around?
Dead Siri-ous

What did the turkey say to the computer?
Google, google, google!

How do trees use a computer?
They log in!

What happens when you lose a nintendo game?
You ask for a wii-match.

What do you call 18-year olds using dating apps?
Tinder Tots.

Why did the powerpoint maker cross the road?
To get to the other slide!

What did the robot say to the dead robot?
Rust-in-peace

What kind of party does a laptop go to?
A CISCO party.

How do you know you are using Linux?
Your computer only has 4 modes: Abort, Retry, Fail and Reboot!

பாலில் வெல்லம் கலந்து குடிப்பதால் எவ்வளவு நன்மை கிடைக்கும்ன்னு தெரியுமா?

குளிர்காலத்தில் ஏராளமான சரும மற்றும் ஆரோக்கிய பிரச்சனைகளை சந்திக்க நேரிடுவதால், வருமுன் காப்பதே மேல் என்னும் பழமொழிக் கேற்ப ஆரோக்கியத்தை மேம்படுத்தும் செயல்களில் உடனே ஈடுபட வேண்டியது அவசியம். முக்கியமாக உண்ணும் உணவுகளில் அதிக கவனத்தை செலுத்துவதன் மூலம் உடல் ஆரோக்கியத்தைப் பாதுகாக்கலாம். அதுவும் கால்சியம் அதிகம் நிறைந்த பாலில் வெல்லத்தை சேர்த்து அன்றாடம் குடித்து வந்தால், உடலினுள் பல மாயங்கள் நிகழும். நம் அனைவருக்குமே பாலில் ஏராளமான ஊட்டச்சத்துக்கள் நிறைந்திருப்பது தெரியும். அத்தகைய பாலில் சுவைக்காக சர்க்கரை சேர்க்காமல், வெல்லத்தை கலந்து குடித்தால், நல்ல சுவையுடன் இருப்பதோடு, உடல் ஆரோக்கியமும் மேம்படும். இக்கட்டுரையில் ஒருவர் பாலில் வெல்லம் குடிப்பதால் கிடைக்கும் நன்மைகள் குறித்து கொடுக்கப்பட்டுள்ளது. அதைப் படித்து தெரிந்து கொள்ளுங்கள்.

நோயெதிர்ப்பு சக்தி:

பாலில் கால்சியம் வளமான அளவில் உள்ளது. இது எலும்புகளை வலிமைப்படுத்துவதோடு, நோயெதிர்ப்பு மண்டலத்தையும் வலிமைப்படுத்தும். அதுவும் பாலில் வெல்லத்தை சேர்த்து குடித்தால், குளிர்காலத்தில் உடலைத் தாக்கும் பாக்டீரியாக்கள் அழிக்கப்பட்டு, உடல் ஆரோக்கியமாக இருக்கும்.

செரிமானம்:

பெரும்பாலானோர் அஜீரண கோளாறால் அடிக்கடி அவஸ்தைப்படுவார்கள். இதற்கு முறையற்ற வாழ்க்கை முறை அல்லது ஜங்க் உணவுகளை அதிகம் உண்பது காரணமாக இருக்கலாம். ஆனால் அஜீரண கோளாறு, மலச்சிக்கல், முறையற்ற குடலியக்கம் போன்றவற்றில் இருந்து வெல்லம் விடுவிடுக்கும். அதுவும் பாலுடன் வெல்லத்தை கலந்து தினமும் குடித்து வந்தால். செரிமான மண்டலத்தின் செயல்பாடு மேம்பட்டு, அஜீரண கோளாறு ஏற்படுவதில் இருந்து முற்றிலும் விடுபடலாம்.

மூட்டு வலி:

எலும்பு சம்பந்தப்பட்ட பிரச்சனை கொண்டவர்களுக்கு பால் மிகவும் நல்லது. பாலில் உள்ள கால்சியம் எலும்புகளை வலிமைப்படுத்தி, மூட்டு வலிகளைக் குறைக்கும். அதிலும் பாலுடன் வெல்லத்தை கலந்து குடிப்பதால் இன்னும் சிறப்பான பலன் கிடைக்கும்.

கர்ப்ப கால இரத்த சோகை:

கர்ப்ப காலத்தில் பெண்கள் சிசுவின் ஆரோக்கியத்தை அதிகரிக்கும் உணவுகளை உண்பதோடு, தங்களது உடலையும் கவனிக்க வேண்டும். நிறைய பெண்கள் கர்ப்ப காலத்தில் இரத்த சோகையால் பாதிக்கப்படுவார்கள். ஆகவே தான் மருத்துவர்கள் கர்ப்பிணிகளுக்கு இரும்புச்சத்து மாத்திரைகளை பரிந்துரைக்கிறார்கள். ஒரு வேளை மாத்திரைகளை எடுக்க பிடிக்காவிட்டால், பாலில் வெல்லத்தைக்

கலந்து குடியுங்கள். இதனால் இரத்த சோகையைத் தடுக்கலாம்.

எடை குறைவு:

பால் உடல் எடையை கூட குறைக்கும் என்பது தெரியுமா? அதுவும் தினமும் பாலில் வெல்லத்தை கலந்து குடிக்க, விரைவில் எடை குறையும். வெல்லம் ஒரு இயற்கை சுவையூட்டி என்பதால். சர்க்கரையால் உடல் பருமனடைவதைத் தடுக்கலாம்.

சரும ஆரோக்கியம்:

குளிர்காலத்தில் தொடர்ச்சியாக சரும பிரச்சனைகளை சந்திக்கிறீர்களா? எவ்வளவு பராமரிப்புக்களைக் கொடுத்தாலும், சருமம் பொலிவோடு காணப்படவில்லையா? அப்படியெனில் தினமும் ஒரு டம்ளர் பாலுடன் சிறிது வெல்லத்தை கலந்து குடியுங்கள். இதனால் சருமம் மென்மையாகவும், பொலிவோடும், வறட்சியின்றியும் இருக்கும்.

மாதவிடாய்:

வயிற்று வலி சில பெண்களுக்கு மாதவிடாய் காலத்தில் கடுமையான வயிற்று பிடிப்புக்களும் ஏற்படும். இம்மாதிரியான நேரத்தில் பாலில் வெல்லத்தைக் கலந்து குடிக்க, உடனடி நிவாரணம் கிடைக்கும். மேலும் தினமும் பாலில் வெல்லத்தைப் போட்டு குடித்து வந்தால், மாதவிடாய் காலத்தில் மனநிலையில் ஏற்படும் ஏற்றத்தாழ்வுகளைத் தவிர்க்கலாம்.

மெட்டபாலிசம்:

பாலில் வெல்லத்தைக் கலந்து குடிப்பதால் முறையான செரிமானம் நடைபெறுவதோடு, உடலின் மெட்டபாலிச அளவும் மேம்படுத்தப்படும். உடலின் மெட்டபாலிச அளவு சீராக இருந்தால், நாள் முழுவதும் உடலியக்கமும் சீராக இருக்கும்.

எலும்பு ஆரோக்கியம்:

வெல்லத்தில் உள்ள பொட்டாசியம் மற்றும் பாலில் உள்ள கால்சியம், எலும்புகளின் ஆரோக்கியத்தை மேம்படுத்தி, முன்பிருந்ததை விட எலும்புகளை மேலும் வலிமையாக்கும். எனவே தவறாமல் வெல்லம் கலந்த பாலை அன்றாடம் குடியுங்கள்

இரத்த சுத்தம்:

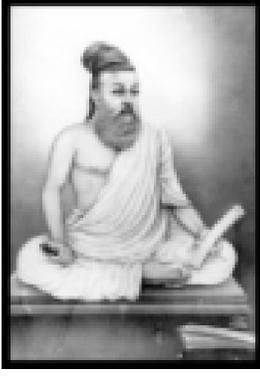
வெல்லத்தின் முக்கியமான மருத்துவ குணம் என்றால், அது இரத்தத்தை சுத்தம் செய்து, உடலில் உள்ள டாக்ஸின்களை வெளியேற்றும். ஆகவே உங்கள் உடலில் உள்ள இரத்தம் சுத்தமாக வேண்டுமானால், பாலில் வெல்லம் கலந்து குடியுங்கள்.

ஸ்டாமினா:

அதிகரிக்கும் சர்க்கரை, வெல்லம் இரண்டுமே கார்போஹைட்ரேட்டுகளை தூண்டி, உடலின் ஆற்றல் அளவை அதிகரிக்கும். ஆனால் இந்த இரண்டிற்கும் ஒரு வித்தியாசம் உள்ளது. அது சர்க்கரையில் உடலுக்கு உடனடி ஆற்றலை வழங்கும் சிம்பிள் கார்போஹைட்ரேட் உள்ளது. ஆனால் வெல்லத்திலோ காம்ப்ளஸ் கார்போஹைட்ரேட் உள்ளது. இது உடைவதற்கு நேரம் எடுத்துக் கொண்டாலும், நீண்ட நேரம் ஆற்றலைத் தக்க வைக்கும். ஆகவே உடலில் ஆற்றல் நிலைத்திருக்க வேண்டுமானால், பாலில் வெல்லம் கலந்து குடியுங்கள்.

Courtesy: Pesod, December 2017

TIRUKKURAL AND FAIR AND ETHICAL MANAGEMENT - 5



Tirukkural is a complete and comprehensive book for life and each Kural gives direction to LEAD, CONDUCT and LIVE life successfully and ethically. It touches all aspects and dimensions of Personal, Social and Business Life and Governance of Society.

The following Kurals convey the essence of Leadership and Governance.

Anbunaan Oppuravu Kannottam
Vaymaiyoudu
Einthusalbu Oondriya Thoon Kural 983

அன்புநாண் ஒப்புரவு கண்ணோட்டம் வாய்மையொடு
ஐந்துசால் ஊன்றிய தூண். குறள் 983

“Love to all, sensitiveness to shame, complaisance, indulgence to the fault of others and truthfulness; these five are the pillars that support the edifice of a noble character.”

Gunalam Sandror Nalane; Piranalam
EnnalathuUllathoom Andru Kural 982

குணநலம் சான்றோர் நலனே பிறநலம்
எந்நலத்து உள்ளதூஉம் அன்று. குறள் 982

The Worthiness of the Worthy is the worthiness of their character; all other distinctions add nothing to their worth.”

Kadan Enba Nallavai Ellam Kadanarinthu
Sandranmai Merkkolbavarkku Kural 981

கடன் என்ப நல்லவை எல்லாம் கடன் அறிந்து
சான்றாண்மை மேற்கொள் பவர்க்கு. குறள் 981

‘Behold the men that know their duties and want to cultivate worth in themselves ; everything that is goodwill be a duty in their eyes.’

(To be continued)

HOME FESTIVALS - 7

ஆடி - Aadi (July/August)



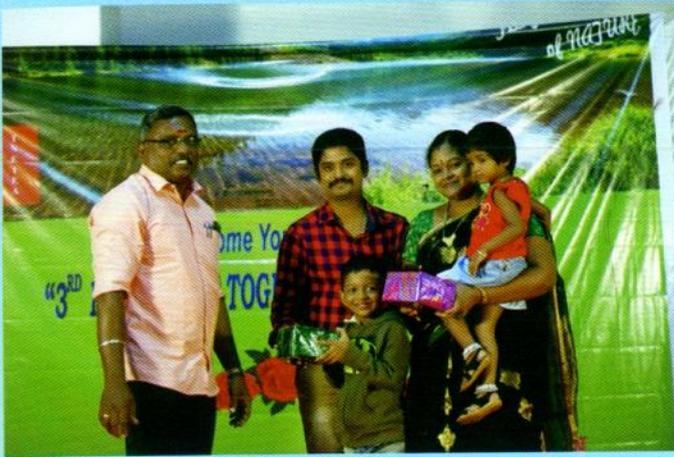
There are two major home festivals this month. The first is **Adi-Perukku**, in honour of the Kaveri River. Women and girls go to the nearest river where they place offerings on a bamboo tray

(upper left) into the water, then have a feast upon the riverbank. **Varalakshmi Vratam** (“Vow to bring Lakshmi”) is also a ladies’ festival, in which paintings of the Goddess of Wealth are made upon the walls (upper right), kumbha pots intended for worship are decorated with Her image. Beside the pot are placed various cosmetics, comb, beads, etc and worship is done. Then the ladies sing songs inviting the Goddess to their home. Kozhukkatai, rice and jaggery cakes are a favourite of the day. In the evening, friends are invited to the home and given clothing, coconuts and sweets.

(To be continued)

FAMILY GET-TO-GETHER - May 2019







WISEWHAM ELECTRICALS

விஸ்வம் எலக்ட்ரிகல்ஸ்

EA Electrical Contractor, EA No. 2442
(RMU & RMG Supply and Erection)

Authorised
Dealer

SIEMENS

SIEMENS
11 kv Air Insulated
Ring Main Gear (RMG)



SIEMENS
11 kv
VCB



SIEMENS
11 kv SF6 Insulated
Ring Main Gear (RMG)



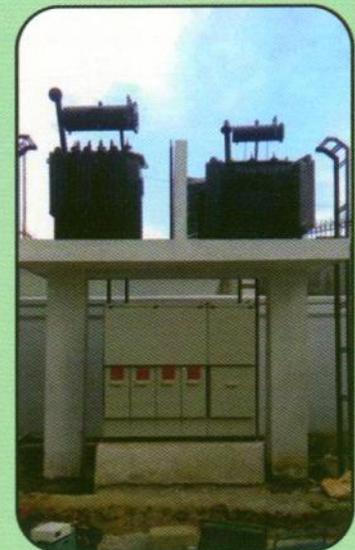
SIEMENS
3 Way RMU



SIEMENS
4 Way RMU



SIEMENS
6 Way RMU



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