



ELECTRICAL

INSTALLATION ENGINEER

NEWS LETTER

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

No.1/61-10, Plot no. 48, Ground Floor, 3rd Street, Ravi Colony, Near Kathipara, St. Thomas Mount, Chennai – 600 016.

Phone: 044-22330601, 9710204300 Email : tngade@gmail.com Website : www.teiea.com

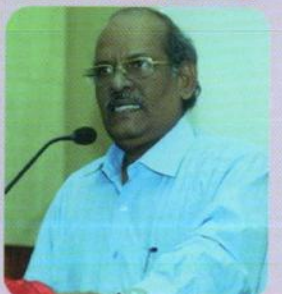
ISSUE NO. 150

VOL : No. 13/2018

MONTHLY ISSUE NO. 8

PRIVATE CIRCULATION ONLY

AUGUST 2018



EDITORIAL

Dear Members, Fellow Professionals and Friends,

Seasons Greetings to One and All!

Happy Independence Day!!

We are very Happy to record that this is the “150th ISSUE” of the NEWS LETTER. The Successful journey has been possible with the devoted work of the ‘TEAM’ with the support of the OFFICE BEARERS and MEMBERS of the Association, the encouragement and suggestions from the assorted readers and the continuous support of all the ADVERTISERS.

The month of August immediately brings to our mind the Independence Day on the 15th of August, which we will celebrate with Pride and Glory. It also reminds us of two important events that happened in the past in the month of August in connection with our Movement for Freedom.

On 1st of August 1916, ‘Home Rule’ Movement was flagged by Annie Besant, followed by “Swaraj” movement by LokamanyaTilak and so on and on, which really laid the foundation for organized Freedom Movement all over the Country.

On 8th August 1942, Mahatma Gandhi launched the Quit India Movement for freedom from British rule in Mumbai (then Bombay), which really gave the Big Push for the Freedom Movement all over the Country resulting in achievement of Freedom on the 15th of August, 1947.

We are a proud Nation at present with admiration from all over the World as a large and vibrant Democracy with fast and appreciable Growth of Economy to become a leading Economic Power of the World soon. We are galloping to catch up with the Technological Developments all over with all the Glory around, we are aware that there are many ills like corruption, degradation of Moral Standards in all activities and Public life are plaguing our Nation and we have to step up our efforts to make them ‘Quit India’. We seem to be losing sight of our Great Tradition and Values which we always stood for and gained recognition of the World at large and were looked up to provide ‘Light’ and guidance. It is time that we gear up our Spiritual Wisdom to set an example to the World.

In the Energy and Engineering and Technology front, with all our activities and initiatives like Make in India, Start up India, Digital India and so on and initiatives and big push in the areas of New and Renewable Energy are all providing continuous challenges to our profession of providing Safe, Quality, Reliable, sustainable and uninterrupted Power for all needs at all times. We are also adopting and working on the latest Technology Directions of the World like Automation, Artificial Intelligence, Internet of Things, Agility and so on and all these add to our challenges. We will continue to succeed as we have done in the past decades.

We thank all those members who have helped us by participating in the advertisement appearing for the issue July 2018 – Universal Earthing Systems Pvt. Ltd., Supreme Power Equipment Pvt. Ltd., Consul Neowatt Power Solutions Pvt. Ltd., Dehn India Pvt. Ltd., Alfa Switchgear (I) Pvt. Ltd., Excel Earthings, Power Cable Corporation, Wilson Power and Distribution Technologies Pvt. Ltd., Galaxy Earthing Electrodes (P) Ltd.

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Thank You

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A controlled circulation publication, Our Magazine Newsletter depended mainly on advertising to keep it going, and I would like to pay special tribute to those companies that supported us over the years—some of whom have been with the magazine since its inception.

We thank you very much for your advertising pages, patronage, more important, your confidence in us. We had a great time.

As for the future, we still have a great magazine that will continue to serve our Electrical Fraternity. We request your support for years to come.

Thank You,
G.Venkatesh
Editor

Jun 2007

Speech by
Mr. N.S. Sethuramon, President

ROLE OF ELECTRICAL INDUSTRY IN NATIONAL DEVELOPMENT
Speech delivered by our President
ELECTRICAL CONTRACTORS' ASSOCIATION (A GRADE)
Mr. N. S. SETHURAMON
Member - Tamil Nadu
13 October 1975

Gentlemen / I am proud to be associated with the Electrical Contractors' Association, as it has been the foundation for my envisaging the possibilities of manufacturing Electrical Equipment. Having come across many varieties of Electrical Equipment both companies and intricate. It indeed gives us a wide knowledge on the possibilities of manufacturing them in India.

It gives the great pleasure to address you about the contribution of Electrical Industry to the growth in India, on the centenary of the invention from which the rest of the electrical industry grew. For exactly a hundred years ago on the eve of October 21st, Edison succeeded in developing the world's first working light bulb, an essential part of our life something which we painfully recognise whenever we have a power shortage.

Power, as we all know, is inextricably linked with the economic development of any country in our country, in the pre-independence era manufacturing activity was limited to small lamps. Thus, the Government had to develop a programme for the construction of a power grid which would meet the increasing energy demands of the public. The main programme consisted of generators, switchgear, transformers, transmission towers, insulators, etc. Considering the high technological base required for the manufacture of such products, foreign collaboration was permitted in establishing the various industries.

Therefore, in the early 50s, the Government of India established a Directorate to specially deal with technical development. This Directorate had in due time grown to such an extent that it has become varied in different fields of manufacturing. The Electrical Directorate was established to coordinate and help the entrepreneurs in establishing a uniform code of procedure in the matter of collaboration and disbursement of foreign exchange. Though it was full time at

some stages, the Government regulations greatly helped the various Electrical Industries to conduct their operation without undue competition involving those professions that are necessary to prevent competition from import. No doubt, in the early stages, the entrepreneurs had the double task of adapting foreign technology to Indian conditions and simultaneously had to import man power to be able to absorb the imported know-how and this was the problem that, as energy demands grew, voltage levels increased and the specifications became more stringent.

Power industry in India is keeping pace with technology developed in advanced countries. The voltage gap between the absorption of new technology has been narrowed down considerably almost in all sectors of the industry. Participation in various international programmes has gone to a greater scale to help the growth of our knowledge. As population density increases and energy needs grow, we are challenged to find ways of maintaining more power through a given space, higher and higher voltages have to be necessarily introduced. We are out on the verge of having a national grid at 400 kv level which would indeed be a great feat to say the least that most of the equipment of equipment we are also fully equipped to offer a complete range of consultancy services to other developing countries for the implementation of their Industrial Schemes.

As for the capability of the industry to catch up with technological innovation, this is simply proved from the fact that most of the equipment required for the 400 kv transmission system are being met from indigenous production.

The immediate future of the industry is pre-occupied with reaching an aggregate



generating capacity of 44,826 MW fixed for the South Plan. It is proposed that the extra power would also mean the additional establishment of industries and more efficient operation of the West Plans, and only 4000 MW of capacity was added during the past five years. Such a fast increase of 3,700 MW yearly. The bottlenecks in the call for Herculean efforts. The entrepreneurs in the resource, steel, cement and electrical equipment. While control of this first three parameters is incorporated fully coordinates planning and made available on time. To the end, we must be able to sit down with Electricity Board representatives and work out their requirements, our capacity and an optimal plan to link both as to ensure a smooth flow of orders and goods. If such an agreement can be worked out, it would be of great benefit to all concerned.

What are the problems which your entrepreneurs will have to face in the future? Fuel shortages, raw material shortages, credit squeeze, in fact shortages of almost anything you can think of. This definitely does not seem to be the right economic climate to set up an industry. But this is not so. What we need is not better conditions, but people with perseverance and business, for after all a business is merely money that can be worked out, it would be of great benefit to all concerned.

What are the problems which your entrepreneurs will have to face in the future? Fuel shortages, raw material shortages, credit squeeze, in fact shortages of almost anything you can think of. This definitely does not seem to be the right economic climate to set up an industry. But this is not so. What we need is not better conditions, but people with perseverance and business, for after all a business is merely money that can be worked out, it would be of great benefit to all concerned.

in the hands of a capable manager. If we have powerful managerial techniques to solve these problems. You entrepreneurs must keep your eyes and ears open to new developments and an early start must be made to adopt these ideas to the present production techniques. After all, genius is a catalyst for taking pains. What Disney the inventor of the cartoon film was a cartoon he could, regardless of cost. One day we are finished. We have been declared bankrupt? Without betting on him and said Walt Disney a multimillionaire in the end. So may / summary who are driven by the feeling that good is not good enough and only the best will do. Lastly, I would like to conclude by naming an incident which occurred on Edison's death on October 18, 1931. It was this drive which made Walt Disney the great inventor in the United States to be turned off for one minute in the decade when his paralyzing affliction was relieved. I think the fact that the current could not be shut down was a much greater tribute to Edison than should hopefully expect that the Electricity Authorities will keep the power flowing at all times without interruption.

THANK YOU

YOUR CONTRIBUTION TOWARDS NEWS LETTER

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 - ⊗ No Unauthorized Red/Fblue or any other light on bonnet/top of the vehicle.
 - ⊗ No Pressure / musical / multi-toned horn in any motor vehicle.
 - ⊗ Always choose and drive in appropriate lane.



July
2010



book. However, it is important to test each device separately, particularly when the generator is used in a domestic environment. CI 23.2.5 of IS 3043 - 1987.

Q.12 Explain Earthing of Mobile Low voltage Generator.

Ans: Mobile Generators - Where a supply is taken from a mobile generator, the following recommendations, in addition to those given in 23.2.5 shall apply:

a) The earth terminal of the generator should be connected to the vehicle chassis;

b) The earth terminal at each outlet on the generator or connected electrical equipment is, however, a should be connected to the earthing conductor on the mobile generator.

c) Where an electricity board protective earth terminal is connected to the earthing conductor on the mobile generator, CI - 23.2.6 of IS 3043 - 1987.

Q.13 Explain single High voltage Generator Isolating (Synchronous Machines) with an incoming Alternator when the Generator is operating in parallel facility.

Ans: Generator operating in isolation (from mains or other supplies). The ear-point of the generator should be connected (via a resistor, if necessary) to through a bonded link for test purposes to an earthing conductor and the independent earth electrode.

Q.13.b Explain single High voltage Generator Alternator when the standby generator is without parallel facility.

Ans: Standby generator (without parallel facility) is not operating in isolation from other supplies) the generator should be connected to a separate earthing conductor through a bonded link for test purposes to an earthing conductor and the independent earth electrode.

Q.13.c Explain single High voltage Generator Alternator when standby generator is capable of parallel operation with an incoming supply.

Ans: Standby generator (capable of parallel operation with an incoming supply) - The operation of a private parallel facility system is subject to an electricity board technical agreement of the electricity board. In most cases, when parallel operation with an incoming supply is required, an earthing conductor is connected between the generator star point and the

beled test link. The conductor should be interlocked with the incoming supply circuit breaker so that it is open during periods of parallel operation. The link is not during a period of parallel operation, the earthing conductor should be arranged to close automatically dependent upon the system parameters and the manufacturer's recommendations.

Q.14.a Explain Multiple High voltage Generator Earthing when Generators operate in isolation from other supplies?

Ans: Generators operating in isolation from other supplies - When it is required to operate two or more generators in parallel and the method of energy source connection is direct or resistance earthing, each generator ear-point and the earthing conductor, each electrode (as described in 23.2.1) The conductors need to be connected to a single earth source earth.

If a neutral earthing transformer is to be used for energy source earthing, a should be connected, except the in the case of an isolated generating system, the earthing conductors are not required.

Q.14.b Explain Multiple High voltage Generator Earthing when standby Generators are without main parallel facility.

Ans: Standby generators (without main parallel facility) - When the generating sets are not to be connected in parallel with the main supply, and have direct or resistance earthing, the standby generator ear-point and the earthing conductor, each electrode (as described in 23.2.1) The conductors need to be connected to a single earth source earth.

If a neutral earthing transformer is used, the earthing conductors are the same as described for a single parallel facility.

Q.14.c Explain Multiple High voltage Generator Earthing when standby Generators are capable of parallel operation with an incoming main supply.

Ans: Standby generators (capable of parallel operation with an incoming main supply) - When the generating sets have direct or resistance earthing and are used in parallel running is a requirement. These should be interlocked for incoming parallel operation of the generator so that they are open during parallel operation of the with the main busbar. CI 23.3.3.3 of IS 3043 - 1987.



PHOTOS OF NATIONAL ENERGY CONSERVATION DAY FUNCTION HELD AT KALAYANAR (RANGAM, CHENNAI, ON 14-12-2006)

GOVERNMENT OF TAMILNADU ELECTRICAL INSULATION DESIGNATED AGENCY FOR ENERGY COI

Electricity Minister
ARJOT A. VEERASAMY
holding over a
HANDBOOK ON ENERGY CONSERVATION to
Mr. R. SIVAPATHY,
Principal Secretary,
Energy Department.

Mr. A.K. VENKATASAMY,
President, Tamilnadu
Electrical Insulation
Engineers' Association -
A Grade -
presenting the papers.

Mr. S. MAHADEVAN,
presenting the papers.

11

Jan
2007

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UNDERSTANDING POWER SYSTEM HARMONICS

Harmonic distortion is not a new phenomenon. Concern over harmonic distortion emerged during the early history of ac power systems. Widespread applications of power electronic-based loads continue to increase and have sparked research that has led to much of the present-day understanding of power quality problems. The current drawn by electronic loads can be made virtually distortion-free (i.e. perfectly sinusoidal), but operating devices remain in equipment manufacturing and electric utility systems in standard-making activities.

Harmonic Distortion and Definitions

Power electronic loads control the flow of power by drawing currents only during currents only during certain intervals by the end of no longer sinusoidal and appear chopped or limited. The resulting current in a power system is usually small and does not present an inherent voltage distortion and, in some cases resonance, voltage distortion and, in some cases resonance.

In a "soft" power system, where the available fault current is high (thus the system impedance is low), the voltage quality problem is usually small and does not present a serious concern. Unlike transient events such as lightning that last for a few microseconds to several cycles, harmonic currents are steady-state periodic phenomena that produce continuous sinusoidal waveforms. These magnitudes and phase angles are compared using Fourier analysis. The periodic non-sinusoidal waveforms are described in terms of their harmonics (e.g., 60 Hz) and their fundamental frequency (e.g., 60 Hz). Harmonic distortion is defined as the ratio of the rms value of the harmonic to the rms value of the fundamental, and their sum is referred to as total harmonic distortion (THD). THD applies to both current and voltage and is defined as the rms value of both current and voltage divided by the rms value of the fundamental, and then multiplied by 100%. Voltage THDs below 5% are usually considered to be acceptable, but those above 10% are usually definitely unacceptable and will cause problems for sensitive equipment and loads.

The most common measure of distortion is total harmonic distortion (THD). THD applies to both current and voltage and is defined as the rms value of both current and voltage divided by the rms value of the fundamental, and then multiplied by 100%. Voltage THDs below 5% are usually considered to be acceptable, but those above 10% are usually definitely unacceptable and will cause problems for sensitive equipment and loads. It is not generally known the power factor is closely linked to harmonics. The traditional definition of power factor is the cosine of the relative phase angle between fundamental voltage and current. True power factor is average power divided by the product of rms voltage and rms current. Harmonics increase the theoretical maximum true power factor of a distorting load as a function of current THD. The table assumes the optimum case, i.e., the displacement power factor is 1.0.

Current THD (%)	Maximum True pf
20	0.98
100	0.71

When a three-phase power system is balanced, harmonic fall into the phase sequence system shown in Table 2. Thus, the traditional rule that "balanced components" is no valid when harmonics are present. It is important to note that harmonic multiples of three (i.e., triplen) are zero-sequence. This fact accounts for neutral conductor overheating, which is explained in a following section.

Harmonic	Phase Sequence
First	+
Second	0
Third	+
Fourth	0
Fifth	+
Sixth	0

Harmonic Sources

There are two general categories of harmonic sources: saturable devices and power electronic devices. Saturable devices produce harmonic due mainly to iron saturation, as is the case for transformers, machines, and fluorescent lamps (with magnetic ballasts). For economic reasons, most transformers and motors are designed to operate slightly past the knee of the iron core saturation curve. The resulting magnetizing currents are pulsed and rich in the third harmonic. Unless blocked by delta transformation, a synchronous machine will produce a third harmonic current of approximately 30% of the fundamental.

Power electronic loads draw power only during portions of the applied voltage waveform. These loads include switch-mode power supplies, fluorescent lamps (with electronic ballast), voltage source converters, phase-locked mechanical converters, induction just a long with power supply. Desktop computers, video cassette recorders, and televisions have similar waveforms. The current THD is approximately 100%.

Figure 1. Current waveform of fluorescent lamp with (a) a magnetic ballast and (b) a electronic ballast

Figure 1 shows two current waveforms for a fluorescent lamp. (a) shows a sinusoidal current waveform with a magnetic ballast. (b) shows a distorted current waveform with a sharp peak and a deep zero-current interval, characteristic of an electronic ballast.

Figure 2. Current waveform and harmonic spectrum of a PWM converter

Figure 2 shows a current waveform and its harmonic spectrum. The waveform is a high-frequency PWM signal. The spectrum shows a series of discrete harmonic components, with the fundamental component being the largest.

Electrical Installation Engineer - November - November 2010



SCIENTISTS PROJECT A DRIER AMAZON AND WETTER INDONESIA IN THE FUTURE

Climate models predict that an increase in greenhouse gases will dry out the Amazon rainforest in the future while causing wetter conditions in the woodlands of Africa and Indonesia. Researchers at the University of California, Irvine and other institutions have identified an unexpected but major factor in this worldwide precipitation shift: the direct response of the forests themselves to higher levels of carbon dioxide.



“People tend to think that most of the disruption will come from heat going into the oceans, which, in turn, will alter wind patterns,” said James Randerson, UCI’s Ralph J. & Carol M. Cicerone Chair in Earth System Science. **“We have found that large-scale changes in rainfall can, in part, be attributed to the way tropical forests respond to the overabundance of carbon dioxide humans are emitting into the atmosphere, particularly over dense forests in the Amazon and across Asia.”**

A new study led by former UCI postdoctoral scholar Gabriel Kooperman and published today in *Nature Climate Change*, demonstrates that interactions between rainforests and rising CO₂ levels will contribute to an asymmetrical pattern of rainfall change across the tropics.

In many aspects of Earth system science, the local effects of environmental factors can impact faraway regions through their influence on the circulation and movement of moisture within the atmosphere. The UCI-led group predict a similar cascade of events, beginning with stomata, small structures on the underside of leaves that open and shut in order for plants to take in the CO₂ they need to grow - and that also release water vapour.

When more CO₂ is present, these orifices do not open as widely, which reduces the amount of water evaporated into the atmosphere. According to the researchers, this small process at the plant level, multiplied across the rainforest, will cause changes in the atmosphere, affecting the way winds blow and the flow of moisture coming from the ocean.

“In many tropical forest regions, the moisture supplied by transpiration, which connects water underground at the root level directly to the atmosphere as it is pulled up to the leaves, can contribute as much as moisture evaporated from the ocean that rains back down at a given location - which is normal rainforest recycling,” said Kooperman, now an assistant professor of geography and atmospheric sciences at the University of Georgia.

“But with higher CO₂, trees and forests evaporate less moisture into the air, so fewer clouds are formed above the Amazon,” he said. “And rather than [joining with the usually abundant clouds and] raining over the forest,

water vapour from the Atlantic Ocean blows across the South American continent to the Andes mountain range, where it comes down as rain on the mountain slopes, with limited benefit to the rainforest in the Amazon basin.”



This recipe for drought in South America is unique to the Amazon and distinctly different from an increase in rainfall predicted over forests in Central Africa and the Maritime Continent, a vast area between the Pacific and Indian oceans that includes Malaysia, Papua New Guinea and the heavily populated Indonesian archipelago. Randerson said that the reduction in evaporation will lead to warming over the forests on islands such as Borneo, Java and Sumatra, which are surrounded by humid air above warm ocean surfaces. “You’ll get a stronger contrast in heating over the islands compared to the nearby ocean, and so it will enhance a natural ocean-land breeze, pulling in more moisture from these neighboring ocean systems to increase rainfall over the forests,” he said.

The research project, which used a combination of standard simulations provided through the Coupled Model Intercomparison Project Phase 5 and simulations with the state-of-the-art Community Earth System Model, revealed that the response of tropical vegetation to higher CO₂ can be an important driver of climate change in the tropics, according to Kooperman.

He also highlighted the fact that the resulting droughts and forest mortality in the Amazon and a potential increase in flooding in other rainforests may have an impact on biodiversity, freshwater availability and food supplies for economically vulnerable populations.

Amazon – Interesting Facts

1. The Amazon is the world’s biggest rainforest, larger than the next two largest rainforests — in the Congo Basin and Indonesia — combined.
2. At 6.9 million square kilometers (2.72 million square miles), the Amazon Basin is roughly the size of the forty-eight contiguous United States and covers some 40 percent of the South American continent. The “Amazon rainforest” — which defined biogeographically includes the rainforest in the Guianas, which

technically are outside the Amazon Basin — covers 7.8-8.2 million sq km (3-3.2 million sq mi), of which just over 80 percent is forested.

3. The Amazon River is by far the world's largest river by volume. It has over 1,100 tributaries, 17 of which are longer than 1000 miles.
4. The Amazon River once flowed west-ward instead of east-ward as it does today. The rise of the Andes caused it to flow into the Atlantic Ocean.
5. The Amazon is estimated to have 16,000 tree species and 390 billion individual trees.
6. Nearly two-thirds of the Amazon rainforest is found in Brazil
7. The Amazon is thought to have 2.5 million species of insects. More than half the species in the Amazon rainforest are thought to live in the canopy.
8. 70 percent of South America's GDP is produced in areas that receive rainfall or water from the Amazon. The Amazon influences rainfall patterns as far away as the United States.
9. Cattle ranching accounts for roughly 70 percent of deforestation in the Amazon.
10. Deforestation in the Amazon rainforest has been declining since 2004, mostly due to the falling deforestation rate in Brazil. There are a variety of reasons for the decline, including macroeconomic trends, new protected areas and indigenous territories, improved law enforcement, deforestation monitoring via satellite, pressure from environmental groups, and private sector initiatives.

Indonesia has the second largest forest in the world

Forest in Indonesia is the lungs of the world. Indonesia is one of the 10 countries that have the largest forest area in the world with 133.300.543 ha width. The forests are spread over the islands of Kalimantan, Sumatra, Sulawesi and Papua. In these islands there are many forests. One of the largest forests is the tropical rain forest.

Indonesia has been famous for a long time to have a wealth of wealth that makes other countries compete to benefit from the wealth of this country. Indonesia's tropical forests hold much of the world's much-needed microbiological energy potential. Microbiological energy is called the second and third generation of world energy sources. Microbiological energy can only be found in tropical rainforests of biodiversity.

Indonesia's Environment Status reports that water quality degradation is caused by the destruction of water catchment areas compounded by the symptoms of climate change. Land degradation causes erosion in a watershed so as to disrupt water supply to support domestic, hydropower, agricultural, and industrial activities. Based on the provisions of Law No. 41 of 1991, in every watershed ecosystem there is a minimum forest area of 30 percent. Many watersheds in Indonesia are no longer in accordance with this provision. Of course you understand, rules are created for our good.

Almost every expedition to the ecology of tropical forest exploration in Indonesia, it hardly discovered a new species. Even a number of species are endemic, not found elsewhere. Bekantan in Borneo, birds of paradise in Papua, and anoa in Sulawesi are some examples of endemic animals. And the more surprising is, it is easy to extinct for an endemic animal in Indonesia.

There are findings of compounds for medicinal raw materials in Indonesian forests that are not owned by other countries. These findings are of high value in the eyes of the world to be the target of the world's pharmaceutical countries. A scientist admitted the findings could cost 200 million US dollars if it is old. Indonesia's forests do save a lot of treasure.

Indonesia's tropical forests are the last home and hideaway for the unique biodiversity of the world. The biodiversity contained in Indonesia's forests comprises 12 percent of the world's mammal species, 7.3 percent of reptile and amphibian species, and 17 percent of bird species from around the world. This condition places Indonesia as one of the highest biodiversity countries in the world. Based on FAO data in 2010 the world's forests – including Indonesia's forests – totally store 289 Giga Tons of carbon and play an important role in safeguarding the stability of the world's climate.

Indonesia is a home to the largest rainforest in the whole of Asia, although Indonesia continues to develop these lands to accommodate its growing population and economic growth. Of the 3,305 known species of amphibians, birds, mammals and reptiles in Indonesia, 31.1 percent are present and 9.9 percent are threatened. Indonesia is home to at least 29,375 species of vascular plants, of which 59.6 percent is still present.

MEMBERS DETAILS

S.No.	Company Name	District	Contact No.	License No.
181.	Circuit Engineering	Coimbatore	0422-2400438, 98430 16438	EA 1701
182.	CV Electric Company	Coimbatore	98946 59279	EA 2403
183.	Darshan Controlss Corporation	Coimbatore	0422-2317091, 98431 36626	EA 2445
184.	Del Star Engineers	Coimbatore	95851 34161, 98430 11641	EA 2309
185.	Devishree Electricals	Coimbatore	0422-2497843, 98401 87897	ESA 117
186.	Electrical Installation Systems	Coimbatore	94422 27237, 79044 13299	EA 2046
187.	Energy Control Corporation	Coimbatore	98432 36625, 98430 36626	ESA 333
188.	Essaar Electro Controls	Coimbatore	0422-2535407, 98422 53540	EA 2277
189.	Geethanjali Electricals	Coimbatore	98422 56341, 99655 56341	EA 2660
190.	Hindustan Electro-mech Engg. Co.	Coimbatore	0422-2525382, 94433 49382	EA 1400
191.	Jayam Power Controls	Coimbatore	0422-2496722, 98422 66722	EA 2609
192.	Krishna Bharathi Power Systems	Coimbatore	0422-2665793, 99524 37301	ESA 357
193.	Lalitha Enterprises	Coimbatore	94442 19715, 93677 83845	EA 1709
194.	MK Power Control Corporation	Coimbatore	95855 44881, 95855 44882	EA 2811
195.	N.K. Electricals	Coimbatore	99655 76386	EA 2716

KNOW THY POWER NETWORK - 131

Let us move further to a new site. We know that an electrical power system facilitates the transport of electrical energy from one end to another. In this process, the electrons play a leading role. They carry the energy from the power stations to our premises. Three other players also play supportive or opposing roles to this process of moving energy from the power stations to our door steps. Among them are, the power systems equipment / devices like generators transformers circuit breakers, transmission and distribution lines and cables capacitors and protective devices, consumers devices / equipment and the threats created by various hostile forces that include life threatening forces (both external and internal forces)

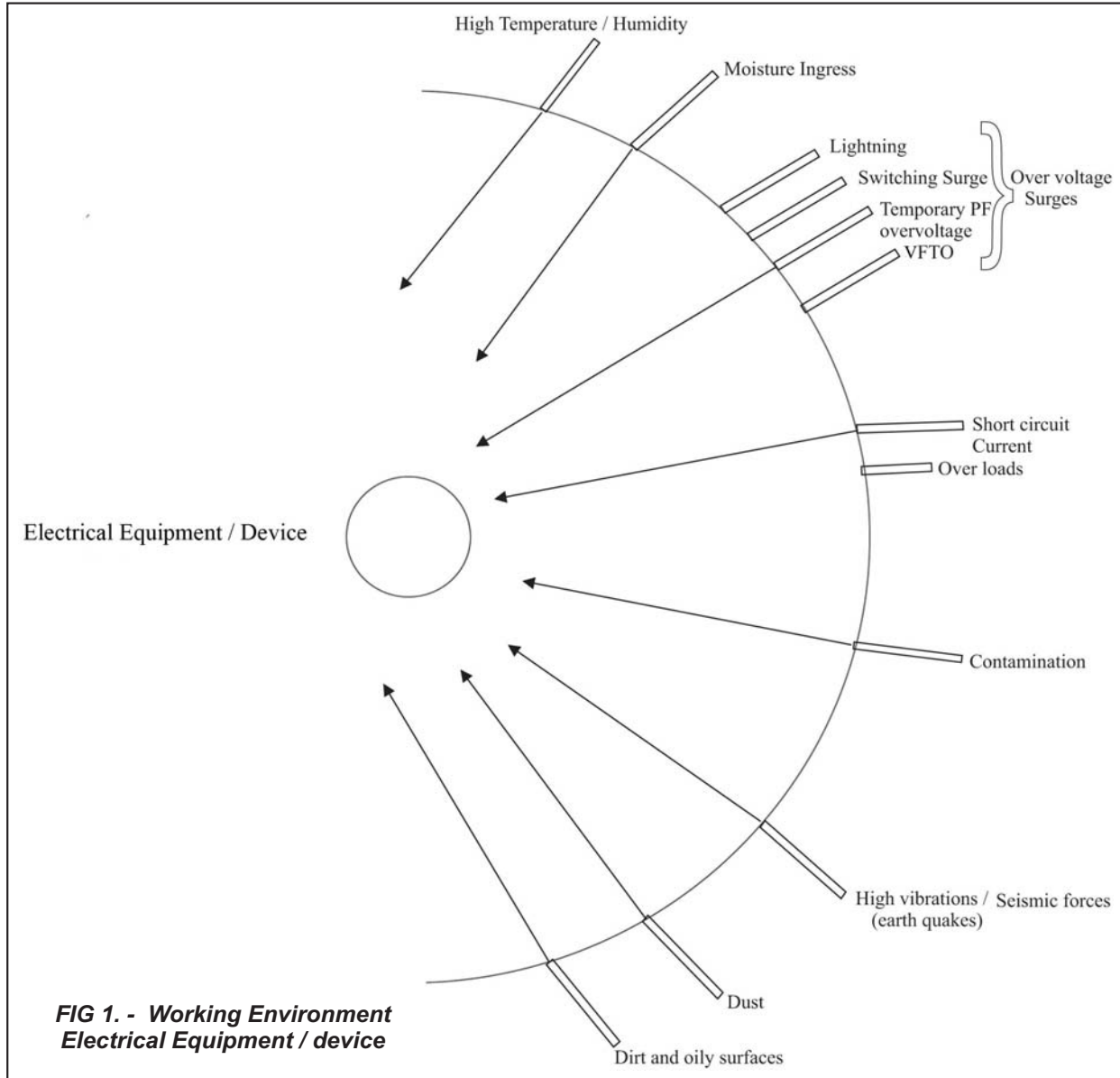
How we understand this ongoing process of electrical power transfer from the generating stations to our premises self of our activities. Unfortunately barring a few, none shows any interest to it. i.e. they pay no attention to it nor cares about it.

This prompts me to take this site for this sojourn. We always have good faith and trust on our equipment and expect them to function throughout their designed life span smoothly. We never see the reality in the ground nor do we ever care about the operating environment that surrounds our equipment and the life threatening forces faced by them. Moreover, we fail to pay any attention to remedy the sufferings experienced by them. This kind of trust or centralization of trust placed on our equipment at times can back fire and shake the pillars of trust we placed on the existing power system to which our equipment and devices are connected i.e. it may fail and bring darkness at an inconvenient and unexpected time.

The protective landscape is incredibly vast. Organized and automated equipment, life threatening forces play active and deeper roles in the game outlined. The point to be stressed at this junction is that said threatening forces have no qualms, no rules and always set the bar at incredibly higher level. There is a big need for us to clearly monitor them, to keep a watchful eye on them, track them, nullify their effects and also to take / necessary steps to modify / refine the design of our equipment. i.e. there is a need for us to encounter these threat forces in their track and eliminate / bottle them. At times simple routine protection methods may not be effective; we

need refined, better protective measures to successfully block them, confine / put them in a closed loop and eliminate / moderate their impacts and to work ahead of their next move.

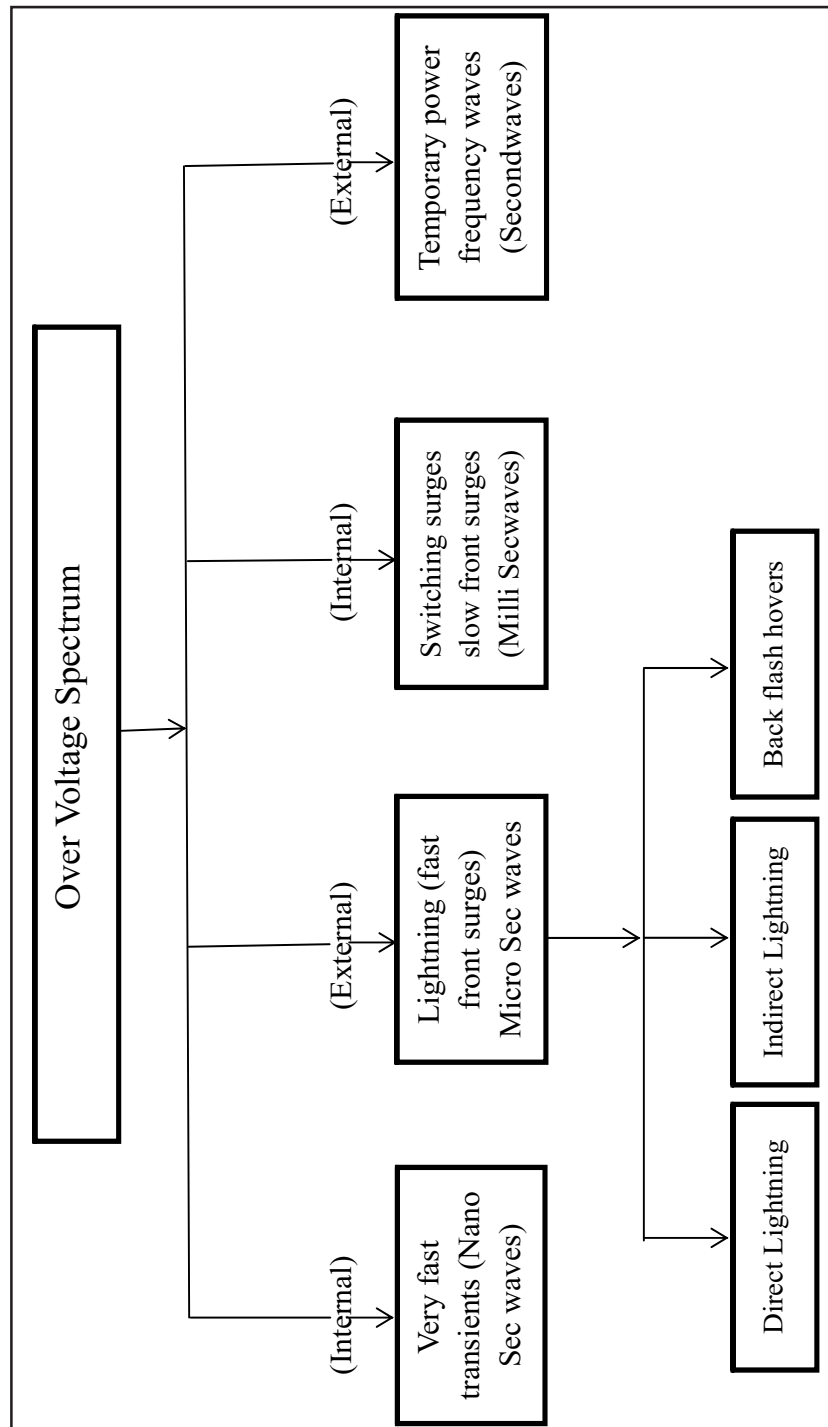
On viewing the present landscape, we find that there are growing threats and inadequacies and worrisome security gaps in the protective system. This prompts us to address the growing volume of threats and reduce the rate of defective / failed equipment and devices. i.e. we have to pay a close attention to the existing weak links in the protective chain (protection vulnerabilities) and fine tune our response to the threat forces. In fine, it is to be stated that the present threat environment is very complex and the threat forces are stronger and determined. So it demands a focused attention. Fig 1. Furnishes the general working environment of an equipment / device.



Among these threatening forces dust, dirt and oily surfaces, moisture ingress, contamination, higher temperature zones, high vibratory locations / areas and the elimination / reduction of their impacts are generally known to all and hence not repeated here.

The over voltage surges and their deadly attacks on the electrical premises, electrical equipment and devices are not known to all the readers. Hence they have been succinctly brought out. In the subsequent articles, the effects of short circuit currents and over loads and the protective methods to control / restrict them will be discussed.

- c) **Impacts Brought:** Gradual deterioration of the insulation of the equipment like Transformers, Circuit Breakers and Arresters. It produces severe voltages on all the connected equipment.
- d) **Protective Measures:** Specially designed Metal Oxide Surge Arresters.
- e) **Gaps in the Power Network:** That helps the intrusion of these waves missing links in the protective system – *Yet to be established*



Let me sign off here.



(To be continued...)
V. Sankaranarayanan, B.E., FIE,
 Former Addl. Chief Engineer/TNEB
 E-mail: vsn_4617@rediffmail.com
 Mobile: 98402 07703

USEFUL TIPS ON ELECTRICAL SAFETY

General Public

- Get all the electrical works done only by qualified licensed electrical contractors.
- Use only ISI marked electrical appliances, cables and wires.
- Switch off the supply before inserting and removing the plug socket outlets.
- Electricity supply for Refrigerator, Wet-grinder and other home appliances may be availed through pin plug sockets controlled by suitable switch controls, another third pin connected to earth.
- Use 'ELCB' the 'LIFE SAVER' wherever hand held / portable appliances are used.
- Replace damaged electrical components like switches, plug sockets etc., immediately when noticed.
- While installing the T.V. antennas
 - a) Don't install them nearer to the OH electrical lines.
 - b) Don't tie the stay wires of T.V. antenna poles to the structures of electrical installations (e.g. service poles, lamp fittings etc.,)
- Provide and maintain earth electrodes to earth the conducting body of electrical appliances.
- Install switches, Plug sockets etc., at an inaccessible height and away from the approach of children.
- Periodically test the electrical installation and replace if required. Temporary electrical wiring for the Temple Festivals, marriage functions may be carefully got done by licensed electrical contractor only.
- Avoid using stay wires and electrical fixtures as poles / supports to tie wires / ropes to dry wet clothes and save your family.
- During Car Festival, for running cars of higher pitch, seek the help of Electricity supply authorities for the safety of public.
- Do not Transport Vehicles, ladders etc., which are higher in height beneath the electric OH lines.
- Do not secure poultries / domestic animals to the electric poles or the stray wires.
- Don't use electric poles as support to pandals or displaying advertisement boards.
- If any snapped electricity conductors is noticed inform the electricity people but don't touch or go near them.
- Don't construct buildings near the electricity lines; consult Electricity supply officials before planning for the same.
- Watch your children while they are playing with kites near any electric OH lines.
- Don't go near the fencing of electrical transformers / structure yard on streets for nature's call.
- Don't stand beneath the lengthy trees during rain with thunders. Avoid lightning strikes.

ELECTRICAL SAFETY RULES

- Do not renew a blown fuse until you are satisfied as to the cause and have rectified the irregularity.
- Do not close any switch unless you are familiar with the circuit which it controls and know the reason for its being open.
- Do not work on the live circuit without the express orders of the supervisor. Make certain

that all safety precautions have been taken and you are accompanied by a second person competent to render First Aid and Artificial Respiration.

- Do not touch or tamper with any electrical gear or conductor unless you have made sure that it is DEAD AND EARTHED.
- Do not disconnect earthing connections or render ineffective the safety gadgets installed on mains and apparatus.
- Do not open or close switch or fuse slowly or hesitatingly. Do it quickly and positively.
- Don't use wires with poor insulation.
 - Do not touch any electrical circuits when your hands are wet or bleeding from a cut or an abrasion.
 - Do not work on energised circuit without taking extra precaution such as the use of rubber gloves.
 - Don't use fire extinguisher on electrical equipment unless it is clearly marked for that purpose. Use sand and blanket instead.
 - Do not throw water on live electrical equipment in cases of fire.
 - Do not attempt to disengage a person in contact with a live apparatus which you cannot switch off immediately. Insulate yourself from earth by standing on rubber mat or dry board, before attempting to get him clear. Do not touch his body, push him clear with a piece of dry wood.
 - Do continue artificial respiration until recovery or death is certified by doctor.
 - Do not allow visitors and unauthorised person to touch or handle electrical apparatus or come within the danger Zone of HV apparatus.
 - Do not test circuit with bare fingers.

INDIA'S FIRST INDUSTRIAL SOLAR MICROGRID COMMISSIONED IN GUJARAT

Swedish-Swiss multinational giant ABB today announced it has commissioned India's first industrial solar microgrid at its Vadodara manufacturing facility in Gujarat.

Microgrids with integrated battery energy storage allow cutting down of planned and unplanned power outages. When are often connected to renewable energy sources and provide more control to companies on how and when to deploy the stored power. A key benefit is the reduction in overall operational costs and reduced electricity bills.

The Vadodara factory is ABB's largest facility in India with over 3,000 employees and among its biggest manufacturing hubs in the world. **"The microgrid is the first-of-its-kind to be installed at a manufacturing campus in India and will harness the area's abundant solar energy supply to help the expanding factory meet its growing electricity needs, while lowering its carbon footprint," the company said in a statement.**

The microgrid's rooftop photovoltaic field and its battery-energy storage system will support the factory's productivity and enable green power supply. A sophisticated control and automation system serves as the brain of the microgrid which ensures maximizing renewable energy use. The facility's carbon footprint is expected to be reduced by around 1,400 tons of carbon dioxide per year.

"Growth demands power and access to clean, reliable electricity sits at the heart of India's economic development," said Claudio Facchin, President of ABB's Power Grids Division. "The solar energy driven ABB Ability microgrid at our Vadodara campus reinforces our commitment to clean energy as we lead by example to enable a stronger, smarter and greener grid," he added.

ABB India Managing Director Sanjeev Sharma said reliable, resilient and cost-effective power supply through microgrids is key to achieve Make in India targets, speed up industrial development and realize the vision of round-the-clock power for all.

Special International Training Course on
DESIGN, INSTALLATION & MAINTANENCE OF SMALL
WIND TURBINE

14th November to 14th December 2018

Organized by



NATIONAL INSTITUTE OF WIND ENERGY

Ministry of New and Renewable Energy,

Government of India

Chennai

Sponsored by



MINISTRY OF EXTERNAL AFFAIRS

Government of India

New Delhi

Introduction

Renewable Energy in particular Wind and Solar has become mainstay in meeting energy needs having achieved grid parity in term of costs as well as technical requirement. The wind energy has proved a highly successful energy option with installation of over 522 GW worldwide as on April 2018. It is estimated that viable wind power potential across globe is 72TW, which is four times more than the current World's total energy demand. The major wind generator installation is in USA, some of the European countries and Asian countries like China and India and other countries catching up with the rest. Lack of skilled human resource has been one of the main barriers that hinders wind and other renewable energy integration.

The global market for small wind turbines (SWTs) has been on the upswing over the last two to three years, which can be deployed for a diverse pool of applications, both in 'grid-tied' and 'stand-alone' modes. The recorded small wind capacity installed worldwide has reached more than 755 MW by end of 2013 and China contributes 41%, USA 30% and UK 15%. Based on the world distribution of turbine manufacturers, the production of small wind remains concentrated in few world regions in China, in North America and in several European countries. Developing countries continue to play a minor role in small wind manufacturing.

The National Institute of Wind Energy (NIWE), under the Ministry of New and Renewable Energy, Government of India has pioneered in promoting wind Energy and has contributed for promotion of wind energy as one of the primary energy sources in India. Decades of concerted efforts have started to yield gratifying results and today, Wind power contributes about 10% (34,046 MW) of the total Indian energy mix of 3,43,788 MW and stands fourth in terms of installed wind power capacity worldwide as on April 2018. Small wind is the best decentralized form suitable for Urban setup and can work in complimentary pattern with Solar roof top. To highlight, NIWE has so far successfully organized 28 international training courses, wherein 572 professionals from over 80 countries have been trained and has also organized 27 national training courses and trained about 1300 professionals which includes special course on Small Wind Turbine design, installation and maintenance. With this vast experience, India can incorporate lessons learnt from its own experience to foster growth elsewhere in the globe. In this context, a five weeks International Training Course

is scheduled by NIWE. The Course is sponsored by Ministry of External Affairs (MEA), Government of India, under ITEC programme.

Objectives

- The prime objective is to transfer knowledge and special skills to the international participants.
- To build skilled human resource so that there will be advancement of wind energy in the participating country.
- To provide an invaluable platform for exchange of professional and cultural experiences among diverse participants.
- To leverage the research that continues to shape this rapidly evolving discipline.
- Exchange of open source technical advances, experiences and discuss global best practices to enable the technology to expand rural wind electrification globally.

Training Methodology

- a) Class room lectures including exercises and case studies to stimulate active participation and dialogue.
- b) Practical classes at different laboratories.
- c) Hands-on working on wind energy equipments.
- d) Study visits to operating small wind farms and wind turbine manufacturing facilities to enhance effective transfer of knowledge.

Course Syllabus

The course content for the training has been carefully thought out syllabus with specific subject experts giving lectures and going through specific case studies such that, at the end of the course considerable useful knowledge transfer is perceived.

The course will address the following aspects:

- Introduction to wind energy, evolution & developments
- Government policies and supportive schemes
- Introduction to Small Wind Turbine & Hybrid Systems
- Siting of SWT in Urban landscape
- Design, Installation & Commissioning of Small Wind Turbine
- Hybrid system with Wind component & energy storage
- O & M aspects of Small Wind Turbine

The course is designed in such a way that the participants will themselves design the parts/components of the Small Wind Turbines from the low cost and locally available materials, construct, installation, commission and erection of the turbine to produce power and also Operation Maintenance practices. The participants will spend more time at the laboratory for practicals

Venue

The venue for the programme will be the **Conference Hall of National Institute of Wind Energy, Chennai, India.**

The Programme

The course duration will be 31 days from **14th November to 14th December 2018**

Target Participants

The course will be useful for anyone involved in wind energy or those who are looking for an introduction. Persons from the following fields will find this course very relevant.

- Academic and R & D Institutions
- Power Industry
- Wind Turbine Manufacturers
- Suppliers and Distributors
- Utilities

- Consultants
- Project Developers
- Government Organization
- Rural Mechanics
- NGO's & independent Green Engineers

Resource Persons

The resource persons for the training course would be scientists / engineers of NIWE, Small Wind Turbine Manufacturers, Experts and Engineers, who have contributed significantly for the development of small wind turbine technology. The design, construction and maintenance of small wind turbine part will be done by the Engineers of Minvayu, Auroville, Tamil Nadu near

Pondicherry, who have rich experience in design, construction, supply and providing training for the rural mechanics to build, install and maintain low cost wind turbines with local materials.

Reason to Attend

The course will offer a good foundation on the principles of engineering behind wind energy technology and power generation and detailed about making Small Wind Turbines with Installation, Commissioning and O&M aspects. The course would facilitate an invaluable forum for dialogue and open exchange of views and experiences with Indian scientists and professionals. The course would give a picture of complete know-how and pave the way to go about designing and manufacturing Small Wind Turbines as well as the installation and maintenance of the same.

Eligibility

- Applicants should be from any one of the ITEC countries. List of ITEC countries can be found in www.itecgoi.in
- **Degree in Science / Diploma / Engineering Disciplines / ITI Holder / Rural Mechanic with Knowledge in English**
- Age should be between **25 to 45 years**.

Course Fee

There is **NO COURSE FEE** for the participants of ITEC partner countries and is fully funded by Ministry of External Affairs (MEA), Government of India under ITEC programme. The funding includes **to and fro air fare, local travels, accommodation, living allowance and book allowance**. Accommodation provided will be of international standards.

How to Apply?

1. Those who are interested to apply for this Training Course are required to visit the website www.itecgoi.in.
2. Click on the **NEW USER** for filling up the online application form. It will take you to the streams to be chosen where you have to choose 'Environmental and Renewable Energy Course' and then select 'National Institute of Wind Energy'.
3. It will take you to the institute page where you have to click on the **'apply' link** provided in Special International Training Course on Design, Installation and Maintenance of Small Wind Turbine and follow the instructions.

Instructions

- Applicants are required to apply for ITEC training programme by filling up the online application form and take a print out of filled form. This form is to be submitted to the nodal/designated Government Department/Agency of applicant's country.
- Nodal/designated Department/Agency is, in turn, required to forward the applications to the Embassy/High Commission of India, accredited/concurrently accredited to the nominating country along with undertaking by candidate and certification from employer (Part-II of Application Form).
- Candidates may check the status of their application by logging-in at www.itecgoi.in. The credentials for log-in may be noted while filling up the application form.

Course Coordinator

Dr. P. KANAGAVEL, Additional Director

Information, Training and Customized Services (ITCS)

National Institute of Wind Energy

Velachery – Tambaram Main Road, Pallikaranai, Chennai – 600 100, Tamil Nadu, India

Phone: +91-44-2246 3982, +91-44-2246 3983, +91-44-2246 3984, +91-44-2246 3994 (Direct)

Mobile: +91 - 9445798007 Fax: +91 - 44 - 2246 3980 E-mail: itraining.niwe@gov.in

ABOUT NIWE

National Institute of Wind Energy formerly Centre for Wind Energy Technology shortly known as NIWE is an autonomous R&D institution established at Chennai in 1998 by the Ministry of New and Renewable Energy (MNRE), Government of India. It is a premier institution with highly experienced professionals having expertise in all related disciplines of wind energy sector. This combination makes it a forward looking and practical institution always well placed to take the next logical steps towards advancing wind technology in the right direction. With its progressive approach to all wind energy related science and technology from onshore to offshore, NIWE assures assistance from resource assessment to project implementation. As an integral part of NIWE, a world class accredited Services providing Wind Turbine Test Station (WTTS) is established at Kayathar, Tamil Nadu. Perhaps, NIWE is the only Testing and Certifying agency in the country.

NIWE has been vested with the responsibility to provide complete scientific and technical backing to all stakeholders in the field of wind energy and has stated its commitment through its quality policy.

QUALITY POLICY



NIWE is committed to achieve customer satisfaction, loyalty and confidence by providing credible, prompt and complete solutions of international quality to all the stakeholders in the wind energy sector.

NIWE, strives to be technical focal point of excellence for the present and future. NIWE shall stay at the forefront of Wind Turbine Technology application by continuously improving its expertise.

One great lesson I learned from my life. There is no market for your emotions, so never advertise your feelings, just show your attitude.

BLOOM ENERGY: THE COMPANY WHICH IS TRYING TO CHANGE THE RULES OF POWER GENERATION

KR Sridhar has no doubt that BloomNSE 0.00 % Energy is at the forefront of a revolution, which could one day be seen to be as significant as the information revolution in the last century or the industrial revolution two centuries ago. Specifically, he thinks that he is driving one of the great decentralisation movements that will change life on earth within a few decades. “It happened with computer and the mobile phone,” he says. “Now it is happening with electricity.”

Bloom Energy, which he founded 15 years ago in the Silicon Valley, makes a thin ceramic wafer that can be stacked up to power large campuses, using natural gas or biogas as main inputs. In the future, Sridhar hopes to use it with solar energy and provide uninterrupted power to anyone, whether a small house or a large building or a large city.

That will take time. For the moment, *Bloom is busy providing corporate campuses electricity using natural gas. It has teamed with Gas Authority of India Limited (GAILNSE 0.69 %) for the supply of gas, and won at least one multinational customer in Bengaluru (overseas clients include*

Google, Apple, Walmart and Ebay). By providing uninterrupted power generated on site, Bloom Energy is trying to change the rules of power generation and distribution. Indian companies now use diesel generators or solar cells to back up or supplement their power supply in their campuses. Diesel generators are noisy, polluting and expensive. Solar power often plays hide and seek during the day and disappears during the night. Power from natural gas remains steady, and the Bloom solution does not involve burning the fuel or driving turbines. It is silent, relatively clean, and efficient.

It would indeed be a revolution if it works. The technology, however, may have some distance to cover before it becomes universally acceptable. Sridhar was once a professor of aerospace engineering at Arizona University in Tucson. There, he worked on a project to terraform Mars and make it habitable. Specifically, he had worked on a project to generate oxygen on Mars, but it was wound up after some time. He set up Bloom Energy to use similar technologies on earth, running the oxygen generator in reverse and producing electricity with low pollution. The earth project was at least as hard as the one for Mars. Bloom Energy took a long time to develop a working model.

It launched its first product in 2010. Bloom’s technology is not new, and consists of using a fuel cell to produce electricity. Specifically, it uses a type of cell called Solid Oxide Fuel Cell (SOFC). Fuel cells generate electricity through a chemical reaction mediated by a liquid electrolyte. A solid oxide fuel cell has no liquid electrolytes.



Usually consisting of an abundant material called zirconium oxide, it requires air to flow on one side and a hydrocarbon fuel like natural gas on the other. Once all the reactions are over, you end up with water, carbon dioxide and electricity. With a bit of pre-cleaning of the air, you could produce very clean electricity, with only carbon dioxide as the byproduct. There is no combustion. The campus remains clean.

Bloom Energy says that its boxes produce far less carbon dioxide than by any other means (see How Bloom...). If one uses biogas, the entire procedure is supposedly carbon neutral if we discount the emissions from manufacture of the boxes. India has plenty of organic waste that can be used to produce gas, which can then be used in the place of natural gas to produce clean electricity. The method is attractive for large campuses that produce a lot of organic waste. It is good enough for small townships that also has a lot of waste. When combined with natural gas, solid oxide fuel cells can power homes with minimum pollution compared with power from coal or burning natural gas.

Disruptive Technology

The Bloom Box is considered to be the beginning of a disruption. Its energy efficiencies increase with a few concomitant technologies. Currently, the byproduct of steam is let out without harvesting its energy. Using the hot steam — the cell runs at a temperature of 800 degrees centigrade — to run a turbine in a combined cycle will produce more power, and increase the efficiency of the process. Using DC equipment will boost the efficiency of the further, as no energy is then lost converting DC into AC and then back. DC equipment is becoming popular anyway, and so the Bloom server fits into current trends.

Market economics, however, puts a different spin on the story. “Its success depends on the cost of capital and cost of gas,” says Brookings Fellow Rahul Tongia. “Bloom becomes attractive if both are cheap.” Utilities may not like high-paying corporate customers to be self-sufficient in large numbers. For a company, decentralised generation can avoid additional investments during expansion. It is also useful for running data centres. Since a Bloom server cannot be started and shut down quickly at will, it may not be a good substitute for diesel generators. It is, however, ***a good solution for running data centres. “Solid oxide fuel cells are ideal in a situation that requires continuous power generation,” says Ashutosh Gandhi, professor at the Indian Institute of Technology (IIT) Bombay.***

Bloom is just the front runner in a long line of companies trying to use solid oxide fuel cells.

“Judging from what happens in conferences,” says Rahul Walawalker, MD of the Pune-based Customised Energy Solutions, “solid oxide fuel cells have a bright future.” Bloom has solved some technical challenges for commercialising solid oxide fuel cells. There are more technical hurdles still to cross for them to be part of every household, as Sridhar envisages. One day, he imagines a situation where every house uses a solar panel and solid oxide fuel cells to power their entire house, including charging a car. This day is at least a decade away, if not more.

How Bloom scores in emission control			
	Tons CO ₂ /MWh	Tons NO _x /MWh	Tons SO _x /MWh
Bangalore Grid	0.94	0.0031	0.0049
Diesel Generator	0.77	0.0092	0.0049
% of time a company runs on diesel	10%		
Wt avg Emissions for a company	0.92	0.0037	0.68
Bloom on Natural Gas	0.35	0.00000085	0.000006
% reduction vs Grid + Backup	62%	100%	100%
Bloom on Biogas	0	0	0
% reduction vs Grid + Backup	100%	100%	100%

Source: Bloom Energy

Note: Table represents real data for a company whose identify cannot be disclosed.

Technology and social media have brought power back to the people. - MARK MCKINNON

ENERGY, ELECTRICAL ENERGY AND RENEWABLE ENERGY – 11

Sustainable Growth, Sustainable Electrical Energy and Renewable Energy

Thermo Chemical Technologies – Gasification Technologies.

Biomass and GAS:

We took up in part 9 of this series of Articles focused to Electrical Energy and Renewable Energy, about the Plasma Gasification Technology, indigenously developed to Generate Electricity from Plastic Wastes to tune with the “World Environment Day” and concern for plastic wastes etc. during that month.

The real solution to address the dangers of Plastic Wastes definitely lies in Perfecting the Technology, Scaling it up to handle Tons and Tons of Plastic wastes, which is possible, and spreading it all over with the support and guidance of the Government. This Technology is now being examined for installation of a 500 KW Capacity plant at Namakkal utilizing the Plastic wastes segregated from Municipal Solid Wastes being collected in that town.

From this Part 11 onwards, we will be discussing in more detail about different Technologies to produce different kinds of Gases from different kinds of Biomass.

Gas can be produced from Biomass through different technologies and processes selected suitably for different kinds of Biomass Stock.

Gas is Energy and it can be used directly for Heating, can be used to Generate Electricity by using it as Fuel in a suitable Engine Generator Set, and can also be used as Automobile Fuel to run the Engine and the Automobile. Gas is a commonly used term and we are familiar with LPG (Liquified Petroleum Gas) and CNG (Compressed Natural Gas), both of which are obtained from Petroleum. There are many other Gases like ‘Gobar Gas’, Bio Gas, Producer Gas, Syn Gas etc all of which are obtained through processing of Biomass. As we have seen earlier, depending on the type of Biomass, its characteristics, Moisture content, Calorific values etc. technologies are chosen to obtain Energy from them, which broadly falls into 2 Categories namely:

- a) Bio Chemical Technologies and
- b) Thermo Chemical Technologies.

1) Gobar Gas and Bio Gas:

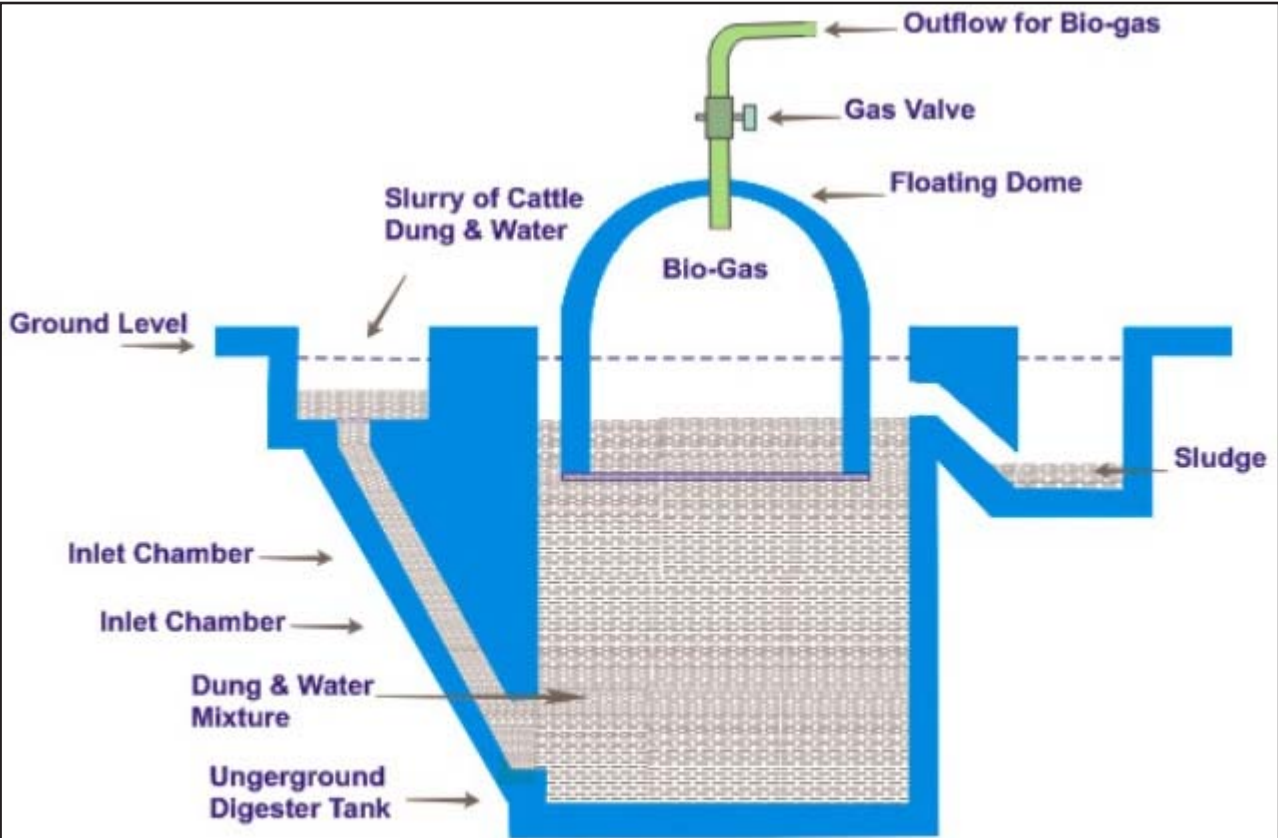
We are all familiar with Gobar Gas produced from ‘Gobar’ or Cowdung and the Technology involved falls under the category of “Bio Chemical Technology” and is known as Bio Gas or Biomethanation Technology or Anaerobic Digestion Technology. This Technology can easily be adopted to address all kinds of wastes from Animals, Poultry, Food and Vegetables and Fruits wastes and all kinds of “Bio Degradable Wastes”. There are lakhs and lakhs of Domestic, Small and medium sized plants all over the country, with capacities ranging from 1,2,3,5,10 Cubic Meter per Day to around a maximum of about 100 Cub M per day. In almost all cases, the Gases are used for Heating and Cooking purposes successfully. Presently in a number of places and cases, the same technology of Biomethanation has been scaled up to produce large quantities like 36000, 40,000, 50,000 Cub.M.per day capacities and so on..

Pictures and Diagrams of some of the small, medium and large capacity plants are shown.

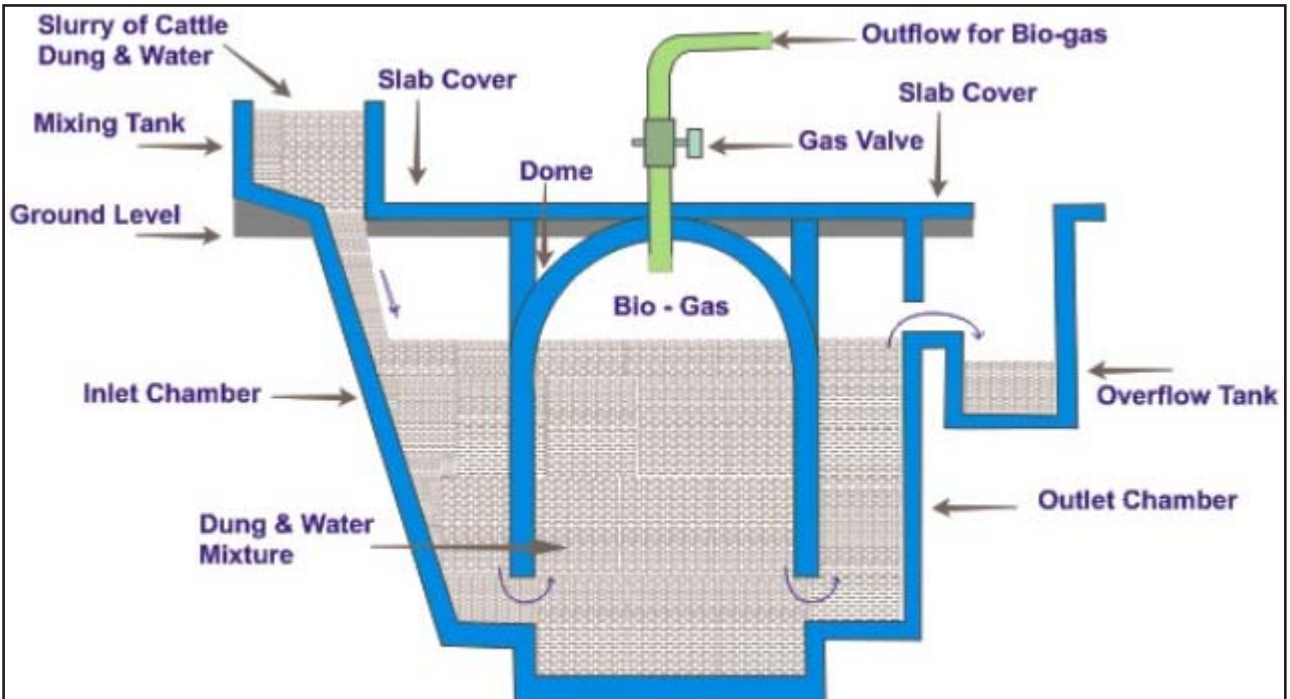
A large sized Bio Gas Plant to produce about 36,000 Cub.M per day

Basically, Bio Gas produced from Biomethanation Plants using different kinds of Bio Degradable materials comprises of 45 to 55% of Methane Gas (CH₄), 50 to 40% of Carbon di oxide (CO₂) and traces of other gases like Sulphur Di Oxide etc. The average Calorific Values of Bio Gas are around 4,500 K.Calories per Kg. These are directly used to produce heat and for cooking using suitable kinds of Burners.

Dedicated designs of Engines are now manufactured to take Bio Gas as fuel and Generating Sets of Capacities from a few KWs to hundreds of KWs and up to a MW and above are now available.



Floating Dome type Bio-gas Plant



Fixed Dome type Bio-gas Plant



**A Small 'Ready Made'
0.5 or 1.0 Cub M
Plant to handle Food
and Vegetable wastes**

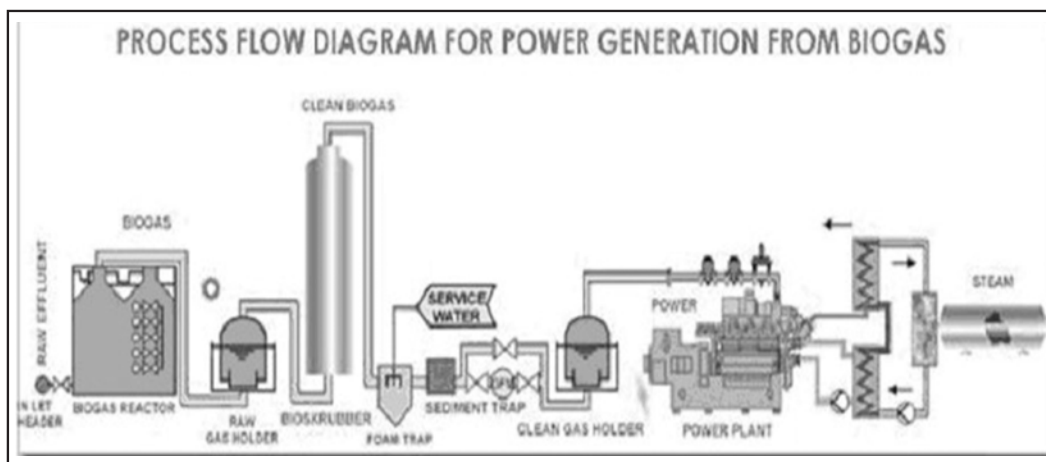
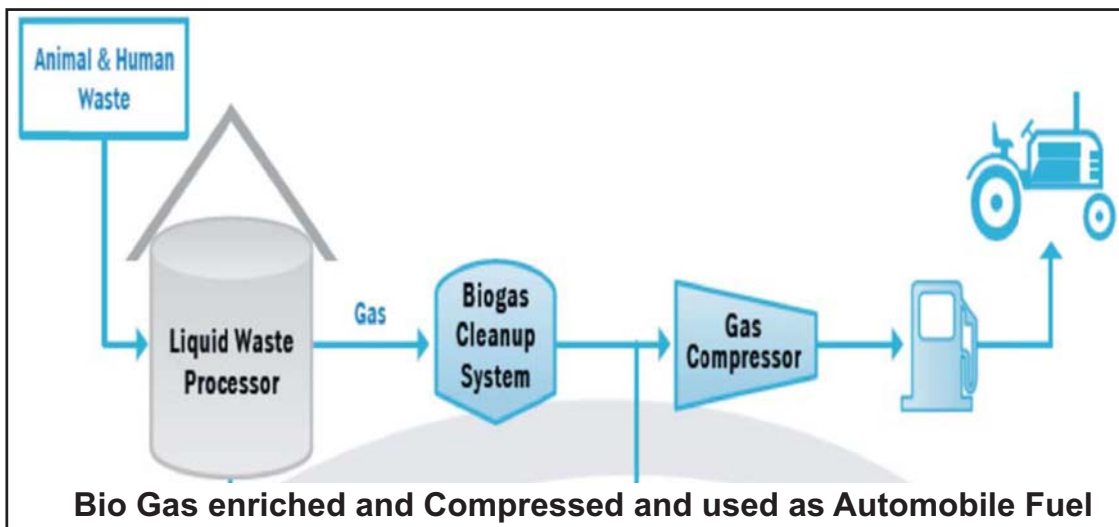
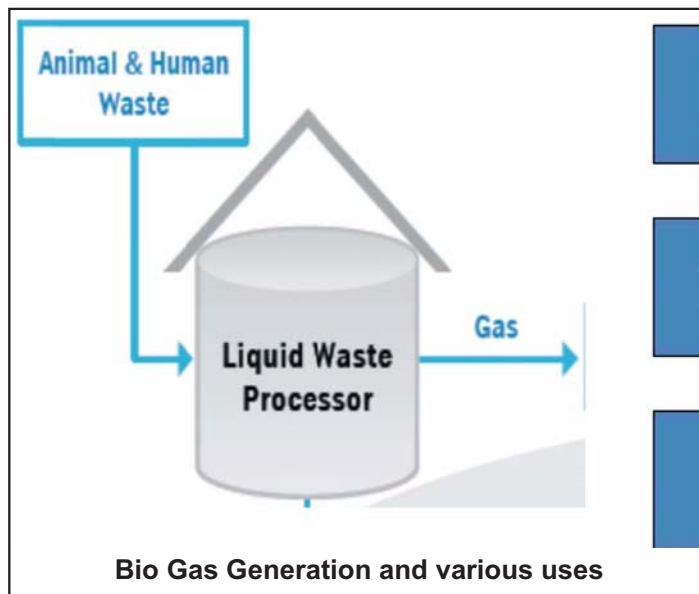


A large sized Bio Gas Plant to produce about 36,000 Cub M per day

Depending on the type and characteristics of materials, around 10 Kgs to 25 Kgs of Bio degradable wastes mashed and mixed with equal quantity of water and fed into the Anaerobic Digesters' produce 1 Cub.M of Bio Gas after a duration of about 30 days. Then it is a continuous process with daily feeding and daily production of Gas.

Scrubbing processes are developed to remove Carbon Di Oxide from the Bio Gas to make it enriched and possessing a Calorific Value of around 9000 K.Calories per KG.

Electricity Generation through Engine Generator set using Bio Gas is around 1-5 to 2 Units per Kg of Bio Gas and with enriched Bio Gas, we can get about 4 Units per Kg.



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

METHANOL-FUELLED CARS COULD DRIVE US TOWARD AN EMISSIONLESS FUTURE

The plant belongs to Carbon Recycling International (CRI), whose engineers have developed a novel method of using renewable energy to produce methanol fuel from waste streams of CO₂ and electrolyzed water. Methanol generated this way, CRI is betting, could have a real impact on climate change.

Over the past decade, CRI engineers have been refining and vetting their process at the plant, which is named for the late Nobel Prize-winning chemist George A. Olah. A pipeline carries about 5,500 metric tons of CO₂ per year from Svartsengi, which also supplies the electricity to split water into hydrogen and oxygen. The hydrogen and CO₂ are then combined to form water-laden methanol, which is distilled into pure methanol. Opened in 2012, the plant now produces 4,000 metric tons, or 5 million liters, a year. Some of the fuel, which CRI has dubbed Vulcanol, is used to operate a test



fleet of methanol-burning sedans built by the Chinese car giant Geely Auto Group.

The carmaker's founder, billionaire Li Shufu, has been pushing methanol transportation in his country. Geely has a factory in Shanxi province that can produce up to 100,000 methanol cars a year and is constructing another factory in Guizhou province.

Of course, in an ideal low-carbon world, the roads would be filled not with methanol cars but with electric vehicles charged by renewable energy. We're still well short of that goal, however. Today, EVs make up a tiny fraction of cars in every country where they're sold. Even under the most optimistic assumptions, it may be midcentury before a majority of cars on the road are all-electric.

In the meantime, methanol is among the most promising alternatives for significantly shrinking our cars' carbon footprint. If you power a methanol plant with a renewable energy source and capture the CO₂ coming from the exhaust of, say, a steel plant, you can halve the total carbon being released into the atmosphere. So even though burning methanol in a car's internal combustion engine does release CO₂, along with some water vapour, you're first capturing CO₂ from the steel plant. That is, you're basically recycling the carbon and extracting some useful work before it gets released.

"Many people are convinced that EVs will solve our climate problem," says G.K. Surya Prakash, a professor of chemistry at the University of Southern California and a longtime collaborator of Olah's. "But the technology isn't there yet, the batteries aren't there yet. And many third-world countries don't have enough electricity even for basic needs, so what's all this talk about EVs?" Methanol, by contrast, is doable right now, he says. The simple alcohol can be burned in an internal combustion engine, and it can be stored, transported, and distributed using the same basic infrastructure that's now used for gasoline and diesel.

"That's the beauty of methanol," says Prakash. "You don't have to build an entirely new infrastructure from scratch."

The European Union, India, and Israel are all investing in methanol transportation, Wuebben notes. And in China, methanol accounts for 8 percent of transportation fuel, and the market research firm IHS Markit is projecting demand to grow by 7 percent per year. The availability of methanol-gasoline blends there ranges from 5 percent methanol (M5) to 100 percent (M100). While most of China's methanol is produced from coal or using coal power, Geely's Li recently called for the creation of a "liquid sunshine economy," in which the fuel's production would be solar powered. And in April, the Chinese car startup AIWays, working with the German car engineer Roland Gumpert and the Danish fuel cell company SerEnergy, unveiled a methanol fuel cell sports car at the Beijing Motor Show.

And Iceland's CRI is riding the methanol wave. At the company's headquarters in Kópavogur, just outside Reykjavík, BenediktStefánsson, the business development director, says it's been quite a ride. CRI was founded by two Icelanders and two Americans in 2006, the same year that Olah, Prakash, and Alain Goeppert published *Beyond Oil and Gas: The Methanol Economy* (Wiley), laying out a grand vision for weaning the world from its habit of consuming some 97 million barrels of oil a day. The following year, CRI opened a small pilot plant. But the global financial crisis of 2008–2009 hit Iceland particularly hard, and investment funding dried up. CRI cobbled together enough money from local investors and family members to complete the Olah plant in 2012. Subsequent investments from Canadian methanol producer Methenex and Geely allowed the company to expand the plant and start developing projects outside Iceland.

In the recently concluded first phase of the fleet test, the cars were driven roughly 150,000 kilometers (93,000 miles). Among drivers testing the vehicles were CRI staff and members of the Icelandic Automobile Association as well as several local service providers in the auto industry. The participants reported virtually no difference in driving experience compared to regular gasoline- or diesel-fueled cars.

The GeelyEmgrand 7 is a mid-sized 4-door sedan similar in size to a Škoda Octavia or Toyota Corolla. It features a 1.8-liter, 127 hpengine which can run on both 100% methanol (M100) and gasoline. The version used in the fleet test has a 50-litre methanol tank as well as a 10-liter gasoline tank. The car starts with fuel from the gasoline tank and automatically switches to methanol once a preset temperature has been reached in the engine. The switch from gasoline to methanol is not noticeable to the driver.

As methanol is stable at a low temperature and therefore evaporates slowly—unlike gasoline—the two-tank solution was implemented to avoid any problems during cold starts. Geely is now working on a new design, eliminating the need for the small gasoline tank.

According to CRI's Director of Sales and Marketing, ÓmarSigurbjörnsson, who managed the fleet test, the reported reduction in well-to-wheel (WTW) CO₂ emissions when driving with renewable methanol compared to gasoline was 70% on average (including all upstream manufacturing, distribution and tailpipe emissions for both the gasoline starter fuel and renewable methanol).

At the Beijing Motor in April, the Chinese car startup AIWays unveiled a methanol fuel cell sports car [top] designed by Germany auto engineer Roland Gumpert. The fuel cell system an 0-to-100 km/h acceleration of about 2.5 seconds.above] was supplied by SerEnergy. The car boasts a top speed of 300 kilometers per hour an 0-to-100 km/h acceleration of about 2.5 seconds.





V. G. SIDDHARTHA
Café Coffee Day



Entrepreneurship is embedded in our genes which were eclipsed by the Britishers ruling over us for over 200 years. The new wave of Indian entrepreneurs is likely to become a Tsunami by 2020.

Sikhs from Punjab and traders from Gujarat and Marwar are popularly considered more

entrepreneurial. This is not true as entrepreneurship is coming up in every corner of India as witnessed by the success stories in the media.

Our **V.G. Siddhartha** gave a “**booster shot**” to coffee drinking through his **1438** strong **Café Coffee Day** chain covering **175 cities**. His tagline to promote his Café Coffee Day is very appropriate – “**A lot can happen over coffee**”. His brand touches 1.2 million Indians daily. He grew coffee in Chikmagalur, Karnataka and exports about 28,000 tons of coffee annually, sells another 2,000 tons locally for about Rs. 350 million each year, and his coffee growing and trading company **Amalgamated Bean Company (ABC)** has an annual turnover of Rs. 25 billion. Siddhartha now has 200 exclusive retail outlets selling his brand of Coffee Day powder all over South India. **ABC is India’s largest exporter of green coffee.**

Siddhartha obtained a Master’s degree in Economics from Mangalore University in 1984, after which he joined J M Financial Services in Mumbai as a Management Trainee under MahendraKampani. After a two-year stint he decided to strike out on his own. As a first generation entrepreneur, his father gave him some money to start up any business of his choice. He started by buying out an ailing coffee curing factory, turned it around and became an exporter of premium coffee. In 1993, he set up his own coffee trading company. Vertical integration followed, from plantations to trading and the logical step in 1996 to Café Coffee Day! From a handful of cafes in six cities in the first 5 years, ‘Café Coffee Day’ has today become India’s largest and premier retail chain of cafes. As of May 2013, there are 1438 outlets across 28 states of India. **Siddhartha was awarded the Next Gen Entrepreneur award in 2003 for transforming a commodity business into one India’s largest retail brands.**

HUMOUR

HAVE FUN – In lighter (serious too) vein
 You’re getting old when you enjoy remembering things more than doing them.
 It doesn’t matter how often a married man changes his job, he still ends up with the same boss.
 Real friends are the ones who survive transitions between address books.
 Saving is the best thing, especially when your parents have done it for you.

Wise men talk because they have something to say; fools talk because they have to say something
 They call our language the mother tongue because the father seldom gets to speak!
 Man: Is there any way for long life?
 Dr: Get married.
 Man: Will it help?
 Dr: No, but then the thought of long life will never come.
 Why do couples hold hands during their wedding? It’s a formality just

like two boxers shaking hands before the fight begins!
 Wife: Darling today is our anniversary, what should we do?
 Husband: Let us stand in silence for 2 minutes.
 It’s funny when people discuss Love Marriage vs Arranged. It’s like asking someone, if suicide is better or being murdered.
 There is only one perfect child in the world and every mother has it.



The Madras Day
CELEBRATING THE FOUNDING OF THE CITY, 1639

சென்னை தினம்
நகர நிறுவனக் கொண்டாட்டம், 1639

Madras Week Celebrations
August 19 to 26, 2018



A city deserves to celebrate its birthday.

And Madras, that is Chennai certainly deserves it.

So a small group of people who love this city launched a unique celebration in 2004.

The founding day of Madras is considered to be August 22, 1639.

It was on that day, in that year, that a sliver of land, where Fort. St. George stands today, was transacted by the East India Company.

The deal was struck by Francis Day, his 'dubash' Beri Thimmappa, and their superior, Andrew Cogan, with the local Nayak rulers. It is believed that this deal was made on August 22, 1639.

Out of the fort, grew settlements. Then the villages around it were brought together. And then, the old and new townes linked up. And then we had the city.

Madras... the name is synonymous with Mylapore temples, SanThome Basilica, Mount Road Mosque, the filter coffee, rendu idly oruvasambhar, the fantastic roads and the heritage buildings.

Today, Chennai stands tall for a variety of reasons. Education, Healthcare, IT, History, Tourism, Auto Industries, Movies, etc. And yes, it also has its warts.

Madras Day celebrates the city.

Madras Day was an idea that three people put together – the city's famed historian, S. Muthiah, journalist Sashi Nair and publisher Vincent D' Souza. Later, they have been joined by three others – senior journalist and editor Sushila Ravindranath, journalist and website entrepreneur Revathi R and entrepreneur and writer-historian V. Sriram.

Madras Day focuses on the city, its history, its past and its present and the core team motivates communities, groups, companies and campuses in the city to host events that celebrate the city.

Heritage walks, school exchange programmes, talks and contests, poetry and music and quiz, food fests and rallies, photo exhibitions and bike tours these and more are the ways in which the city is celebrated

In order to enlarge participation, the Madras Day has been expanded to create the Madras Week

In 2018, MADRAS WEEK will be celebrated from August 19 to 26.

MADRAS DAY, as always, is August 22.

***Life is too short to stress yourself with people
who don't even deserve to be an issue in your life.***

FIFA WORLD CUP

We know the ‘French’ connection with Pondicherry – They could cheer and Celebrate!

Why This Small Village in Goa Was Cheering For Croatia in the Final!!

Croatia, a small Eastern European country with a population of just over 4 million, played its first FIFA World Cup final on Sunday in Moscow.

By all accounts, it’s been a remarkable journey for the men from the Balkans who have endured three consecutive knockout matches going into extra time and two penalty shootouts. If they win, it’ll truly be one of the great sporting achievements of our generation.

One can be sure that the football-mad state of Goa will watch Sunday’s final between Croatia and France with rapt attention. While many may fancy the French, there is one small village supporting the team from the Balkans as a result of an interesting bit of shared history.

Way back in the 16th century, a group of Croat sailors and merchants visited a small riverside settlement 4 km away from Old Goa called Gandaulim. While the sailors and traders didn’t stay for long, what they did leave behind was the restored Church of Sao Braz besides the Cambarjua canal.

Centuries after they left, the link between Croatia and this settlement in Goa was rediscovered by Croatian Indologist Zdravka Maticic, while she was studying Sanskrit in India.

“Moments of ecstasy awaited her (Zdravka) at Gandaulim when she saw that the Church of Sao Braz, a small chapel built in June 1541 and elevated to a parish church in 1563 by Archbishop D Frei Alexio de Menezes (1595-1607). The petite church had a remarkable resemblance to the church of Svete Vlaho (Sao Braz) in Dubrovnik in her country.



Sao Braz church in Goa (Left) and the jersey of Croatian WC captain Luka Modric. (Source: Facebook/E-Bay)

Her painstaking research motivated the visit of a 15-member Parliamentary delegation from the Republic of Croatia, accompanied by Ambassador Zoran Andric, to the quaint little Gandaulim village in April 1999,” says this report in Goa Now.

Some historians believe that the Portuguese may have brought the Croats, who were expert shipbuilders, while another theory suggests that Croats came over to this teeming suburb of Old Goa as merchants. Portuguese writer Gomes Catao, meanwhile, refers to a thriving town of nearly 12,000 residents during its heyday filled with Croats. However, some believe that differences with the occupying Portuguese changed those dynamics and they soon left.

Also Read: This Forgotten Coach Was the Architect of Indian Football’s ‘Golden Age’

Nonetheless, since the delegation’s visit in 1999, the village has received more Croatian tourists every year. “Every time a Croatian ship comes to the Mormugaoharbour, the sailors come to visit our church,” says a villager BrazSilveira to the Times of India.

Croats from different walks of life have sought to donate their money or work to restore the church, and this has resulted in the development of a close rapport between the locals and tourists. In fact, last year a Croatian team visited the village to film a documentary.

“We are waiting to see the documentary that recorded the historical landmarks in our village,” says Esperance Silveria e Vaz, another village resident, to ToI.

While many in India will support the French in the World Cup final, one can be sure that this small village in Croatia will back the men from the Balkans.

வியப்பூட்டும் இந்தியா - 8

சலார் ஜங் அருங்காட்சியகம்



உலகிலுள்ள மிகப் பெரிய அருங்காட்சியகங்களில் ஒன்று, ஐதராபாத் திலுள்ள சலார் ஜங் அருங்காட்சியகம் தனிப்பட்ட மனிதர் ஒருவர் சேமித்த பொருட்களை வைத்து இவ்வளவு பெரிய அருங்காட்சியகத்தை அமைத்திருப்பது மிகவும் ஆச்சரியமான விஷயம். இது ஐதராபாத் நகரின் மூலி ஆற்றங்கரையில் அமைந்துள்ளது.

மூன்றாம் நலாப் மிர் யூசுஃப் அலிகான் சலார் ஜங், ஏழாவது நிஜாமின் பிரதம மந்திரியாக இருந்தவர். இவரின் வருமானத்தின் பெரும் பகுதியை,



அரியபொருட்கள் வாங்கிச் சேமிப்பதில் செலவிட்டார். உலகின் பல்வேறு பகுதிகளிலிருந்து கலை நுட்பமான பொருட்களை எல்லாம் தேடித் தேடிவாங்கினார். அப்படி அவர் சேகரித்த 35 ஆண்டுகாலப் பொக்கிஷங்களே இந்த அருங்காட்சியகத்தில் வைக்கப்பட்டிருக்கின்றன.

முதலாம் நூற்றாண்டைச் சேர்ந்த பொருள்களிலிருந்து அவர் வாழ்ந்தகாலம் வரையிலான பொருட்களைச் சேகரித்திருந்தார். ஜப்பான், சீனா, மியன்மார், நேபாளம், பாரசிகம், எகிப்து, வட அமெரிக்கா மற்றும் ஐரோப்பிய நாடுகளுக்குப் பயணம் செய்து, கலைப் பொக்கிஷங்களை அள்ளி வந்தார்.





உலோகச் சிற்பங்கள், சலவைக்கல் சிற்பங்கள், ஓவியங்கள், தந்தத்தில் செதுக்கப்பட்ட நுணுக்கமானக் கலைப் பொருட்கள், வித விதமான துணிகள், பீங்கான் ஜாடிகள், விரிப்புக்கள், கடிகாரங்கள், இருக்கைகள், கையெழுத்துப் பிரதிகள், புத்தகங்கள் என்று சுமார் 42,000 பொருட்களும் 60,000 நூல்களும் 950 கையெழுத்துப் பிரதிகளும் இங்கே உள்ளன.

1951-ம் ஆண்டு அப்போதைய பிரதமர் ஜவாஹர்லால் நேரு இந்த அருங்காட்சியகத்தைத் திறந்து வைத்தார். இரண்டு அடுக்குக் கட்டிடத்தில் 38 பிரிவுகளாகப் பிரிக்கப்பட்டு, பார்ப்பதற்கு வசதியாக வரிசைப் படுத்தியுள்ளனர்.

இவற்றுடன் பெரிய நூலகம், படிக்கும் அறைபதிப்பகம், ரசாயன முறையில் பொருட்களைப் பாதுகாக்கும் ஓர் ஆய்வகம், விற்பனையகம் போன்றவையும் உள்ளன. ராஜா ரவிவர்மா ஓவியங்கள், ஒளரங்கசீப், ஜஹாங்கீர், நார்ஜஹானுடையவாஸ்கள், திப்புசுல்தானின் அங்கிகள், தலைப்பாகை, நாற்காலிகள் என்று வரலாற்று முக்கியத்துவம் மிக்கப் பலபொருட்களை இங்கு கண்டுளிக்கலாம்.

முக்காடு போட்டிருக்கும் ரபேக்கா சிலை மிகவும் புகழ்பெற்றது. மெல்லிய துணி மூடியிருப்பதால் முகம் மங்கலாக இருப்பது போல் வடிவமைத்துள்ளனர். 1876-ல் பென்சொனி என்னும் இத்தாலிய சிற்பியால் இந்தச் சிற்பம் செதுக்கப்பட்டது.

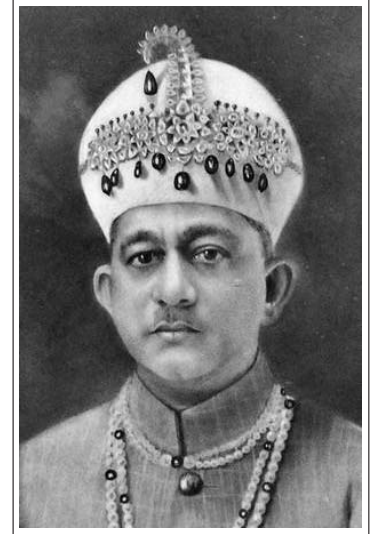


உலகின் பல்வேறு நாடுகளிலிருந்து பெறப்பட்டுள்ள குரான் நூல்கள், விதவிதமான அளவுகளிலும் வடிவங்களிலும் இங்கே வைக்கப் பட்டிருக்கின்றன. தங்கம், வெள்ளித் தகடுகளில் எழுதப்பட்ட குரான், மிகச் சிறிய குரான் போன்று பல ஆச்சரியங்களுக்கு இங்கே பஞ்சமில்லை.

கடிகாரங்களுக்கு என்று தனிஅறை உள்ளது. பழங்கால சூரியக் கடிகாரத்திலிருந்து 20-ம் நூற்றாண்டின் அதி நவீன கடிகாரங்கள் வரை வைக்கப் பட்டிருக்கின்றன. பூதக் கண்ணாடியால் பார்க்கக் கூடிய மிகச் சிறிய கடிகாரமும் உள்ளது.

இங்கு வரும் பார்வையாளர்கள் அனைவரையும் ஈர்த்த ஒரு பொருள் என்றால் அது, இசைக்கும் கடிகாரம் தான். 200 வருட கடிகாரம் ஒருமுறை கூடப் பழுதாகாமல் ஓடிக் கொண்டிருக்கிறது. 350க்கும் மேற்பட்ட உலோக பாகங்களால் இந்தக் கடிகாரம் உருவாக்கப்பட்டுள்ளது.

ஒரு மணி நேரத்துக்கு ஒருமுறை கடிகாரத்தின் மேல் பகுதியில் உள்ள கதவு திறக்கப்பட்டு, தாடி வைத்த ஒரு மனித பொம்மை வெளியே வருகிறது. சுத்தியலால் ஓர் உலோகத் தகட்டின் மீது ஓங்கி அடித்துவிட்டுச் சென்று விடுகிறது. இதைப் பார்ப்பதற்கே மக்கள் அதிகமாக இங்கே வருகிறார்கள்.



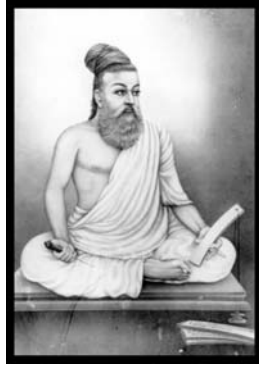
இருக்கை வசதிகளுடன் கூடிய பெரிய அறையில் அமர்ந்து, காத்திருந்து, மணியடிப்பதைப் பார்த்துச் செல்கிறார்கள்.

தொடர்புக்கு: ஆம்பூர் மங்கையர்கரசி, mangai.teach@gmail.com

Courtesy: தி இந்து, தேதி: 06.12.2017

TIRUKKURAL AND MANAGEMENT IN A 'NUTSHELL' - 64

We have been analyzing Management and Peter Drucker and Tiruvalluvar has devoted 700 Kurals out of 1330 to deal with Management and Wealth and administration covering all aspects of Ethical practices in Economics and Safety and Well Being. As we saw, Peter Drucker sums up all the jobs of Managers as;



Management of Economic Performance of Business, Managing the Managers and Managing the Work and the Workers.

Economics deals with Wealth and Tiruvalluvar names his main part of the Kural as "**PORUL**" which literally means Wealth.

In the context of 'Acquisition' of Wealth, which in modern times mean 'Profits', 'Reserves', and 'Surplus' Tiruvalluvar provides some very important, interesting and Ethical dimensions.

The KURAL below stresses the importance of Profits, to make the Business or the Person meaningful.

*"Porulal Lavaraip Porulagach Cheyym
Porulallathu Illai Porul Kural 751*

பொருள் அல் லவரைப் பொருளாகச் செய்யும்
பொருள் அல்லது இல்லை பொருள். குறள் 751

"There is nothing like wealth to lead consequence to men of no consequence"

This Kural stresses the importance of acquisition through Right and Ethical means, which only can help achieve all round happiness and Good Deeds (CSR etc)

*"Araneenum Inbamum Eenum Thiranarinthu
Theethuindri Vantha Porul Kural 754*

அறன்ஈனும் இன்பமும் ஈனும் திறன் அறிந்து
தீது இன்றி வந்த பொருள். குறள் 754

"Behold the substance that is acquired by means that are not evil; righteousness floweth there from and Happiness also."

In the following KURAL, Tiruvalluvar brings out the Modern Concept of "Win Win" which can only help sustain the Profits.

*"Arulodum Anbodum Vaaraap Porulakkam
Pullar Purala Vidal Kural 755*

அருளொடும் அன்பொடும் வாராப் பொருள் ஆக்கம்
புல்லார் புரள விடல் குறள் 755

"Affect not the substance that is divorced from Mercy and Kindness, and touch it not with thy hands."

HOME FESTIVALS - 9

புரட்டாசி - Purattasi (September/October)



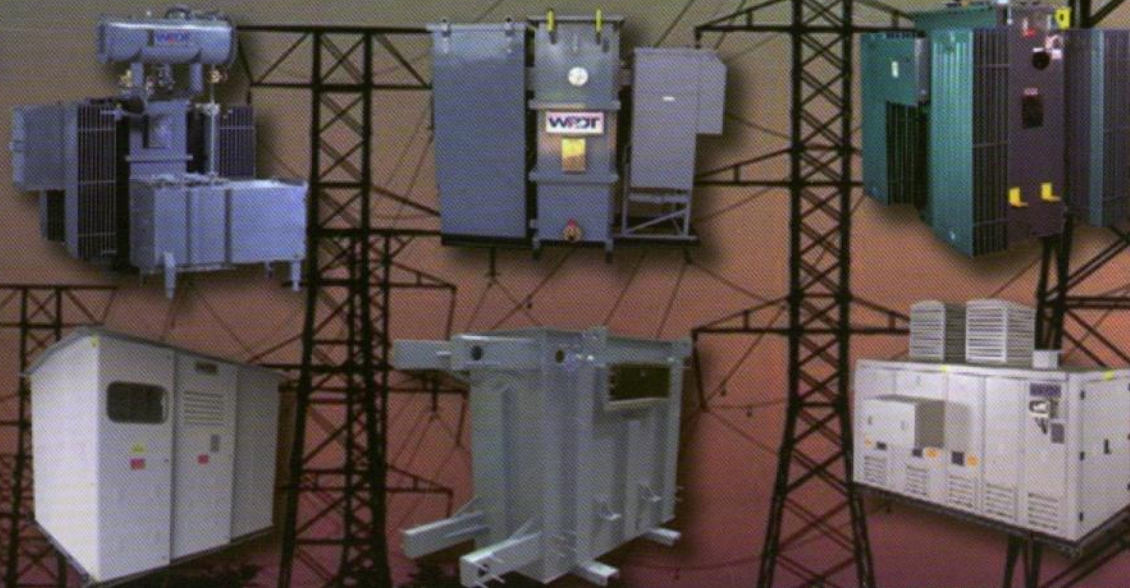
Navaratri ("nine nights") is the principal festival this month (above left). The Goddess is worshipped in Her many forms, and on the ninth day, Sarasvati (centre of the painting) is invoked to bless musical instruments, account books, agricultural instruments and home tools (upper left). On VijayaDasami, the day following Navaratri, Goddess Durga is invoked as children are given their first instruction, worship their school books and honour their teacher (bottom left). A decorated display of dolls (lower right) is displayed through the nine days, then dismantled and stored on the tenth day. **VijayaDasami is also the birthday of Lord Venkateshwara** (upper right), presiding Deity of Tirupati temple in Andhra Pradesh, India's wealthiest temple.

(To be continued)

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