



# ELECTRICAL

## INSTALLATION ENGINEER

### NEWS LETTER

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

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# EDITORIAL

Dear Members, Fellow Professionals and Friends

*Seasons Greetings to One and All!*

*"Happy Engineers' Day"*

It is very happy to see signs of all round progress in our Country and good rains in many parts with excesses in some places. Waters in Cauvery is a relief and the inflows are continuing, which gives us hopes of better harvests.

As rains giving hopes for a better harvests, AGM gave better hopes to our Association's future. This year AGM was held at TTDC, Mahabalipuram on 30<sup>th</sup> Aug 2014. In spite of busy schedule, our members participated in large numbers. It is really heartening to see more and more members now volunteering for association works. Please check the MOM in this issue for more details.

As an editor I would like to congratulate Elected Office Bearers for the year 2014 – 2016.

Mr. U. Baskaran, M/s Balaji Electrical - President

Mr. K. Kannan, M/s Tandem Enterprises - Secretary

Mr. P. Suyambu, M/s Sudha Sudhan Engineers - Treasurer

And all others for a successful stint as office bearers.

The Month of September comes with the Celebration of Engineers Day on the 15<sup>th</sup> of the month, celebrated in remembrance of Sir Mokshagundam Visvesvaraya, the most outstanding Engineer of all times. It was this day 147 years ago that this great contributor to growth and engineering was born. Every year the celebration of the Engineer's Day revolves around a central theme. We take pleasure in publishing a write up on the 'Theme' of Engineers Day for the year, **'Making Indian Engineering World-Class'**, in this issue, which reminds us of our Importance and the responsibilities associated with that.

Agriculture or Manufacturing or Construction or Infrastructure or any activity for that matter, Engineering matters. In Agriculture, for example, India is one of the few countries of the World employing a sizable percentage of the population directly in Agriculture, which is diminishing fast. This need not be considered as negative, as opportunities for skill and knowledge development have increased vastly providing opportunities for better and more comfortable employments. Agriculture is very important and we are in the right direction of progress as we have achieved self sufficiency and more in agricultural production, which should be sustained and improved. Intervention of Engineering and Mechanization is the answer, as the Mechanization in Agricultural operations in our country is still very low, but, this is going up steadily compelled by the shortages and costs of labor, which should continue and gallop.

Our Prime Minister, in his Independence day Address talked about "Zero Defect" and "Zero Effect" in Engineering and Manufacturing activities, which is absolutely essential in the present context of very competitive and highly demanding World today. There is also another important dimension of challenge for the Engineering Fraternity today concerning "Excellence", which can be understood by the following quote;

*"Industrial and Society 'Comfort' revolutions of the last Century were inventions designed without full grasp of the consequences. Change can be brought about not by going back to Nature and hiding in the Woods, or indulgences in the form of 'Save the Earth' campaigns but by articulating a 'Vision' for the future and pursuing it with all ingenuity, for 'upgrading' and 'redesigning'....".*

Our pursuit of Excellence in all activities, Energy Excellence in particular, ably supported by Engineering can only help create a Safe and Comfortable World for the present and for future generations.

*We thank all those members who have helped us by participating in the advertisements appearing for the issue August 2014 – Tandem Enterprises, Blue Sea Power Solutions Pvt. Ltd., EA Facilities Services Pvt. Ltd., Power Links, Larsen & Toubro Ltd., Ashlok Safe Earthing Electrode Ltd., Wilson Power and Distribution Technologies Pvt. Ltd., Ess Enn Power Controls Pvt. Ltd., Universal Earthing Systems Pvt. Ltd., Cape Electric Pvt. Ltd., Abirami Electricals, FLIR Systems India Pvt. Ltd., Intrans Electro Components Pvt. Ltd., Heat Craft Engineers Pvt. Ltd., Faith Power Solutions, Power Cable Corporation, Max Electric Co., EVR Electricals Pvt. Ltd., Galaxy Earthing Electrodes Pvt. Ltd., Elmeasure India Pvt. Ltd., Sivasakthi Electricals.*

EDITOR

**SAVE ENERGY - SAVE RESOURCES - PRESERVE LIFE ON EARTH**

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**Secretary : K. KANNAN**  
**Treasurer : P. SUYAMBU**

**Editor :  
 G. VENKATESH**

**Printer :  
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## நன்றி! நன்றி! நன்றி!

மாண்புமிகு தமிழக முதலமைச்சர் அம்மா அவர்களுக்கு நன்றி!



மின் ஒப்பந்தக்காரர்கள், மின் நுகர்வோர்கள், சிறு தொழில் முனைவர்கள் ஆகியோரின் நீண்டநாள் கோரிக்கையைக் கருத்தில் கொண்டு, 630 கிலோ வாட் மின் திறன் கொண்ட உயர் மின்னழுத்த மின் மாற்றிகள், மின்னாக்கிகள் மற்றும் மின் சாதனங்களை நிறுவ மாவட்ட அளவிலான மின் ஆய்வாளர்களே அனுமதி அளித்தால் போதும் என்று அரசாணை எண். 159 மூலம் 14.08.2014 அன்று உத்தரவிட்ட மாண்புமிகு தமிழக முதலமைச்சர் அம்மா அவர்களுக்கு, மின் ஒப்பந்தக்காரர்கள் மற்றும் மின் நுகர்வோர்கள் என அனைத்துத் தரப்பினர்கள் சார்பாக எங்களின் மனமார்ந்த நன்றிகளைத் தெரிவித்துக் கொள்கின்றோம்.

20 ஆண்டுகளுக்கு முன்பு பிறப்பிக்கப்பட்ட பழைய உத்தரவை மாறுதல் செய்ய உதவிய மாண்புமிகு தமிழக மின்சாரத்துறை, மதுவிலக்கு மற்றும் ஆயத்தீர்வைத் துறை அமைச்சர் அவர்களுக்கும் எங்களின் அன்பார்ந்த நன்றிகளைத் தெரிவித்துக் கொள்கின்றோம்.

இந்த அரசாணை வெளிவருவதற்குத் தேவையான அனைத்து முயற்சிகளையும் மேற்கொண்ட எரிசக்தி துறை செயலாளர் அவர்களுக்கும் மற்றும் அரசு தலைமை மின் ஆய்வாளர் அவர்களுக்கும் எங்களது நெஞ்சார்ந்த நன்றிகளைத் தெரிவித்துக் கொள்கின்றோம்.

630 கிலோ வாட் மின் திறன் கொண்ட உயர்மின்னழுத்த மின்சாதனங்களுக்குத் தகுதிச் சான்றிதழ் அளிக்கும் பணி மாநிலம் முழுவதும் உள்ள 23 மின் ஆய்வாளர்களிடம் பகிர்ந்தளிக்கப்பட்டதன் மூலம், எங்களின் பயண நேரம், போக்குவரத்து மற்றும் தங்குமிடம் செலவுகளைக் குறைத்த தமிழக அரசுக்கு எங்களது நன்றிகளைத் தெரிவித்துக் கொள்கின்றோம்.

மாவட்ட மின் ஆய்வாளர்களுக்கான எல்லைகளை மின் பயனிட்டாளர்கள் மற்றும் தொழிற்சாலைகளின் எண்ணிக்கைக்கேற்ப மறுபரிசீலனை செய்து, புதிய எல்லைகளை அரசாணை எண். 108 மூலம் 28.5.2014 அன்று வெளியிட்டு வேலைப்பளுவை எல்லோருக்கும் பகிர்ந்தளித்ததன் மூலம், எங்களின் வேலைகளை எளிதாக்கிய மாண்புமிகு தமிழக முதலமைச்சர் அம்மா அவர்களுக்கு எங்களது உளமார்ந்த நன்றிகளைத் தெரிவித்துக் கொள்கின்றோம்.

மேற்கூறிய அரசாணைகள் மூலம் துரிதமாக, காலதாமதமின்றி, உடனுக்குடன் மின் அமைப்பின் வரைபட கூராய்வு ஒப்புதல்கள், ஆய்வறிக்கைகள் மற்றும் நன்னிலைத் தகுதிச் சான்றிதழ்கள் ஆகியவற்றை பெற வழிவகுத்த தமிழக அரசுக்கு மீண்டும் ஒருமுறை எங்களது நன்றியினைத் தெரிவித்துக் கொள்கின்றோம்.

அனைத்து தரப்பினரும் பயன்பெறும் வகையில், மின் சாதனங்கள் நிறுவுவதற்கான விதிகளை மாற்றியமைத்த மாண்புமிகு தமிழக முதலமைச்சர் அம்மா அவர்களுக்கு நன்றி! நன்றி! நன்றி!

தமிழ்நாடு உயர்மின்னழுத்த மின் ஒப்பந்தக்காரர்களின் பொறியாளர்கள் சங்கம்



## TAMILNADU SECRETARIAT



**Fort St George** (or historically, **White Town**) is the name of the first English (later British) fortress in India, founded in 1644 at the coastal city of Madras, the modern city of Chennai.

The East India Company, which had entered India around 1600 for trading activities, had begun licensed trading at Surat, which was its initial bastion. However, to secure its trade lines and commercial interests in the spice trade, it felt the necessity of a port closer to the Malaccan Straits, and succeeded in purchasing a piece of coastal land, originally called *Chennirayarpattinam* or *Channapatnam*, from a Vijayanagar chieftain named Admiral Chennappa Nayaka based in Chandragiri, where the Company began the construction of a harbour and a fort. The fort was completed on 23 April 1644, coinciding with St George's Day, celebrated in honour of the patron saint of England. The fort, hence christened Fort St George, faced the sea and some fishing villages, and it soon became the hub of merchant activity. It gave birth to a new settlement area called George Town.

The construction of the fort provided the impetus for further settlements and trading activity, in what was originally an uninhabited land. Thus, it is a feasible contention to say that the city evolved around the fortress. The fort currently houses the Tamil Nadu legislative assembly and other official buildings. The fort is one of the 163 notified areas (megalithic sites) in the state of Tamil Nadu.

The **Tamil Nadu Legislative Assembly** is the sole house of the unicameral Tamil Nadu Legislature. The Tamil Nadu Legislative Assembly alone has powers to legislate laws covering state subjects in the Indian state of Tamil Nadu. It has a strength of 235 members of whom 234 are democratically elected using the First-past-the-post system. The remaining member is nominated as a representative of the Anglo Indian community.

The first legislative assembly election for the Presidency was held in February 1937. The Indian National Congress obtained a majority by winning 159 of 215 seats. C. Rajagopalachari became the first elected chief minister of the Presidency under the provincial autonomy system guaranteed by the Government of India Act of 1935. The first assembly was constituted in July 1937. Bulusu Sambamurti and A. Rukmani Lakshmipathi were elected as the Speaker and Deputy Speaker respectively. The first assembly lasted its term till February 1943.



# TAMIL NADU GOVERNMENT GAZETTE

## EXTRAORDINARY PUBLISHED BY AUTHORITY

**No. 159**

**CHENNAI, THURSDAY, AUGUST 14, 2014**

Aadi 29, Jaya, Thiruvalluvar Aandu – 2045

### Part II – Section 2

Notifications or Orders of interest to a section of the public  
issued by Secretariat Departments.

### NOTIFICATIONS BY GOVERNMENT

#### ENERGY DEPARTMENT

APPOINTMENT OF CHIEF ELECTRICAL INSPECTOR AND ELECTRICAL INSPECTORS DECENTRALIZATION OF  
POWERS AND FUNCTIONS UNDER THE SAID ACT.

*[G.O. Ms. No. 59, Energy (D2), 14<sup>th</sup> August 2014, Aadi 29, Jaya, Thiruvalluvar Aandu-2045]*

**No. II(2)EGY/489(a)2014.**

In exercise of the powers conferred by sub-section (1) of Section 162 of the Electricity Act, 2003 (Central Act 36 of 2003) and in super session of the Energy Department Notification No. II(2)/EGY/845/95 published at pages 241 to 243 of Part II – Section 2 of the Tamil Nadu Government Gazette, dated the 8<sup>th</sup> March 1995, the Governor of Tamil Nadu hereby appoints the Chief Electrical Inspector to Government, the Senior Electrical Inspectors, Electrical Inspectors and Assistant Electrical Inspectors of the Tamil Nadu Electrical Inspectorate to be the Electrical Inspectors to exercise the powers and perform the functions specified in column (3) of the (Table) of an Electrical Inspector under the said Act in respect of the class of works and electric installations specified in column (2) thereof, subject to the restrictions that then Assistant Electrical Inspectors, Electrical Inspectors and Senior Electrical Inspectors shall enforce full powers under the Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations 30, except sub-regulation (5) of regulation 30, sub-regulation (2) of regulation 34 and regulation 116.

Sl. No.	Class of works and electric installations	Powers and functions (category of work)	Assistant Electrical Inspector	Electrical Inspector	Senior Electrical Inspector	Chief Electrical Inspector to Government
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	New and addition and alterations in the Electrical Installations of voltage exceeding 650V including Multi-storeyed building of more than 15 metres in height at the voltage exceeding 650V	Drawing scrutiny, Inspection and issue of Permission	–	Drawing scrutiny, Inspection and issue of permission upto 630kVA Installed Transformer capacity / stand alone Generating units / loads of voltage exceeding 650V	Drawing scrutiny, Inspection and issue of permission above 630kVA and upto 2500kVA Installed Transformer capacity / Stand alone Generating units / loads of voltage exceeding 650V	Drawing scrutiny, Inspection and issue of permission above 2500kVA Installed Transformer capacity / Stand alone Generating units / loads of voltage exceeding 650V
		Drawing scrutiny, Inspection and issue of Permission	–	Drawing scrutiny, Inspection and issue of Permission of all stand alone Generating units upto 630kVA and all loads of voltage upto 650V.	Drawing scrutiny, Inspection and issue of Permission of all stand alone Generating units above 630kVA and upto 2500kVA of voltage upto 650V.	–



<i>Sl. No.</i> (1)	<i>Class of works and electric installations</i> (2)	<i>Powers and functions (category of work)</i> (3)	<i>Assistant Electrical Inspector</i> (4)	<i>Electrical Inspector</i> (5)	<i>Senior Electrical Inspector</i> (6)	<i>Chief Electrical Inspector to Government</i> (7)
2	Multi-storeyed building of more than 15 meters in height at the voltage upto 650V	Drawing scrutiny, Inspection and issue of Permission	–	Drawing scrutiny, Inspection and issue of Permission of Multi-storeyed buildings	–	–
3	Periodical Inspection	Periodical Inspections of Electrical Installations of voltage exceeding 650V	Periodical Inspections upto 630kVA installed Transformer capacity	Periodical Inspections above 630kVA installed Transformer capacity	–	–
		Periodical Inspections of Grid Interactive Generating Units	Periodical Inspections of Grid Interactive Generating Units upto 2 MW	Periodical Inspections of Grid Interactive Generating Units above 2 MW and upto 250 MW	Periodical Inspections of Grid Interactive Generating Units above 250MW	–
		Periodical Inspections of Substations	Periodical Inspections of Substations upto 33kV including Distribution Transformer	Periodical Inspections of Substations above 33kV	–	–
4	Standalone Generating Units of voltage less than 650V	Inspection	Inspection of standalone Generating Units of voltage upto 630kVA	Inspection of standalone Generating Units of voltage above 630kVA	–	–
		Issue of Permission	–	All	–	–
5	Electrical installations put up for VVIP visits and public assembly	Inspection and issue of permission	Inspection and issue of reports to electrical Installations put up for VVIP visits and public assembly	Issue of permission to electrical installations put up for VVIP visits and public assembly	–	–
6	Electrical Accidents	Enquiry and reporting of Electrical Accidents	Enquiry and reporting of Electrical Accidents upto 650V	Enquiry and reporting of Electrical Accidents above 650V	–	–

**Note:**

1. The powers and functions vested with the posts of lower cadres can also be exercised by the posts of higher cadres for specific reasons recorded therein.
2. Other class of works which are not prescribed for the sub-ordinate officers and the restrictions made above shall be exercised by the Chief Electrical Inspector to Government

**RAJESH LAKHONI,**  
Secretary to Government



# ANNUAL GENERAL BODY MEETING

**Date: 30.08.2014, Saturday**

**PLACE: TTDC, MAMALLAPURAM**

## MINUTES OF MEETING

The Annual General Body Meeting started with a Welcome Note by Mr. U. Baskaran, President.

Mr. P. Suyambu, Treasurer submitted the audited accounts for the years 2012-2013 & 2013-2014 and circulated copies of audited accounts. All members gave their consent. The Audited accounts passed unanimously thereafter.

Mr. K. Kannan, Secretary and Mr. G. Venkatesh, Joint Secretary briefed members about the performance of the Association between 2012-2014.

To mention a few,

1. Regular monthly meetings were conducted.
2. Achieved improved attendance in monthly meetings.
3. Regular communications were maintained with all members through e-mail.
4. In spite of Backlog in auditing the Accounts before 2012, all the Backlog has been cleared and IT filing has been completed upto March 2014.
5. All efforts are being taken to obtain TDS refund, which is due to Association.
6. The monthly rental income from its assets, has been enhanced in accordance to the market value.
7. The fixed deposits have been increased by 75% in past 2 years.
8. Improved realization of subscription arrears, from the members, has been achieved due to Treasurer's efforts.
9. Association Website has been revamped and updated regularly.
10. Newsletter distribution streamlined.
11. Secretary extended his special appreciation to **Mr. B. Paalanikumar, Vice President & Mr. M. Balamurugan, Committee Member for the efforts taken for promoting the New Year Diary 2014.** This effort had given a financial gain to the tune of Rs.2.46 Lakhs to the Association.
12. Better Interaction with CEIG office.
13. All efforts are taken for extending the Licence period from the present period of 2 years to 4 years. All the Members gave a special appreciation to Mr. U. Baskaran, President, for his sincere efforts.
14. Technical Guideline Book has been revised and sent for concurrence to concerned Government office and on getting the concurrence, efforts shall be made to publish the New Guideline Book at the earliest.

### **During the General discussion, the following points were discussed:**

1. Discussion regarding Newsletter contribution arose, to whether it can be clubbed with yearly subscription. It was decided to club the membership fee of Rs.1000/- & contribution for Newsletter Rs.1000.00 to Membership Fee of Rs.2000/- per Year. The Members gave their consent for the same, considered and the resolution passed. It has also been decided to collect yearly payment arrears from the members @Rs.2000/- per Year.
2. Mr. J. John, VP, suggested that the association to conduct EC meetings in all the VP zones regularly.
3. Few members complained of not receiving the website Login ID & Password. Association has assured to send all the members a fresh Login ID & Password.
4. Sub-committee shall be formed to follow members' grievances regarding payments from their clients.

### **The election to Office Bearers of the association for the years 2014-2016 was conducted.**

There were 2 nominations for President post 1. Mr. U. Baskaran, 2. Mr. R. Ramachandran.

There were 2 nominations for Secretary Post 1. Mr. K. Kannan, 2. Mr. S.D. Poongundran.

Just before the elections, Mr. S.D. Poongundran publically withdrew his nomination. As Mr. K. Kannan was the only nomination for the Secretary, Mr. K. Kannan was elected unanimously.

Mr. R. Ramachandran also withdrew his nomination for the president post in favour of Mr. U. Baskaran. As Mr. U. Baskaran was the only nomination for the President's post, Mr. U. Baskaran was elected unanimously.



Mr. P. Suyambu was the only person nominated for the Treasurer post during the election, Mr. P. Suyambu was elected unanimously.

The following were Declared as Elected Office Bearers for the year 2014 – 2016.

**Mr. U. Baskaran, M/s. Balaji Electrical** - **President**  
**Mr. K. Kannan, M/s. Tandem Enterprises** - **Secretary**  
**Mr. P. Suyambu, M/s. Sudha Sudhan Engineers** - **Treasurer**

All the above were unanimously reelected.

The following member was selected for Joint Secretary.

**Joint Secretary** - **Mr. S. Gopalakrishnan, M/s. Vinpower Engineers & Associates**

It was decided to revamp the VP zones and Members gave their concurrence for the same.

VP Chennai	VP Coimbatore	VP Cuddalore	VP Madurai
VP Salem	VP Tiruchi	VP Tirunelveli	VP Vellore

The following members were selected for VPs for respective regions.

**VP Chennai** - **Mr. B. Paalanikumar, M/s. Sivasakthi Electricals**  
**VP Vellore** - **Mr. N. Vasu, M/s. N. Vasu**  
**VP Cuddalore** - **Mr. S.D. Poongundran, M/s. Sudhan Power Tech**  
**VP Salem** - **Mr. S. Manivannan, M/s. Mani Engineering**  
**VP Tiruchi** - **Mr. S. Kalyana Venkatraman, M/s. Sundhar Electricals Pvt. Ltd.**  
**VP Coimbatore** - **Mr. R.P. Hariharan, M/s. Abirami Electricals**  
**VP Madurai** - **Mr. S. Ponnambalanathan, M/s. Ramani Engineering**  
**VP Tirunelveli** - **Mr. J. John, M/s. Gopi Electricals**

Meeting ended with a Vote of Thanks from Mr. K. Kannan, Secretary.

The AGM concluded with a Good Dinner in TTDC, Mamallapuram.

## TECHNICAL SEMINAR REPORT - 30<sup>th</sup> August 2014

Technical seminar was conducted by our association on 30<sup>th</sup> Aug 2014, in Tamilnadu Tourism Development Corporation, Beach resort complex, East Coast Road, Mamallapuram.

The technical Seminar session started with member registration by 3.30 PM. Members showed great interest on products displayed by event sponsors.

Mr. U. Basakaran , President of our association inaugurated the technical session with his welcome speech. In his speech extended his warm welcome to Members, Sponsors & Office bearers.

First Mr. G. Sunil ,Vice President of Syska LED Lights gave his presentation. In his presentation, he explained the advantages of LED lighting system over the conventional lighting. He also explained in detail about the advance technology used in Syska LED lights.

Next, Mr. Keerthivasan of SGI Engineers Pvt. Ltd., spoke about “Safe Earthing and Advance Lightning Protection”. In his speech he highlighted the advantages of using latest 2<sup>nd</sup> Generation Active lightning arrestors, which provide enhanced protection for all types of buildings. He also explained how earthing materials shall give better earthing and ecofriendly.

After a small Tea break, Asmon Wire industries & Tesla electric & Engg (I) Pvt. Ltd. continued the second session.

Mr.Somasundaram & Shanmugam explained, how copper wires can save electricity and can give a lasting protection to the entire electrical wiring system.They also gave some useful tips to members about identifying inferior quality cables, offered with exorbitant discounts.

Tesla Engineering who represent Mahindra Powerol generators gave a detailed presentation regarding the range of generators. Explained the advantages of Mahindra over their competitors.

Mr.TLL Ram made the seminar more lively with his oratory skills.

Seminar ended with presentation of momentos to sponsors & Vote of Thanks by Mr. K. Kannan, Secretary.



நண்பர்களே!

அனைவருக்கும் வணக்கம். விஜயதசமி மற்றும் தீபாவளி நல்வாழ்த்துக்கள்!

நமது, தமிழ்நாடு உயர்மின்னமுத்த மின் ஒப்பந்தக்காரர்களின் பொறியாளர்கள் சங்கத்திற்கான ஆண்டு பொதுக்குழு கூட்டம் மற்றும் 2014 – 16 ஆம் ஆண்டிற்கான புதிய நிர்வாகிக்களுக்கான தேர்தல் ஆகியவை 30.08.2014, சனிக்கிழமை அன்று மாமல்லபுரத்தில் உள்ள தமிழ்நாடு சுற்றுலா கழகத்திற்கான கடற்கரை உணவகம் மற்றும் தங்கும் விடுதியில் இனிதே நடைபெற்றது.

அன்று நடைபெற்ற சங்கத் தேர்தலில், சங்கத்திற்காக பணியாற்ற தலைவராக என்னையும் (உ. பாஸ்கரன்), செயலாளராக திரு. கி. கண்ணன் அவர்களையும், பொருளாளராக திரு. பெ. சுயம்பு அவர்களையும் மீண்டும் ஒருமுறை ஒரு மனதாகத் தேர்வு செய்ததற்கும் மற்றும் துணைத் தலைவர்கள், துணைச் செயலாளர் ஆகியோரைத் தேர்வு செய்ததற்கும், சங்க உறுப்பினர்கள் அனைவருக்கும் எங்களது மனமார்ந்த நன்றிகளைத் தெரிவித்துக் கொள்கின்றோம். எங்கள் மீது நீங்கள் வைத்த நம்பிக்கையைக் காப்பாற்றுவோம் என்று உறுதியளிக்கின்றோம்.

கடந்த இரண்டு ஆண்டுகளாக எங்களுடைய பணிகளைச் சிறப்பாக செய்வதற்கு எங்களுக்கு உறுதுணையாக இருந்து, ஆதரவளித்த உங்கள் அனைவருக்கும் எங்களின் நெஞ்சார்ந்த நன்றிகளைத் தெரிவித்துக் கொள்கின்றோம்.

கடந்த இரண்டு ஆண்டு பணிகளில், உங்கள் பார்வைக்கு சில:

- வழக்கமான மாதாந்திரக் கூட்டங்கள் தொடர்ந்து நடத்தப்பட்டன.
- சங்கத்தின் மாதாந்திரக் கூட்டங்கள் மற்றும் தொழில்நுட்பக் கருத்தரங்குகளில் உறுப்பினர்களின் வருகை எண்ணிக்கை அதிகரிக்கப்பட்டது.
- சங்கம் தொடர்பான தகவல்கள் மின்னஞ்சல் மூலமாக உறுப்பினர்களுக்கு அறிவிக்கப்பட்டது.
- நமது சங்கத்திற்கு சொந்தமான, இராஜா அண்ணாமலைக் கட்டிடத்திலுள்ள இரண்டாவது தளம், எண். 19, மார்ஷல் ரோடு, எழும்பூர், 2457 சதுர அடிக்கான மாதாந்திர நிரந்தர வாடகை சந்தை மதிப்பிற்கு ஏற்ப உயர்த்தப்பட்டுள்ளது.
- வங்கி வைப்புத் தொகை, நிலையான வைப்புத் தொகை மூலமாக கடந்த 2 வருடங்களில் 75% அதிகரிக்கப்பட்டுள்ளது.
- மின் ஒப்பந்தக்காரர்களின் உரிமங்களைப் புதுப்பிக்கும் கால அவகாசத்தை நடைமுறையில் உள்ள இரண்டு ஆண்டுகளுக்கொருமுறை என்பதை மாற்றி மூன்று ஆண்டுகளுக்கொரு முறையும், கம்பியாட்கள் மற்றும் மேற்பார்வையாளர்களின் உரிமங்களை நான்கு ஆண்டுகளுக்கொரு முறை என்பதை மாற்றி ஆறு ஆண்டுகளுக்கொரு முறையும் புதுப்பிக்க வழி செய்யும் வகையில் முயற்சிகள் மேற்கொள்ளப்பட்டுள்ளன.
- உறுப்பினர்களுக்கு முதல் முறையாக உறுப்பினர் சான்றிதழ்கள் மற்றும் அடையாள அட்டைகள் வழங்கப்பட்டு வருகின்றன. நூற்றுக்கும் மேற்பட்ட உறுப்பினர்கள் சேர்க்கப்பட்டு சங்கத்தின் வலிமை அதிகரிக்கப்பட்டுள்ளது.

எங்கள் பணிகளை மேலும் சிறப்பாகச் செய்ய, உங்கள் அனைவரின் ஒத்துழைப்பையும், ஆதரவையும் மற்றும் ஆலோசனைகளையும் எப்பொழுதும் எங்களுக்குத் தர வேண்டுமென்றுத் தாழ்மையுடன் கேட்டுக்கொள்கின்றோம்.

சங்க செயல்பாடுகள் குறித்த உங்கள் கருத்துக்கள், சங்க உறுப்பினர்களின் தொழில் சம்பந்தப்பட்ட பிரச்சனைகள் மற்றும் கோரிக்கைகள் ஆகியவற்றை எங்களுக்குக் கைப்பேசி / தொலைப்பேசி / கடிதம் / மின்னஞ்சல் மூலமாகத் தெரிவிக்குமாறுக் கேட்டுக்கொள்கின்றோம். ஆண்டுப் பொதுக்குழு கூட்டத்தில் உறுப்பினர்கள் தெரிவித்த கருத்துக்கள் மற்றும் ஆலோசனைகளை நடைமுறைப்படுத்த முயற்சிகள் மேற்கொள்ளப்படும் என்று உறுதியளிக்கின்றோம்.

சங்கத்திற்காக பணியாற்ற மீண்டும் ஒருமுறை வாய்ப்பளித்த உங்கள் அனைவருக்கும் மீண்டும் ஒருமுறை எங்களது உளமார்ந்த நன்றிகளைத் தெரிவித்துக் கொள்கின்றோம்.

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நன்றி!

உ. பாஸ்கரன்  
தலைவர்.



Dear Friends,

*Wishing you all Happy Festive Season's Greetings!*

Our, Tamilnadu Electrical Installation Engineers' Association 'A' Grade's Annual General Body Meeting and Election of New Office Bearers for the years 2014-2016, was held successfully on Saturday, 30.08.2014 at TTDC, Beach Resort, Mamallapuram with all our members gathering.

In the election, I (U. Baskaran), along with Mr.K.Kannan and Mr.P.Suyambu, were elected unanimously once again as President, Secretary and Treasurer, respectively. The Vice-Presidents and Joint Secretary were also elected. We wish to thank all the members for electing us for serving our Association. We assure you, that we will fulfill the trust kept on us by you.

We also extend our sincere thanks to all, for the support given to us for the past two years, due to which we have achieved many targets and to name a few:

1. Regular monthly meetings were conducted.
2. Association members participation in monthly meetings and Technical seminars were increased.
3. Regular communications were maintained with all members through e-mail.
4. Monthly Rental Income to our Association from its property at Raja Annamalai Building, Second floor, No.19, Marshalls Road, Egmore, Chennai-600 008, built up area 2457 Sq.ft. has been enhanced in accordance to the market value.
5. The fixed deposits have been increased by 75% in past 2 years.
6. All efforts are being taken for extending the validity of Contractor Licence and Competency Certificate period from the present period of 2 years to 3 years and 4 years to 6 years respectively.
7. The membership certificates and identity cards are being issued for the first time to all the members, in a phased manner and more than 100 new members were enrolled in our Association to raise our strength.

We seek your continued patronage in the years to come, to achieve the goals set by the association. We solicit from our members on a regular basis articles, write ups on technical issues, suggestions and advances made in the field for the further improvement of our association in every sphere of activity. We try to achieve the visionary messages of our members which were raised during the AGM.

Once again, we wish to thank all members of our association for electing us to serve the association.

WE CAN'T SPELL  
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Thanking you

**U.BASKARAN**  
**PRESIDENT**



# NEW OFFICE BEARERS 2014-2016

## PRESIDENT



**Mr. U. BASKARAN**  
M/s Balaji Electrical  
Chennai - 600 012.

## SECRETARY



**Mr. K. KANNAN**  
M/s Tandem Enterprises  
Chennai - 600 024.

## TREASURER



**Mr. P. SUYAMBU**  
M/s Sudha Sudhan Engineers  
Chennai - 600 088.

## VICE PRESIDENTS

### CHENNAI



**Mr. B. PAALANI KUMAR**  
M/s Sivasakthi Electricals  
Chennai - 600 097

### COIMBATORE



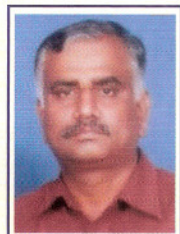
**Mr. R.P. HARIHARAN**  
M/s Abirami Electricals  
Coimbatore - 641 111

### CUDDALORE



**Mr. S.D. POONGUNDRAN**  
M/s Sudhan Power Tech  
Cuddalore - 607002.

### MADURAI



**Mr. S. POONNAMBALANATHAN**  
M/s Ramani Engineering  
Madurai - 625 003.

### SALEM



**Mr. S. MANIVANNAN**  
M/s Mani Engineering  
Salem - 636 008

### TIRUNELVELI



**Mr. S. JOHN**  
M/s Gopi Electricals  
Rajapalayam - 626 117

### TRICHY



**Mr. S. KALYANA VENKATARAMAN**  
M/s Sundhar Electricals Pvt. Ltd.  
Karur - 639 005.

### VELLORE



**Mr. N. VASU**  
M/s N. Vasu  
Vellore - 632 006.

### JOINT SEC.



**Mr. S. GOPALAKRISHNAN**  
M/s Vinpower Engineers & Associates  
Erode - 638 001.



## TECHNICAL SEMINAR PHOTOS - 30.08.2014



**Welcome address by  
Mr. U. Baskaran, President, TNEIA**



**Mr. U. Baskaran, President honouring  
Mr. Sunil G, Vice President, Syska LED Lights**



**Mr. U. Baskaran, President honouring  
Mr. Srinivas, Director, SGI Engineers P. Ltd.**



**Mr. U. Baskaran, President honouring  
Mr. Shanmugam, GM, Asmon Wires & Cables**



**Mr. U. Baskaran, President honouring  
Mr. TLL. Ram, Tesla Electric & Engg. (I) Pvt. Ltd.**



**Mr. U. Baskaran, issuing Association  
Membership Certificate to Mr. R. Ramachandran**



**Mr. U. Baskaran, issuing Association  
Membership Certificate to Mr. D. Chandran**

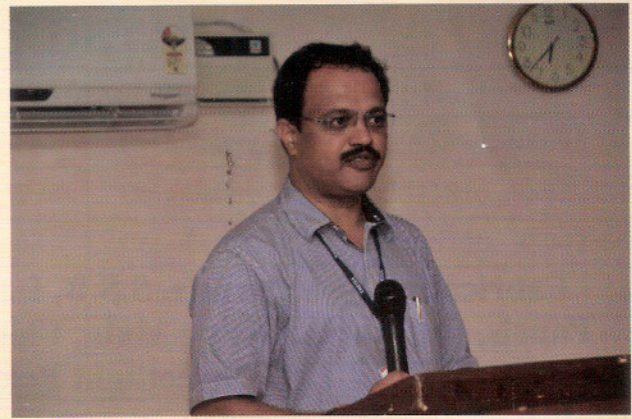


**Mr. U. Baskaran, issuing Association  
Membership Certificate to Mr. G.S. Venugopaal**





**Mr. U. Baskaran, issuing Association Membership Certificate to Mr. A. Radhakrishnan**

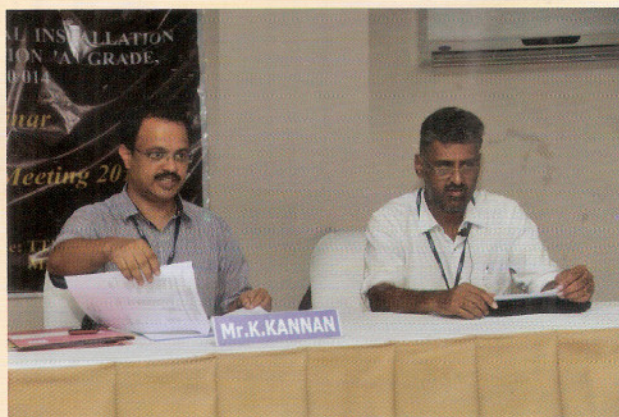


**Vote of Thanks by Mr. K. Kannan, Secretary, TNEIEA**

## AGM PHOTOS - 30.08.2014



**Mr. P. Suyambu, Treasurer, Mr. U. Baskaran, President, Mr. K. Kannan, Secretary, Mr. G. Venkatesh, Joint Secretary**



**Mr. K. Kannan, Secretary, Mr. G. Venkatesh, Joint Secretary Submitting the Annual Report**

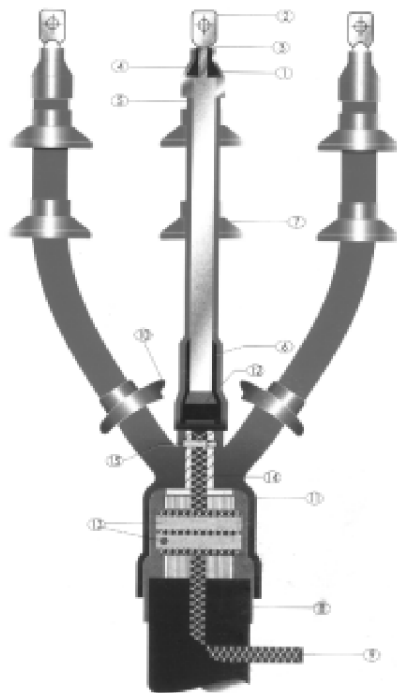


**Members Gathering at AGM**



## MEMBERS DETAILS

S.No.	Company Name	License No.	Place	Contact No.
165.	Power Electricals	EA 2586	Coimbatore	0422-2535530, 99655 04910
166.	Sree Switchgears & Controls	EA 1629	Coimbatore	0422-2511816, 98430 31816
167.	Sri Amman Control System	EA 2668	Coimbatore	0422-2666750, 98942 66694
168.	Sri Srinivaasaa Electricals	EA 1681	Coimbatore	0422-2511876, 94430 44315
169.	Sri Vignesh Electricals	EA 2562	Coimbatore	98941 37868, 81449 10303
170.	Surieya Electricals, Udumalpet	EA 1861	Coimbatore	04252-220916, 94437 35778
171.	Syscon Power Integrators	EA 2068	Coimbatore	0422-2404072, 9842111397
172.	Union Electricals	EA 1606	Coimbatore	0422-2496256, 94430 49625
173.	Volts Trans Engineers	EA 2503	Coimbatore	0422-2233955, 97894 59399
174.	Sri Lakshmi Electricals	EA 1379	Coimbatore	0422-2574193, 98430 57419
175.	B.K. Control Systems	EA 2209	Coimbatore	0422-2533176, 98946 12055
176.	A.M. Manickam, Neyveli	ESA 147	Cuddalore	04142-262247, 94432 62247
177.	Edison Electrical Works, Chidambaram	ESA 221	Cuddalore	04144-230483
178.	Goutom Banerjee, Neyveli	ESA 392	Cuddalore	04142-254623, 94432 68623
179.	Shree Paadali Electricals	EA 2034	Cuddalore	04142-289885, 94432 36015



## POWER LINKS

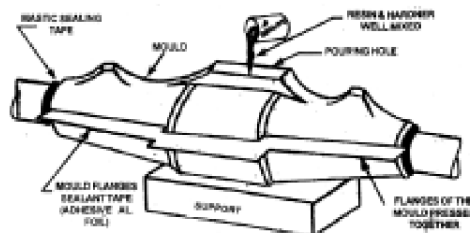
94/95, Triplicane High Road,  
Chennai - 600 005.

**Ph : 28420695, Mobile : 9282143549**

- **HEAT SHRINKABLE &**
- **EPOXY COMPOUND TYPE**
- CABLE JOINTING KITS**

From

**1.1 KV (LT) to 33 KV (HT)**  
**FREE INSTALLATION SERVICE**





# KNOW THY POWER NETWORK - 84

One month has passed and now it is time for us to rejoin and continue our journey across the Power Network.

## **I INFORMATION PROTECTION**

It relates to the security of electronic information and data, both in transit and storage conditions. By storage, it meant when these are stored on digital systems. The key aspect is that the personal information about the utility customers and the electric power system data should be kept 'protected' at any cost from the parties, who plan/wish to harm the utilities or its customers. Today the value of this information is very high. It has very high value both to the utility and the potential intruders. This value increases multifold when it moves/progresses from the 'end user' to the 'system level' of the Utility Operation. Please note that the Customer related information can be got by using today's computationally intensive mechanisms. Further that many of the processors and Communication paths that deal with this information suffer from processor power and Communication speed Constraints. The information and the commands that are used to control the physical part of this Smart Grid viz the power system is equally important. They can not be exposed to outside intrusion. This aspect gives more importance to the need for the protection of Power Systems Commands while considering the vastness of the geographic area covered by the power system and also its sharing with other Organizations. By making malicious intervention, the outside intruders always try to extend their influence on all the Communications to, from, and between various power system components, in view of its wide, adverse impact on the utility and its consumers. Consequently all critical power system activities like monitoring, controls, commands and confidential customer data warrant a very high level of Cyber Security. Thus there exists a need for keeping a higher level of reliability and Confidentiality for the communication consistent with the vital power system applications. In other words, ways and means are to be properly devised so as to ensure the reliability and protection of sensitive information and control from the unwanted, ill-intentioned third parties. So a frame work that achieves the inter operability and security of Smart Grid devices and systems under realistic operating conditions and systems is formed. Its protection from outside influences is also well established. Necessary standards are created for meeting these objectives. These steps help the formation of a Smart Communication network enveloping the physical power grid. Now, it is time for us to get some information on Automatic Meter Reading and its security aspects.

## **II AUTOMATIC METERING INFRASTRUCTURE (AMI)**

In earlier days (even today in most part of our country) meters are used to provide/convey the information about the total energy consumption and its related parameters like Max. Demand and Power Factor only. But modern Smart meters provide information like energy consumption pattern and power quality in addition to its normal function. The special features that are provided to these meters include supporting customer-owned home area networks which automate load response to system conditions, managing prepaid functions and performing service connects and disconnects and also facilitate the distribution automation applications. All these help to improve the efficiency and the reliability of the Power Delivery System. The points we learnt from the discussions so far are

- (i) the communication security options should be selected in such a way so that it will ensure a more secure, faster, less complex method of Security (The information itself is fully secured) and
- (ii) the methods that will secure 'the wires only' and not the information (These methods which are less secure, slower, more complex and errors prone) should not be adopted at any cost.

Let us leave the Smart Grid Topic here and move towards some more Smart Items that exist in the modern world. We can add these Smart topics to the list already maintained by us. The Smart Travel, Smart children and Smart cities are among them.

## **III SMART TRAVEL OR COMMUTING**

It is nothing but a kind of travel or commuting that encompasses a wide range of sustainable Commuter movement. Discounted tickets, Car share scheme/pooling scheme and cycle promotion are among them.

## **IV SMART CHILDREN**

No one can deny that today's children are Smarter than us. The ways in which they think are smarter than what we did as children. Now they can easily question, analyse and use logic more speedily and efficiently than us and never just accept anything. They always probe. It is mainly because of the necessity that exist in the present world or an existential need. These children always look for opportunities and focus on how to improve themselves and better/ brighter their prospects. The next in the list for our learning is Smart city, "an urban reality".

## **V SMART CITY**

There is no firm or pointed definition for the term "Smart City". The broad thinking is that a Smart city is a people friendly city, it is where people's quality of life is enhanced multifold. Today's technological advances help to achieve this. It is a digital world where all modern facilities are readily available; people's lives are made easier",

there is reduced energy consumption and convenient transport services. Smart appliances and equipment meet all their needs more efficiently and effaciously. It has valuable alarm systems that help to safe guard the citizens from emergencies, calamities or similar exigencies. The latest ICT technologies deliver better services, reduce carbon foot prints create sustainable environment and intelligent living conditions. Now you can imagine how the entire city is monitored and controlled by modern Information and Communication systems (ICTs) in real time. Total surveillance is carried out by Computer networks, Softwares, Radars, Scanners and many other kinds of ICT devices. Our life may be “easy” and “care-free”, yet we live like “caged birds” with limited freedom and never escape from the “watchful” eyes of the computers. Among the systems devices and equipment that find wide applications in a Smart city are,

- LEDs (Light Emitting Diodes)
- Solar photovoltaic Panels
- Smart Grid
- Electrical Vehicles
- Good Connectivity and Communications

In this context, kindly note that the highly technical or qualified City Planners, Architects and Communication and Computer Specialists alone decide / determine the design and other functional areas and the future of these *Smart cities* and “ *not the residents who will reside there.*” i.e., the future occupants of these cities have no role or part in the design and construction of these cities.

That is the “way of the world” or “a part of our Modern Life”. What we expect is that these Smart cities, (the flagship projects) should not only be about displaying latest technological developments and delivering services but also they have to inclusive and equitable/lovable places to live in.

From the above, we can feel how these Smart city programmes are carried out. There can be no doubt about the hugeness of the investments required and a thorough integration of various systems. Industries and cities come together, join together and introduce innovative products.

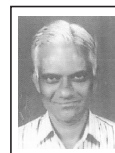
Now let us have some information about the places where these smart cities are currently planned or under execution.

As far as India is concerned, the present Union Government has provided Rs 7060 crore to build 100 Smart Cities as satellite towns. On the outskirts of large cities to accommodate the burgeoning urban population. Foreign investors are also requested to invest and build them. Singapore Government have come forward to execute some of these costly projects. To start with Delhi-Mumbai corridor has been selected for this ambitious mega project. The list below shows the present situation in other countries.

Sl.No.	Country	Places where Smart City projects are under planning/execution
1.	China	Suxhov, Guangzhou and Szecheran; knowledge city at Tianjin
2.	Mexico	Guadalagare. The second populous city in Mexico.
3.	Spain	Barcelona
4.	Vietnam	Da Nong
5.	Argentina	Riode Janero

As far as developing Countries are concerned the Governments feel that these Smart cities will provide answers for all urban ills. By making these cities intelligent, these Government think that present urban system problems can be solved easily. But the reality is that they are creating small green field enclaves on the outskirts of the existing cities and there by turning them into expensive and exclusive gated communities. A new expensive real estate meant to serve a few will be created and the existing cities will be split into two unequal halves. These are the possible short comings of Smart City Projects. The urban future depends on making cities intelligent and this applies equally to the old and new parts of the city. In my next article, the AMI Security will be dealt with further. Now its time for me to sign off.

*(To be Continued)*



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***“I’d put my money on the sun and solar energy. What a source of power! I hope we don’t have to wait until oil and coal run out before we tackle that.” - THOMAS EDISON, 1931***



# PUTTING SINGAPORE ON THE GLOBAL MAP FOR GREEN BUILDINGS

In five short years since it was established, the Singapore Green Building Council has put Singapore on the global map for its excellence in green building practices. Vaidehi Shah traces the industry-led NGO's origin and progress.



While it is unusual for any government to be involved in setting up NGOs (non-government organizations), this did not deter Singapore's building authority in helping to create the city-state's first industry-led organization to champion green building awareness some five years ago.

Never did they imagine that the fledgling Singapore Green Building Council would grow and evolve to become a powerful green building advocate that would put Singapore on the global map.

SGBC's founding president, Lee Chuan Seng, recounts how the idea was one of the recommendations from an international panel of experts invited by the Building and Construction Authority (BCA) to review and improve the authority's green building master plan and certification scheme, called the Green Mark, back in 2008.

The experts, some of whom were board members of the World Green Building Council (WGBC), recommended that an NGO be set up in Singapore to champion the green building cause by providing independent product certification and raising industry awareness.

This NGO would also engage with international NGOs like WGBC to share resources and knowledge, says Lee, who is retired chairman of engineering firm Beca.

He tells Eco-Business in a recent interview: "We were all scratching our heads when they suggested that the industry set up an NGO to champion the green building cause, because till then, we had been more focused on making buildings green than in setting up councils".

The idea took hold and the industry rallied together to support the idea with surprising speed. By the next year, SGBC was set up with seed funding and secretariat support from BCA.

Ng Eng Kiong, SGBC's current and third president, remembers that "it was challenging to get people from all different industry sectors – manufacturing, government, academia and consulting – to come together as one movement. But eventually, we got buy-in for what SGBC was trying to do".

One of SGBC's first initiatives was to certify green building products and advocate green building design, practices and technologies amongst the industry and general public. This later expanded to include certifying green building services in 2012.

WGBC also supported the idea of an organisation that represented Singapore's green building industry because it saw a global demand for Singapore's expertise in greening tropical buildings, says Lee.

SGBC applied to be a member of WGBC in May 2009 and was recognised as a full member within a year - a record speed, notes Lee, winning it global recognition and access to WGBC's international networks.

### ***Promoting public-private partnerships for green buildings***

SGBC also showcased the role that governments could play in strengthening sustainable construction efforts in a country. Tan Tian Chong, SGBC's second vice president, recalls that WGBC was impressed with the public-private partnership model they saw in Singapore.

He tells Eco-Business: "The WGBC chair actually said that Singapore's building sector had the best incentives in the world", referring to incentives for developers and product manufacturers to adopt sustainability practices such as the Green Mark Incentive Scheme for New Buildings and Green Mark Incentive Scheme for Existing Buildings.

SGBC says that working closely with BCA was a key factor in increasing the credibility of the work done by both organisations. Tan, who is also group director of BCA's Technology Development Group, explains that BCA was keen for SGBC to be set up because "the use of sustainable products counts towards a building's eventual Green Mark certification, and we wanted an organisation like SGBC to make sure that this product certification process was rigorous and authoritative".

WGBC's conviction of the effectiveness of the public-private partnership model in Singapore opened up new opportunities for them to engage with green building councils in other countries.

They launched the 'Government Leadership Awards' in 2011 to highlight the role of national and city leadership in enhancing the sustainability of the building sector. Singapore clinched the 'Regional Leadership Award' in the inaugural awards WGBC also released a publication on 'A new era in building partnerships' in September 2013, which says that collaboration between governments, NGOs and industry are a necessary step to meet future challenges in achieving sustainable built environments globally. Here too, Singapore's experience has been cited as an exemplary case study.

Today, SGBC shares its expertise on how the government and industry sectors can work together effectively to set up and administer green building councils, with requests coming in from as far as Morocco, Columbia, Trinidad and Tobago, and Tanzania.

### ***Local membership, global benefits***

Closer to home, SGBC has built up a membership base of almost 430 companies in the five short years since its launch. Its members, who pay an annual membership fee of S\$1,500, include manufacturers of construction products, architecture and engineering firms, building developers, consulting firms, and government agencies amongst others.

In 2010, SGBC launched a green building product certification scheme which has since certified close to 700 products certified across 17 broad categories.

In 2012, SGBC also launched Singapore's first green services certification scheme in consultation with members which focused on the delivery of consulting services in the areas of consulting in architecture, environmental sustainability design, quantity surveying, energy performance contracting and electrical engineering. The scheme has certified 42 services to date.

Yvonne Soh, SGBC's general manager, shares that its members - most of which conduct business in Singapore and overseas - benefit significantly from having the sustainable qualities of their products and services certified under a scheme supported by Singapore's industry and agencies.

"The certification brands our member companies when they want to participate in regional and global jobs, and the endorsement helps them open doors", she says.

Lee adds, "There are more than 2,000 projects in Singapore that are Green Mark certified, and some 200 projects overseas that have applied for Green Mark certification. Nobody asked these overseas projects to get the Green Mark, but they came to Singapore to get the certification nevertheless. This points to the attractiveness of the Singapore brand".

SGBC's member companies agree that this certification has been beneficial to them.

Jason Chang, managing director of wood company Pacific Forest Products commends SGBC's stringent standards and shares that "the certification approval is definitely a great value to the business as it adds reliability and trust to our product".

Joseph Yong, chief operating officer of steelwork company NatSteel Holdings, adds that membership in SGBC has enhanced the company's engagement with sustainability issues.

***We can create a more sustainable, cleaner and safer world by making wiser energy choices.***



He says: "Our partnership with SGBC as one of its founding members reflects our belief that NatSteel can play a role in driving sustainable development in Singapore. Being a part of the SGBC fraternity has given NatSteel the opportunity to learn and share best practices with other green advocates in the industry".

SGBC also fosters capacity building within the sector by organising regular seminars and workshops for members. It also facilitates access to global conferences such as the annual International Green Building Conference which will be held in Singapore this September and the WGBC Congress, which will take place in Brazil this August.

### ***Sustainable succession***

The organisation's leaders say that the key to SGBC's continued success is to ensure a seamless transfer of knowledge between generations of leaders, and that diverse ideas are promoted within its membership.

SGBC's president, who has to be elected from member organisations and nominated by the board, spends two years as the council's first vice president, followed by two more as active president, and a final two in an 'Immediate past president' role in which he or she mentors the new incumbent president.

Lee explains that due to the impact of product and service certifications on the business prospects of companies in the building industry, ensuring that the system remains neutral and independent is a top priority. The leadership framework helps to prevent profit-driven interests from taking over and compromising the credibility of the certification scheme, he adds.

Lee notes: "The diversity of ideas is also a key priority that helps SGBC improve green building standards in Singapore because there are so many different disciplines involved in designing and operating green buildings. No one lasts for ever, and no one has the best ideas".

Lee reflects that serving as SGBC's founding president and then mentor has been an "immensely rewarding experience", due to the quality of members who have voluntarily served on technical committees for developing certification criteria and speaker panels at events organised by SGBC.

"Going forward, SGBC will be working with other organisations, especially our corporate members to engage with end users to push innovations, support research and collaboration, and also to continue to lead engagement with overseas parties to share our Green Building expertise", he says.

*For more information on SGBC, visit <http://sgbc.sg>.*



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## PRODUCT OF THE MONTH

### HERMETICALLY SEALED TRANSFORMERS

Transformers are an important link in the power supply network. Transformers are expected to have long service life together with less maintenance and maximum operational reliability.

Conventional transformer's insulation system aging is dependent on load and temperature. This is further aggravated by oxygen and moisture absorbed from the atmosphere.

Manifold increase in power requirements and increased infrastructure has strained the operational and maintenance resources of all utilities and users.

Transformer design and manufacturing technology has been searching and evolving to find a solution for **near maintenance free transformers**.

Hermetically sealed transformer is a good solution to tackle the above problem.

Hermetically sealed transformer is a transformer which has no conservator and dehydrating breather. The dielectric insulating fluid in the transformer tank is completely sealed and is in zero contact to the atmosphere. This type of transformer is used in applications where the transformer is to be installed in harsh climatic conditions (smoke, pollution, dusty environment, etc) or user prefers low maintenance transformer.



There are two types of construction of Hermetically Sealed Transformers

1. Closed construction type without conservator, without gas cushion, fully oil filled and with corrugation tank.
2. Closed construction type without conservator, with gas cushion (Nitrogen), rigid flat plate tank and with removable or welded radiators.

The design avoids air in the transformer tank thereby avoiding sludging and oxidation of the dielectric fluid. Hence it would be safe to say that these transformers need no maintenance of the dielectric insulating fluid (usually Oil). Gas cushion is used to compensate the volume variation due to heat. Normally the gas is nitrogen. In the fully oil filled hermetically sealed design, oil expansion is taken care by expansion and contraction of flexible fins of the corrugated tank.

The transformers are always shipped fully filled with oil and sealed for lifetime. In this type tank cover will have a filling pipe which ensures enough oil level to cover the bushings.

In the case of hermetically sealed transformers with gas cushion oil expansion is taken care by the Nitrogen cushion above the oil level. Normally these transformers are made up of rigid steel tank with welded or detachable type radiators. The bushings and cable box could be fitted on the longer side of the tank.

To increase the reliability of the valves special spherical stainless steel valves are used in some design.

#### Benefits of Hermetically Sealed Transformer

- Limited oil aging due to oxidation
- Limited Moisture in oil
- Limited cellulose aging in solid insulation
- No Breather and hence no maintenance of breather
- Limited protection devices
- Smaller size
- Lighter weight

#### Specific benefits to customer

- Longer service life
- Higher load ratings
- Reduced maintenance
- Low life cycle costs



### **Hermetically sealed transformers can be used in specific areas like**

Off-shore platforms where it is remote and requires less maintenance

Windfarms, these are usually remote areas where maintenance support is expensive

Residential areas

Ecologically sensitive areas

Limited space conditions like compact sub-stations

*Hermetically sealed transformers in India has not picked up yet. However Wilson Power and Distribution Technologies in Chennai (WPDT) have taken the lead in creating awareness among the stakeholders.*

*WPDT have exhibited hermetically sealed transformers in many exhibitions they have participated. This has caught the attention of few in India.*

*WPDT regularly exports hermetically sealed transformers to the United Kingdom. Recently WPDT have exported few hermetically sealed transformers for a resort project in Maldives. This is a classic case where maintenance will be an expensive affair as the resort is in one of the remote islands of Maldives.*

*WPDT has designed a slimmer and compact hermetically sealed transformers for a compact sub-station project in Nigeria.*

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## **ONE STEP TO SOLAR CELL EFFICIENCY**

Rice Univ. scientists have created a one-step process for producing highly efficient materials that let the maximum amount of sunlight reach a solar cell.

The Rice laboratory of chemist Andrew Barron found a simple way to etch nanoscale spikes into silicon that allows more than 99% of sunlight to reach the cells' active elements, where it can be turned into electricity.

The research by Barron and Rice graduate student and lead author Yen-Tien Lu appears in the *Journal of Materials Chemistry A*.

The more light absorbed by a solar panel's active elements, the more power it will produce. But the light has to get there. Coatings in current use that protect the active elements let most light pass but reflect some as well. Various strategies have cut reflectance down to about 6%, Barron said, but the anti-reflection is limited to a specific range of light, incident angle and wavelength.

Enter black silicon, so named because it reflects almost no light. Black silicon is simply silicon with a highly textured surface of nanoscale spikes or pores that are smaller than the wavelength of light. The texture allows the efficient collection of light from any angle—from sunrise to sunset.

Barron and Lu have replaced a two-step process that involved metal deposition and electroless chemical etching with a single step that works at room temperature.

The chemical stew that makes it possible is a mix of copper nitrate, phosphorous acid, hydrogen fluoride and water. When applied to a silicon wafer, the phosphorous acid reduces the copper ions to copper nanoparticles. The nanoparticles attract electrons from the silicon wafer's surface, oxidizing it and allowing hydrogen fluoride to burn inverted pyramid-shaped nanopores into the silicon.

Fine-tuning the process resulted in a black silicon layer with pores as small as 590 nm that let through more than 99% of light. (By comparison, a clean, un-etched silicon wafer reflects nearly 100% of light).

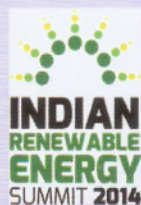
Barron said the spikes would still require a coating to protect them from the elements, and his lab is working on ways to shorten the eight-hour process needed to perform the etching in the laboratory. But the ease of creating black silicon in one step makes it far more practical than previous methods, he said.

*Source: Rice Univ.*

***A man who was completely innocent, offered himself as a sacrifice for the good of others, including his enemies, and became the ransom of the world. It was a perfect act. - MAHATHMA GANDHI***



# EVENTS

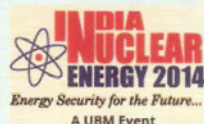


**Event Profile:** The first INDIAN RENEWABLE ENERGY SUMMIT, hosted in partnership with the Government of Gujarat, will be the leading force in delivering a platform for the Renewable Industry to meet, share information on the challenges facing the industry and discuss solutions for advancing India's energy requirement for the future.

**Date:** 9<sup>th</sup> - 10<sup>th</sup> October 2014

**Venue:** Mahatma Mandir, Gandhinagar, Gujarat, India.

**Website:** <http://www.indianrenewableenergysummit.com/AboutUs.php>



**Event Profile:** The 6th edition of-"India Nuclear Energy 2014" 6th International Exhibition and Conference will be held from 6th to 8th November 2014 at Nehru Center, Worli, Mumbai. India Nuclear Energy 2014 is co-partnered by Department of Atomic Energy(DAE), the nodal Government body in the Indian Nuclear Energy sector and Supported by Indian Nuclear Society (INS) The event will cover various aspects of nuclear energy and power.

**Date:** 6<sup>th</sup> - 8<sup>th</sup> November 2014

**Venue:** Nehru Center, Worli, Mumbai, India

**Website:** <http://www.ubmindia.in/indianuclearenergy/home>



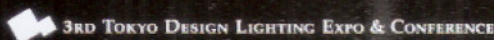
**Events Profile:** Intersolar India is India's largest exhibition and conference for the solar industry and, as a leading industry platform, focuses on the areas of photovoltaics, PV production technologies, energy storage and solar thermal technologies. In 2013, a total of 170 companies from 14 countries attended the exhibition.

**Date:** 18<sup>th</sup> - 20<sup>th</sup> November 2014

**Venue:** Mumbai, India

**Website:** <http://www.intersolar.in/en/intersolar-india.html>

## DESIGN LIGHTING TOKYO 2015



**Events Profile:** DESIGN LIGHTING TOKYO is a venue for business meetings between exhibitors and visitors. Design lightings that enrich the atmosphere will be showcased and plenty of users as architects, designers, etc. that seek stylish design lightings will gather here in Tokyo.

**Date:** 14<sup>th</sup> - 16<sup>th</sup> January 2014

**Venue:** Tokyo Big Sight, Japan

**Website:** <http://www.design-lighting.jp/en/>



**Events Profile:** Featuring live, life size experience walk-through pavilions conceptualized and designed by a technical committee from IEEE and IEEMA & supported by leading ecosystem players

**Date:** 22<sup>nd</sup> - 24<sup>th</sup> January 2014

**Venue:** Bombay Exhibition Centre, Mumbai, India

**Website:** <http://www.ii-intelect.org/>



# THREE-PHASE UPS AND 3\* SINGLE-PHASE RECTIFIER / SERVER LOADS - 1

*Protection and operational reliability improvement using line / neutral inductances and neutral current compensator*

## 1.0 Introduction

The use of computers and servers has become an integral part of professional environment and has substantially grown in the past two decades. Every industry and IT / software parks today use computers and servers (which are sensitive non-linear loads) and look for highest operational reliability or maximum availability of power supplies which is generally made available from single or three-phase Uninterrupted Power Supply (UPS). Most of these loads use a three-phase UPS and thereafter an Moulded Case Circuit Breaker (MCCB) for its power distribution. The load distribution is single-phase (phase and neutral or line and neutral) and the loads are, hence, supplied by different phases.

The server and computer loads use rectifiers or Switched Mode Power Supply (SMPS) for supplying the low voltage DC power to its control electronics or electronic cards. If the same neutral gets connected to different SMPS-based converters, different switching potentials are imposed on the same neutral at same time(s) and this causes unbalanced and uncontrolled operation of the SMPS-based converters resulting in the converters getting switched off. This is an undesirable effect as the power supply is still available but the loads are switched off due to unwarranted switching voltages appearing on the neutral.

On the other hand, when three-phase connection is distributed to single-phase loads, the neutral many times carries high unbalanced / zero sequence current (consisting of unbalanced components of fundamental, 3<sup>rd</sup> or triplen harmonics, and also other harmonics) generated by single phase unbalanced loads. This high neutral current results in tripping of the MCCB. This causes tripping of the loads, which is not desired. Further, this high neutral current enters the UPS increasing second harmonic current in its DC bus. This results in higher ripple current (second harmonic current) to be absorbed by the DC bus capacitance and reduces life of the DC bus capacitance and hence that of the UPS.

Both the above discussed problems can be overcome and the operational reliability of the sensitive loads supplied by an UPS can be substantially improved by use of proper / appropriate neutral inductances and a Neutral Current Compensator (NCC).

## 2.0 Insertion of Neutral Inductances

### 2.1 For UPS supplying power to normal diode rectifiers

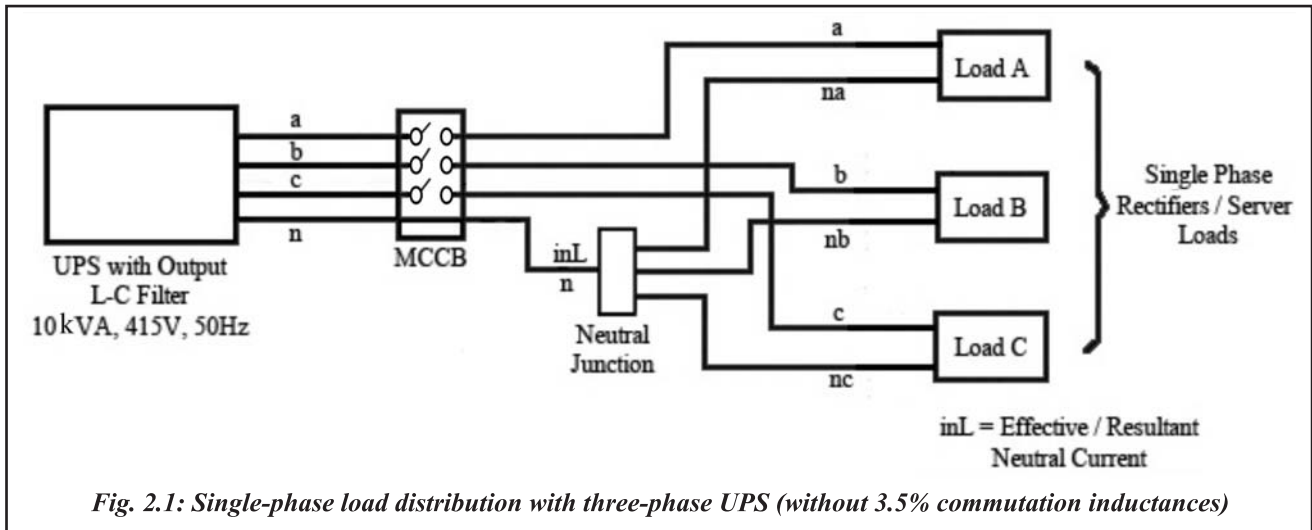


Figure 2.1 shows the load distribution of single-phase rectifier loads supplied by different phases using a three-phase UPS. The same neutral is distributed to all loads along with phase “a” or phase “b” or phase “c”. The blocks shown by Load A or Load B or Load C may consist of a single or multiple rectifiers. To reduce the commutation effect of rectifier diodes / proper functioning of the rectifiers, it is necessary to introduce proper commutation inductances in each phase. However, since these are single-phase rectifiers, both the neutral and phase need commutation inductances. If it is a three-phase rectifier, the three phases will have commutation

inductances and the neutral will not have any commutation inductance inserted in it as it is not connected to the rectifier stack.

The commutation inductance is normally based on the rectifier capacity and its value is calculated based on 3.5% voltage drop across it at full load. This is the normal design practice accepted over many decades for diode / thyristor rectifiers and does not need any further elaboration / experimental verification. Thus, if the single-phase rectifier has 10 kVA capacity at 240V, 50Hz supply voltage, the commutation inductance will be calculated as below.

Nominal fundamental rms current ( $I_L$ )

$$= 10 * 1000 / 240 \quad \text{Eq. (2.1)}$$

This gives  $I_L$  as 41.67 A

$$0.035 = 41.67 * (\omega) * L_c / 240 \quad \text{Eq. (2.2)}$$

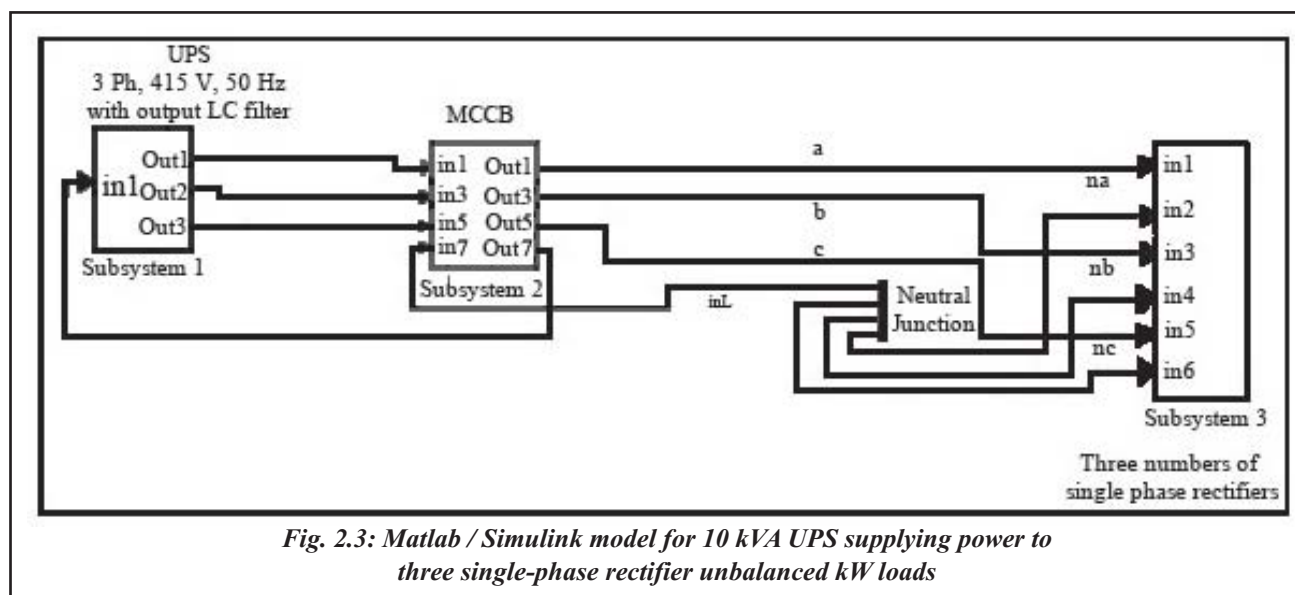
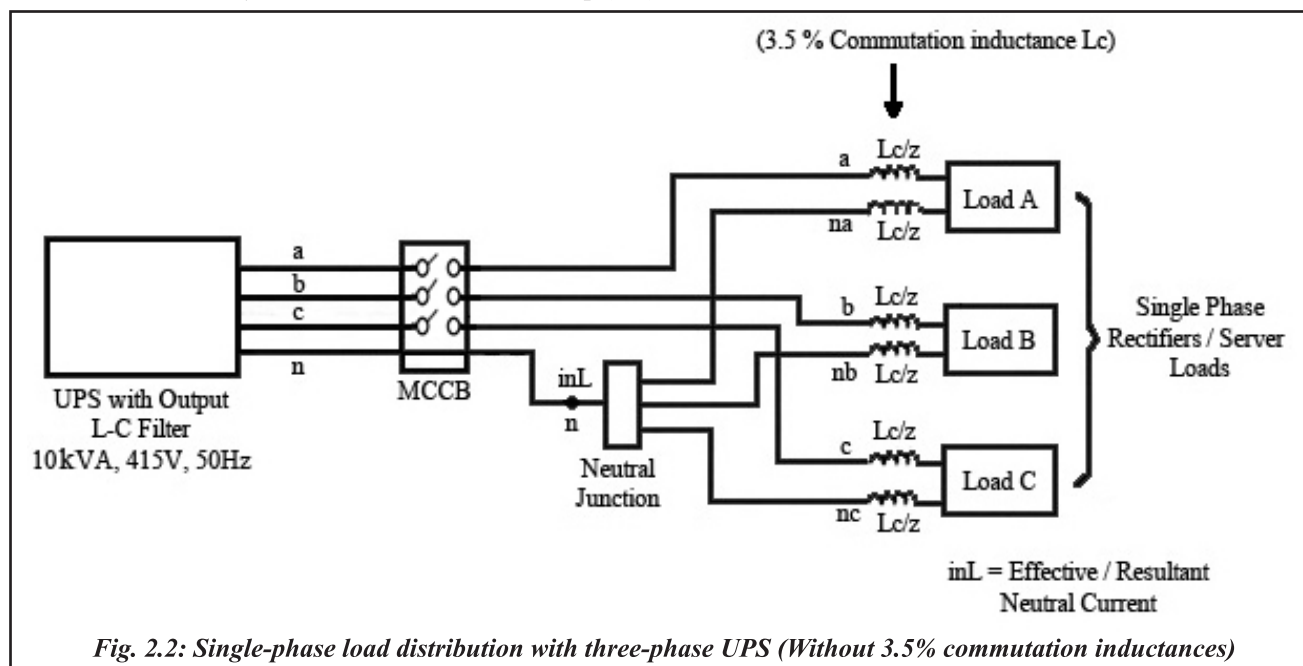
Where  $(\omega) = 2 * \Pi * 50 = 314$

Equation (2.2) yields

$$L_c = 0.035 * 240 / (41.67 * 314)$$

$$= 0.000642 \text{ H}$$

$$= 642 \mu\text{H} \quad \text{Eq. (2.3)}$$





Thus, if a UPS is supplying three single-phase rectifier loads of 10 kVA each, then each of the single-phase rectifiers needs 642  $\mu\text{H}$  inductance to be inserted in its phase. Further, since the neutral is common, the neutral for each rectifier needs an inductance. Further, the  $L_c$  can be divided in two equal parts and 321  $\mu\text{H}$  can be connected in each phase and neutral connection entering the single-phase rectifier. This is shown in fig. 2.2.

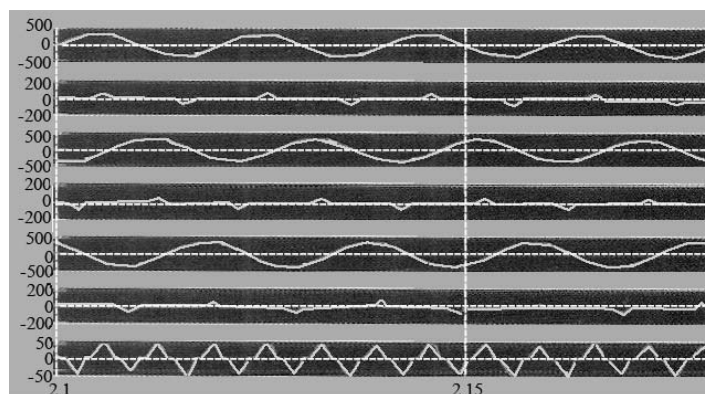
For the same above data, a Matlab / Simulink model is prepared and shown in Fig. 2.3. The model shows a 10 kVA UPS (with output LC filter) supplying power at 415V, 50Hz, to three single-phase rectifiers consuming approximately 3.5, 2.9, and 2.5 kW.

#### Case-1: Without 3.5% commutation inductances

Figure 2.4 gives the load voltages and currents for each of the rectifier (or the phase voltages and currents of the UPS) and also the effective / resultant unbalanced current ( $i_{nL}$ ) flowing through the MCCB into the UPS. Fig. 2.5 gives the phase voltage and current distortion which is approximately 5% and 120% respectively. The current distortion is mainly caused by the presence of large 3rd harmonic. The flattening of the voltage waveforms at positive and negative peaks is based on rectifier load and is visible because the rectifiers have DC capacitances and absence of the commutation inductances.

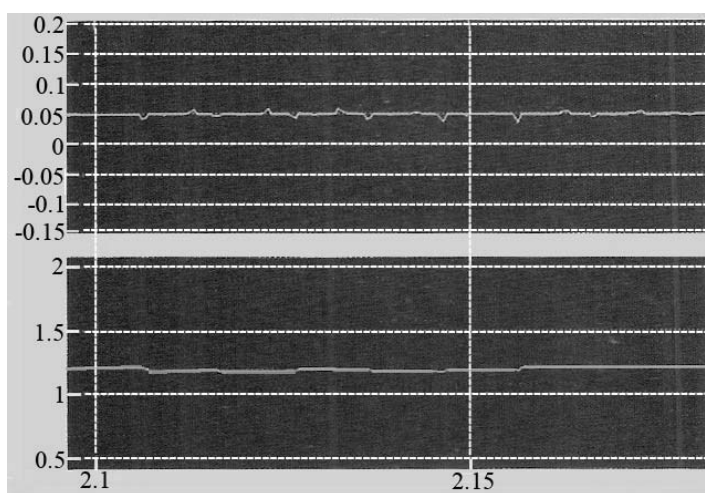
#### Case-2: With 3.5% commutation inductances

Figures 2.6 and 2.7 give similar results or waveforms, as discussed above, with the presence of commutation inductances. The flattening of the voltage waveforms at positive and negative peaks is almost absent. Further, the voltage and current distortion observed is approximately 3.25% and 94%. Thus, the distortion also decreases.



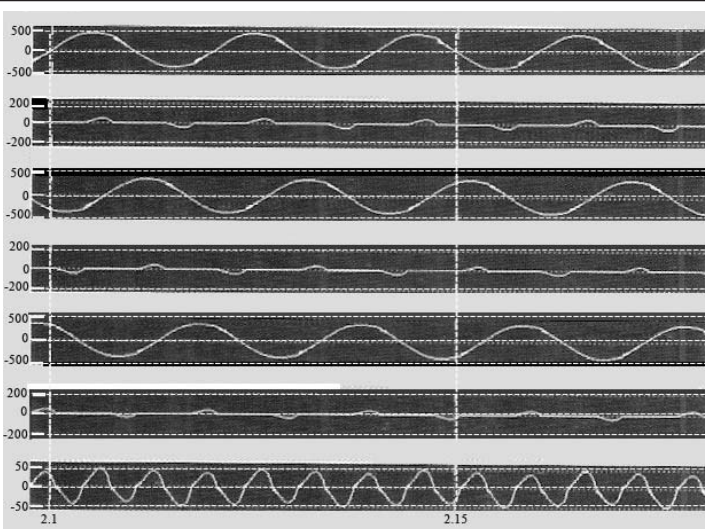
**Fig. 2.4: Load / UPS voltages and currents along with effective / resultant neutral current (without 3.5% commutation inductances)**

Ch1: Phase "a" voltage (load or UPS), Ch2: Phase "a" current (load or UPS), Ch3: Phase "b" voltage (load or UPS), Ch4: Phase "b" current (load or UPS), Ch5: Phase "c" voltage (load or UPS), Ch6: Phase "c" current (load or UPS), Ch7: Effective / resultant neutral current from load flowing through the MCCB into UPS ( $i_{nL}$ )



**Fig. 2.5: Load / UPS voltage and current distortion**

Ch 1: Phase "a" voltage distortion, Ch2: Phase "a" current distortion



**Fig. 2.6: Load / UPS voltages and currents along with effective / resultant neutral current (with 3.5% commutation inductances)**

Ch1: Phase "a" voltage (load or UPS), Ch2: Phase "a" current (load or UPS), Ch3: Phase "b" voltage (load or UPS), Ch4: Phase "b" current (load or UPS), Ch5: Phase "c" voltage (load or UPS), Ch6: Phase "c" current (load or UPS), Ch7: Effective / resultant neutral current from load flowing through the MCCB into UPS ( $i_{nL}$ )

## 2.2 For UPS supplying power to SMPS-based rectifiers

If instead of normal diode rectifiers, the loads use Switched Mode Power Supply (SMPS) for the power supply conversion, then the phases do not require any commutation inductances. However, to avoid different switching potentials getting imposed on the same neutral at same time(s) (causing unbalanced and uncontrolled operation of the SMPS-based converters resulting in the converters getting switched off), the neutral at each single phase load (using SMPS) needs at least 1% isolation inductance

which can be calculated based on equations (2.1) to (2.3). This recommendation is based on long experience of the author in dealing with design and practical implementation of Four Quadrant Voltage Source Converters using Insulated Gate Bipolar Transistors (IGBTs).

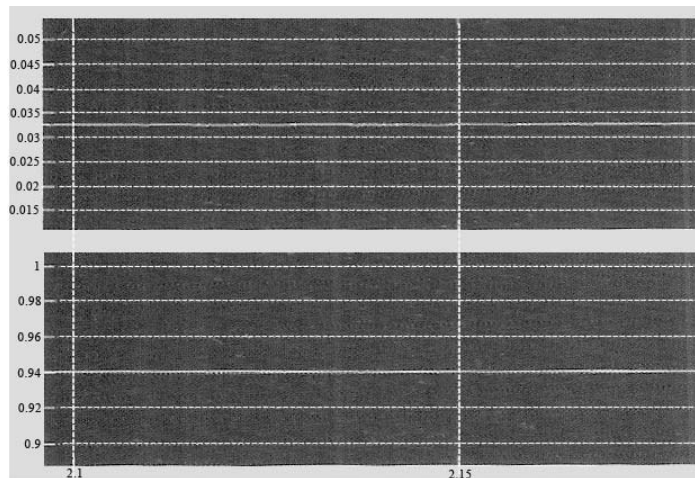
## 2.3 Net result

It should be noted that the any step down transformer impedance and / or cable inductance does not suffice for proper functioning of the single phase loads (either rectifiers or SMPS based).

The suggested method, thus, allows the loads (either rectifiers or SMPS based) function properly when supplied by a three-phase UPS.

Having understood importance of insertion of inductance in neutral associated with each phase, the other problems of UPS life getting affected by high neutral current and MCCB tripping caused due to high neutral current can now be solved by using a "Neutral Current compensator (NCC)".

*(To be continued)*



*Fig. 2.7: Voltage and current distortion at UPS (with 3.5% commutation inductances)*

Ch1: Phase "a" voltage distortion at load or UPS, Ch2: Phase "a" current distortion at load or UPS



**Dr V R Kanelkar,**  
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Jaysingpur, Maharashtra  
Courtesy  
Ieema Journal, January 2014

# INDUSTRIAL ELECTRIC GOODS SUPPLIERS

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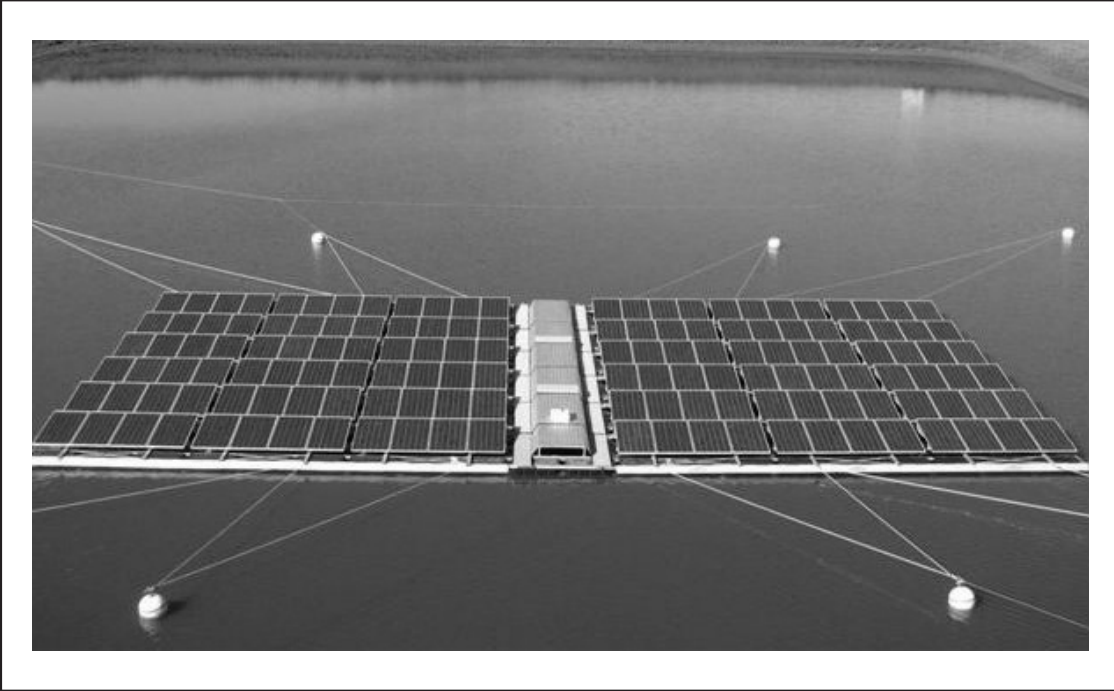
Cable glands : S/C, F/T, D/C  
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Email : rahamathulla00326@gmail.com



## INDIA IS BUILDING A MASSIVE, FLOATING SOLAR POWER PLANT

India will install a 50 megawatt solar power plant on a 1.27 million square metre floating platform by the end of the year.



Solar power is quickly coming into its own, growing some 35 per cent worldwide last year to a total installed capacity of 136,697 MW. It's going to get a nice boost from India, which hopes to float a similar 50MW plant — on a 1.27 million square metre floating platform — by the end of this year.

The Kagoshima Nanatsujima plant consists of some 290,000 solar panels arrayed just off the coast of Kagoshima City, and will generate just north of 70 MW of power annually. That's enough to power more than 22,000 local homes and still leave leftover juice to feed back into the national grid. With its completion earlier this year, the Kagoshima plant is now the single largest solar installation in all of Japan.

India actually faces a similar energy situation to Japan's. Both nations have precious little territory to install these huge arrays. It's not like either nation has a baking hot wasteland in which to install these plants like the US does. India, which has already begun installing 10MW solar plants atop the country's numerous canals, has begun looking to its waters instead.

"There are large stretches of water bodies in Kerala which NHPC [a local energy company] wants to harness for solar power. This floating solar power technology was developed by the Renewable Energy College and has been implemented in the city. The first plant — a pilot project — is scheduled to be commissioned in October this year. NHPC had contacted us for offering technical know-how and installation assistance for their proposed 50-mw plant," said SP Gon Choudhury, chairman of the Renewable Energy College. "Each station would require around 3000 square feet of space to generate 20 kilo watt of power. There are many water bodies that could be used for this," he continued.

Currently, land earmarked for solar development in India is rapidly increasing in value with prices jumping around 10 to 20 per cent per parcel. By building out this capacity over water, government and energy company developers can save both cash and valuable real estate.

And there's reportedly very little environmental impact as well. "The ecology of the water body is not likely to be affected much and it will also reduce evaporation, thus helping preserve water levels during extreme summer. Solar panels installed on land, face reduction of yield as the ground heats up. When such panels are installed on a floating platform, the heating problem is solved to a great extent," said Choudhury. This isn't an ideal solution, it's not as though we can go and cover the world's oceans with photovoltaic cells, but it's certainly a solid intermediary step until we get those space-based solar farms up and running. *[ Inhabitat - Cleantechnica ]*

**USE SOLAR POWER - SAVE ENERGY**

# THEME WRITE-UP OF 47<sup>th</sup> ENGINEERS DAY

September 15, 2014

## ***Theme: “Making Indian Engineering World-class”***

“World-class” engineers denotes the engineers of tomorrow with a broad range of competencies and skills to synthesize new ideas; and develop new processes and technologies to address contemporary challenges to suit global needs anywhere in the world. The word “World-class” is a relative term and is very difficult to define as there is no datum or fixed standard to classify any engineering work as “World-class”. The phrase has different connotations in countries from different categories, viz. Developed, Developing and Under-developed, based on their economic and social standards. However, the engineers, who are the harbinger of development of any country, always strive for enrichment of their knowledge and skill to upgrade the quality of life and their performance. The pursuit for betterment is a continuous process. There is no end to development and engineering progress. The process of upgradation from one standard to the other, from ‘under-developed’ to ‘developing’, or from ‘developing’ to ‘developed’, is a continuous process, which is led by the engineers after taking into account the prevailing socio-politico-economic conditions of the particular country.

Engineers are key figures in the material progress of the world. A world-class engineer, regardless of the job he is engaged in, is always considered an asset to the nation and the society; as it is he who makes a reality of the potential value of science by translating scientific knowledge into tools, resources, energy, and labour to bring science into the service of the country.

It is a challenge to conclude about the class to which the engineers of India belong. In the diversified, heterogeneous nature of development in our country, the engineers have to work from construction of rural roads to manufacturing of spaceships to Mars. Both are equally important for accelerating the development of the country. There is no scope to undermine the contemporary skill and knowledge of the engineers of our country. It is a matter of pride that Indian engineers, whether working in the country or outside, are a force to reckon with globally. The knowledge, skill, and wisdom of Indian engineers is no less than that of their counterparts from other so-called “advanced” countries. Due to the social-politico-economic structure of our country, engineering is still very much labour-intensive. Unlike in other parts of the developed world, Indian engineers are quite capable of blending the modern mechanized systems with prevailing traditional human oriented activities.

However, it does not mean that the pursuit for self-enrichment by Indian engineers will not be perceived. India requires large numbers of qualified and competent engineers to address the numerous challenges faced in the developmental journey. To produce large numbers of competent engineering and technical personnel to take on the global challenges, India will need to complete the following activities to transform the curriculum for training and skill upgradation:

- i) Generate awareness about the global nature of the profession, in-tune with growing challenges and opportunities
- ii) Develop a comprehensive understanding in the respective engineering discipline to tackle complex, real-world problems.
- iii) Accept challenges and solve them with wisdom and shared knowledge
- iv) Acquire knowledge and expertise through lifelong education and continuous learning
- v) Build familiarity in other engineering and scientific disciplines so that interdisciplinary solution approaches can be evolved
- vi) Pursue opportunities to apply skill in both traditional and non-traditional fields to address societal challenges
- vii) Communicate and interact with other highly recognized international leaders in engineering, and
- viii) Establish themselves as personalities with ethical and noble values

Achieving excellence is a journey that needs considerable effort. It requires a transition from a reactive, compliance-based approach to a proactive, contributory and value-add mindset to create an environment of sustained operational progress. Over the long-term, world-class engineers will create a set of approaches and best-practices that will improve tomorrow’s world, create long-term value, and institutionalize business sustainability.



*Compiled by*  
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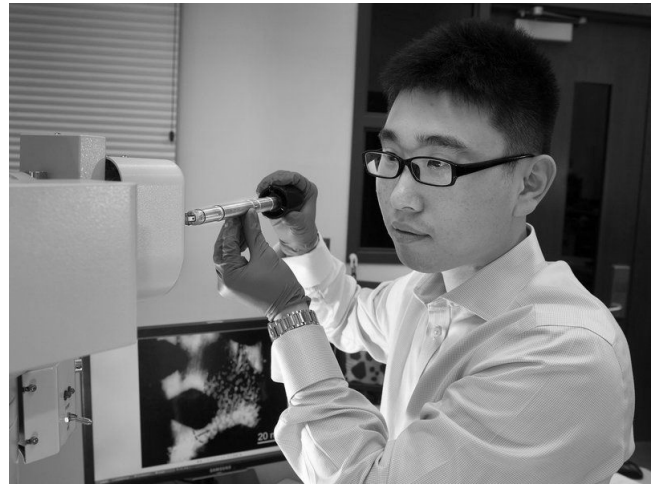


# NEXT-GENERATION ELECTRIC CARS MAY NEVER NEED A BATTERY SWAP

**U.S. Department of Energy researchers pinpoint the reasons why rechargeable batteries lose their ability to hold a charge over time**

From laptops to smartphones to the burgeoning electric car industry, our world is increasingly reliant on rechargeable batteries. But as anyone who's owned a laptop for more than a few years knows, batteries eventually lose their ability to hold a full charge.

Scientists never really understood why this happens, which has made it a hard problem to fix. But according to a pair of recent studies by researchers from the U.S. Department of Energy, published in the journal *Nature Communications*, we may be closer than ever to a battery that doesn't degrade.



Working specifically with lithium-ion batteries, commonly used in consumer devices because of their light weight and high capacity, the scientists have mapped the charge and discharge process down to billionths of a meter to better understand exactly how degradation works. They discovered two culprits in battery degradation. The first: microscopic vulnerabilities in the structure of the battery material steer the lithium ions haphazardly through the cell, eroding the battery in seemingly random ways, much like rust spreads across imperfections in steel. In the second study, focused on finding the best balance between voltage, storage capacity and maximum charge cycles, researchers not only found similar issues with the ion flow, but also tiny accumulations of nano-scale crystals left behind by chemical reactions, which cause the flow of ions to become even more irregular after each charge. Running batteries at higher voltages also led to more ion path irregularities, and thus a more rapidly deteriorating battery.

It may seem like scientists should have fully understood the battery—a technology that's effectively been around since 1800—decades ago. But Huolin Xin, a materials scientist at Brookhaven Lab and coauthor on both studies, says the winning combination of new technologies only recently became available.

"Many state-of-the-art characterization tools, such as aberration-corrected electron microscopes and new synchrotron X-ray techniques, were not available 10 years ago," Xin says. But now, he says, they can be applied to the study of lithium-ion batteries.

The new data gives researchers a clearer picture of how these batteries work, which could lead to longer-lasting batteries in consumer electronics in the not-too-distant future. But, it also presents new problems. Xin says maximizing surface area is important to battery performance, but a larger surface area also likely facilitates degradation.

"To prevent [surface degradation], we can either coat the cathode with a protection layer," Xin says, "or hide these surfaces by creating boundaries within the micron-sized powders [inside the cell]".

Finding the most efficient, cost-effective ways to do this will be part of a future phase of the research.

But Daniel Abraham, a scientist focused on lithium-ion battery research at the Argonne National Laboratory outside Chicago, is skeptical that the new studies represent a real breakthrough. He says mapping work with similar materials has been done in the past, including by his team about 12 years ago. He also believes there may be more to battery degradation than what the new studies have found.

"They're trying to make a correlation between performance degradation and the pictures that they see, which may not be correct," Abraham says. "It's partially the story, but I don't think it's the entire story".

Xin, is more optimistic that the work will lead to battery improvements, not only for future electric vehicles, but for portable electronics as well.

"Lithium-nickel-manganese-cobalt-oxide cathode has recently been identified as the only commercially viable material for next-generation lithium-ion batteries," Xin says. "By resolving its degradation problem, we can make next-generation batteries smaller and make them charge and discharge more reliably".

The two battery experts do agree though, that for many important future applications, finding a way to make batteries that don't wear out as quickly is just as important as creating batteries that have a greater capacity. Xin points out that electric car buyers justifiably worry about battery failure after their warranty expires. Abraham notes that while you likely only need a couple of years of performance from your smartphone or tablet battery, for electric vehicles, most owners are looking for a battery that lasts 10 to 15 years. And for use in the electric grid (to store excess energy produced on off-peak hours), batteries should last 30 years or more. That makes building a better battery for your laptop a lot easier than solving longevity problems in other areas. "It's good to have a higher energy density, but if you get a high energy density but not a long life, then the commercial viability of those technologies comes into question," Abraham says. "Whereas, if you can show that you have a new technology and it can last between 2 and 30 years, that becomes immediately viable commercially". While the work of Xin and his colleagues may help researchers create batteries that don't degrade as quickly, it's clear that further breakthroughs will be necessary before we'll see rechargeable batteries that last a decade or more without serious wear.

**Read more:** <http://www.smithsonianmag.com/innovation/next-generation-electric-cars-may-never-need-battery-swap-180951825/#fDyR61F8ETjovt8.99>

## **FIRST SOLAR BUILDS THE HIGHEST EFFICIENCY THIN FILM PV CELL ON RECORD**

TEMPE, Ariz.—(BUSINESS WIRE)— First Solar, Inc. (Nasdaq: FSLR) today announced it has set a world record for cadmium-telluride (CdTe) photovoltaic (PV) research cell conversion efficiency, achieving 21.0 percent efficiency certified at the Newport Corporation's Technology and Applications Center (TAC) PV Lab. The record-setting cell was constructed at the company's Perrysburg, Ohio manufacturing factory and Research & Development Center, using processes and materials designed for commercial-scale manufacturing.

The record has been documented in the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) "Best Research Cell Efficiencies" reference chart.

This certified result bests the previous CdTe record of 20.4 percent conversion efficiency, which was set by First Solar in February of 2014, and represents the seventh substantial update to CdTe record efficiency since 2011. The achievement also places First Solar's CdTe research cell efficiency above copper indium gallium diselenide based solar cells (CIGS) at 20.9 percent, and well above multi crystalline silicon (mSi), which peaked at 20.4 percent in 2004.

"We have just begun to reveal the true unrealized potential of CdTe PV," said Raffi Garabedian, First Solar's Chief Technology Officer. "Our Advanced Research team continues to deliver extraordinary results by creating practical devices capable of commercial scale production. Not only have we have now demonstrated the highest single junction thin film cell on record, but just as important, our record cells are based on the same scalable manufacturing processes and commodity materials that we have proven through years of volume production".

Garabedian noted that while competing technologies are using increasingly costly materials and cell processes in order to deliver moderate performance gains, First Solar is establishing a rapid path to industry-leading energy densities, while simultaneously improving manufacturing metrics.

"Our significant investment in development of CdTe thin-film technology has enabled a rapid rate of improvement and gives us tremendous confidence in the future," said Markus Gloeckler, First Solar Vice President for Advanced Research. "We have made outstanding improvements in all aspects of our thin-film solar cells and are aggressively pursuing the commercialization of these advanced technologies in our product".

At an analyst briefing last March, First Solar presented a technology roadmap anticipating a 22 percent research cell efficiency milestone in 2015. Today's announcement indicates First Solar is steadily tracking to achieve that goal ahead of schedule.

First Solar has continued to transfer its success in the R&D lab into its commercially produced modules, increasing its average production module efficiency to 14.0 percent in the second quarter of 2014, up 0.5 percent from the first quarter of the year, and up 0.7 percent from FY2013. The company's lead line was producing modules with 14.1 percent average efficiency at the end of the second quarter of 2014.

***Whenever science makes a discovery, the devil grabs it while the angels are debating the best way to use it. - ALAN VALENTINE***



# VEERAN AZHAGU MUTHU KONE - 1

## FIRST FREEDOM FIGHTER

**Veeran  
Azhagu  
Muthu Kone**

(1728-1757), (also known as Alagumuthu konar and Servaikarar) was an Indian revolutionary and independence activist. He is regarded for having raised one of the first revolts against the British East India Company in India. Kone was born and brought up in Kattalankulam, a village in erstwhile Tirunelveli district of Tamil Nadu.



Kone was born and brought up in Kattalankulam, a village in erstwhile Tirunelveli district of Tamil Nadu.

**Puli Thevar** was a poligar (or palayakarar) who ruled Nerkattumseval situated in the Sankarankoil taluk of Tamil Nadu. Puli Thevar who belongs to the warrior Maravar community was one of the earliest freedom fighters. He is one of the first Indian kings to have fought and defeated the British in India.

### History

Puli Thevar was one of the earliest opponents of the British rule in South India. He was involved in a vendetta with the Nawab of Arcot who was supported by the British. Thevar's prominent exploits were his confrontations with Marudhanayagam, who later rebelled against the British in the late 1750s and early 1760s. Nelkatumseval was the headquarters of Puli Thevar, the first chieftain in India to resist the British.

The author of the Thirunelveli District Gazetteer, H.R. Pate, observes as follows:

Nelkatumseval is chiefly memorable as having been in the eighteenth Century stronghold of the redoubtable Puli Thevar, who figured for many years as the leader of the Marava Confederacy against the troops of the Nawab and the Company. He had a shrewd insight into the political situation of the time and was a veritable thorn against the side of the Nawab's agents. Puli Thevar remains one of the illustrious figures in the chequered history of palayakarars. The vivacity of his character gave him an ascendancy over the western palayakarars, while his determined resistance to the Nawab's overlordship made him a potential enemy of the

Wallajahs. He was the principal architect of the coalition of the palayakkars organised against the Nawab. The Nawab acknowledged his victory by presenting him with a gold plate and sword.

Pulithevar is regarded as the first ruler in Indian history, who sowed the seed, by his gallant resistance, to expel foreigners from his native land. His services to the nation are honoured; the government of Tamil Nadu has erected a memorial for him in Nelkatumseval where there are the remnants of his palace.

### Puli Thevan War

There were a number of revolts by local powers in the South, the first being as early as 1757. When Mohammed Ali, the Nawab of the Carnatic, supported by the Company, attempted to extend his control over the "Madurai" and "Thirunelveli" districts, the poligars rebelled. The western poligars, led by Puli Thevar of Nelkatumseval, forged individual alliances and then a grand alliance as they revolted against Mohammed Ali. Of necessity, Ali had to seek assistance from John Company, and, though battles were won and lost, the revolt was put down in 1761 by Yusuf Khan, who had been nominated the Governor of "Madurai" and "Thirunelveli" in 1758 by the British, despite Nawab Mohammed Ali's objections.

### Western confederacy by Nel Kattum Sevval

"Nel kattum sevval" literally translates to "Rice tribute paying place", but after its ruler Puli Thevan's successful (initially) attempts at defying Mohammed Ali, the name changed to nel kattan sevval ("place which doesn't pay rice tribute"). These palayams declared their independence in 1757. Yusuf Khan, or Marudhanayagam, was sent by the British to bring the poligars under control and make them pay kisthi. Earlier campaigns in 1755 by Mahfuz Khan were unsuccessful in subduing the poligars' partly because of their sticking to each other and partly because British troops had to be withdrawn to raise the French siege of Madras (by Lally). Yusuf Khan quickly intimidated the eastern poligars and moved against Pooli Thevan. A series of sieges of Pooli Thevan's forts followed and eventually the Nerkattansevval fort was razed by British artillery. Puli Thevan was captured and escaped/encountered on the way to incarceration. No verifiable records are found about him after his capture/escape. The rise of the western Poligars of south Tamil Nadu is the first war of Indian Independence and not the 1857 sepoy uprising, as written by Savarkar.

### Puli Thevar's struggle-quoted From Caldwell's History of Tirunelveli

In 1736, Muhammad Ali, Nawab of Arcot annexed the kingdom of Madura in Western Tamil Nadu, but the Polygars or Lords of Madura Kingdom were in no mood

to compromise with Nawab. The Polygars refused to pay taxes and pay homage to Nawab. Meanwhile, Nawab = was dragged into the Carnatic Wars between the French and British which lasted from 1743 to 1763. Their zone of struggle was largely in and near the kingdom of Arcot. Nawab allied with the British and soon incurred debts with British because of his lavish lifestyle. This gave the British opportunity to interfere in his domestic affairs. As mentioned before, Polygars viewed Nawab as a usurper who deposed the rightful dynasty of Madura Kingdom. Since Polygars had private armies-with infantry, cavalry, artillery & elephants along with strong forts-often on mountain tops and concealed by forests—they could defy Nawab. There were 77 Polygars who ruled as they willed in their respective domains and fought one another who posed a real threat to their independence if Nawab were to make a serious effort to subjugate them. Long before the Carnatic Wars were over, British got their chance to meddle in affairs of Arcot.

In 1755, Nawab unwisely requested British help to bring the turbulent Polygars into control.

British exploited this chance and sent a large army under Colonel Heron to subjugate the country that lay between Trichinopoly and Cape Comorin. Heron's army behaved like bandits and even looted shrines-an act that made sure that people hated them well.

Heron marched through Polygar country, where he fought a number of Polygars into submission. The strongest Polygar was the Kattabomman of Panjalakurichi. He too surrendered and as he did not pay the full sum demanded by the British as tribute, he surrendered some of his close male relatives as hostages. This part of the story is puzzling indeed. Kattabomman could have easily paid the sum demanded by British, but he chose to give relatives as surety. But soon, Heron asked Kattabomman to pay the demanded sum and recover his hostages as English were in dire shortage of cash. He calculated that since British army would soon march out of country, why waste money? Let them have hostages-It does not cost himself a rupee-this was his line of thought. But this crooked line of thought would in future end up as a disaster for Polygars in future.

Soon British troops under Heron decided to march out of Polygar country. They could not collect tributes as they calculated and as they marched home, Heron ordered a temporary diversion. British army must bring a minor Polygar who was a turbulent figure-His name is Puli Thevar. Puli Thevar was the hereditary title of Polygar of Nelkattumseval, now in Sankarannainarkovil Taluk of Tinnevely District. He possessed only a small estate, but his influence among Western Polygars were considerable-due to the fame of his abilities. That made him indeed a force to be reckoned with.

### **First Siege of Nelkattumseval, 1755**

As soon as Thevar refused the British demand for repayment, they besieged Nelkattumseval but Thevar and his troops resisted. Thevar had a spy in the British camp, the interpreter of Colonel Heron, who relayed the information that the British were short on supplies and also did not have heavy artillery. Thevar was delighted at this news and decided to hold on further. Heron ordered a massive bombardment of Thevar's fort, but the British made little progress against the thick stone walls of the fort. Heron was forced to acknowledge that he could not storm the fort, so he asked that a paltry sum of 20,000 rupees be paid, to which Thevar replied- "My country doesn't have that much income.....Besides I know the value of money well and don't expect me to burn even a single rupee....."

The heroic defense of Nelkattumseval by Thevar's small force along with his efficient spy reports and good diplomacy made sure that British army made no progress in Thevar's country. Also with his army on the brink of mutiny due to lack of food and pay, Heron retreated at full throttle. Soon much of Polygar country was in full revolt and many Polygars confederated into a single force led by Puli Thevar. From then on, an epic struggle of Polygars to resist British sponsored Muslim encroachment would last up to 1761. Once Heron retreated, Thevar let loose his Maravas to seize the whole countryside. Maravas are prominent among the Tamil military caste; their ferocity and predatory warfare made them ideal to fight the British. Thevar himself was a Marava and the majority of soldiers in the Polygar armies were of Marava stock. They looted and ambushed British units, looted and burnt those villages who supported British and overran the whole countryside.

### **Battle & Siege of Kalakadu, 1755**

Puli Thevar also won over three Pathan generals of Nawab named Mudemiah, Mian and Nabi Khan. Mudemiah was a good negotiator so Thevar sent him to Travancore to win Marthanda Varma, Raja of Travancore [whose areas were captured by Heron] to support the Polygar confederacy. Main aim was to expel Mahfuz Khan, agent of Nawab in Polygar country. Mudemiah returned to Tamil country with a force of 4000 men given to him by Marthanda Varma. Puli Thevar joined Mudemiah with his armies to fight Mahfuz Khan's armies. Mahfuz Khan had a larger army than Thevar, as he had received reinforcements from Nawab and British, but he had scattered his forces and Thevar's troops, better armed, swiftly defeated these units before they could coalesce into a large formation. These early swift victories in the open field encouraged Thevar to besiege the fort of Kalakadu. Mahfuz Khan sent a large cavalry force to help the garrison thus besieged. At this critical moment, the Travancore troops retreated



as they had to handle a rebellion at home. With a large chunk of his men lost, Thevar knew well that the war was lost so he retreated.

### **Second Siege of Nelkattumseval, 1755-1756**

Thevar knew well that he stood no chance if his small army engaged the huge cavalry force of Mahfuz Khan so he assembled all available troops and guns into his fort of Nelkattumseval. Mahfuz Khan besieged this fort for the second time that year and sent his horsemen in pursuit of Thevar's Marava troops who had plundered and wreaked havoc in territories held by Arcot troops. The Maravas were chased off and Arcot troops re-established control but Thevar's troops held the Nelkattumseval fort. Mahfuz Khan had trapped Thevar and driven away the predatory Maravas.

### **Second Battle of Kalakadu, 1755**

Thevar instructed Mudemiah to engage Travancore once more into a war with Arcot troops. This battle ended in a clear victory for Travancore force, but Mahfuz Khan went ahead with the siege, as he could not afford to let Thevar escape.

### **Retreat of Mahfuz Khan, 1756**

Mahfuz Khan's army unit ran short of supplies, and he requested more from the British, escorted by troops. Thevar got scent of this program and so he sent a band of his crack troops to attack and loot this British convoy and thereby worsen Mahfuz Khan's misery. Thevar's success gave a rude shock to Mahfuz's belief that Thevar was running out of options; he realized that he must rush back to his base at Tirunelveli in order to meet payroll and supply his troops. Thevar, equally surprised by his success, planned a large scale offensive on the enemy-Arcot-British troops. Thevar used his influence among Western Polygars to become leader of the Polygar council. His power of persuasion was so great that even the strongest Polygars obeyed him and sent troops whenever he demanded. He then turned his attention to the Eastern Polygars, led by Kattabomman. Thevar proposed that he and Kattabomman form a union to fight the enemy. Kattabomman's earlier decision to not ransom his hostages wrecked the whole enterprise. He still had hostages with Nawab and so although he wanted to join Thevar, he must remain neutral or lose his loved ones held captive by the Nawab. However, Madura Polygars joined Thevar and promised troops in event of war; Thevar could cajole Polygars of Nattam to join him. The confederacy's aim was to seize the ancient and strategic city of Madura, as that would be a symbolic restoration of pre-1736 order in addition to enabling them to oust the Anglo-Muslim garrisons and seize control the country south up to Cape Comorin. Their objective was to restore native rule in what was once the kingdom of Madura. British soon learnt of this preparation for war and they were alarmed by the sheer scale of ambitions of Thevar. They blamed Mahfuz's incompetency for this dangerous situation and resolved

to intervene directly. They despatched 1000 sepoys under Yusuf Khan and also put Mafuz's armies under Yusuf Khan's orders.

### **Siege of Srivilliputtur, 1756**

Puli Thevar had already led the confederate army which he had assembled at Nelkattumseval towards Madura. As they marched, they faced the fort of Srivilliputtur, which they must seize if they wished to march on to Madura. This fort and neighbourhood was under Abdul Rahim and he and his troops were confident that they could rout Thevar's host. At first they engaged with Thevar's men in an open battle outside the fort, but Thevar cleverly had the overconfident Arcot army surrounded. The Arcot troops fought hard to break out of this encirclement and fled to the fort. They were so demoralised by their catastrophic engagement that soon most of the Arcot troops either joined Thevar's army or fled. With his troops lost, Abdul Rahim also fled the scene. This great victory prompted even the reluctant Polygars jumped into Thevar's bandwagon. Thevar's overconfidence prompted a fatal change of plans.

The original plan was to march from Nelkattumseval to Madura via Srivilliputtur. With Srivilliputtur in their hands, Madura lay open to capture. Now several Polygars argued that the confederate army must march south and seize Tirunelveli and then move north towards Madura. Their forces were now strong enough that they were confident of victory so Thevar also agreed to this change of plan.

At this time, Madura was only lightly held by Arcot troops. The bulk of the Arcot army, along with Mahfuz Khan, was at Tirunelveli. If the confederates had moved north and seized Madura, Mahfuz Khan would have been trapped in Polygar country and initiative would have passed permanently into Thevar's hands. Kattabomman's treachery wrecked the whole plan. Mahfuz Khan persuaded Kattabomman to support him in return for large land grants and several concessions. As Kattabomman led the Eastern Polygars, war that began as a war of independence now became a civil war.

### **Battle of Tirunelveli, 1756**

Thevar did not lose heart even then. Both sides were evenly matched with 20,000 men apiece, but Mahfuz Khan had superiority in cavalry. On 21 March 1756, some 40,000 men clashed. The battle was fierce and bloody. Even after long onslaughts, the confederates could not break through enemy formations and once the opposition began their counter attack, the exhausted confederate troops broke up and retreated. The confederate army disintegrated and Thevar and his troops marched back to Nelkattumseval. If Kattabomman had not supported Mahfuz, most of Tamil country would have been freed from the control of Arcot Nawab and British. A golden chance was lost-but

certainly not due to Thevar. After all, it was he who took Polygars to the brink of a decisive success.

### **Aftermath**

After this catastrophe, Puli Thevar noticed a drop of morale among his fellow Polygars. He himself evaluated the situation and decided on a double-faced policy. Thevar sent out affirmations of loyalty to the Nawab and the British and even met the Tirtarappa Mudali, a fellow Tamil belonging to the Vellalar caste and Nawab's new viceroy in Madura and Thevar paid him a large sum as tribute. Meanwhile, he loosed his Maravas once more to loot and devastate enemy held territories once more. When Arcot sepoys tried to control them, they looted Arcot camps as Arcot troops watched helpless. Thevar was determined that the British and the Nawab will know no peace. The military commandant, Yusuf Khan, recognized Thevar's tricks and ordered him back to Nelkattumseval. Thevar instead met Nabi Khan and Kattabomman, whose treachery had undermined his earlier effort to liberate Tamil Nadu. Thevar also enlisted Mian in this second confederacy and rallied the Polygars who had lost their nerve after the Battle of Tirunelveli. Thevar thus collected and assembled a force of 10,000 men south of Madura and proceeded eastwards into a forest that was held by Kattabomman, which stretched to the outskirts of Tinnevely.

### **Capture of Tirunelveli, 1756**

Thevar took this torturous route instead of the highway to Tinnevely to conceal his troop movement and surprise the enemy, basing his plan on a spy's report that Mudali had camped his bulk of force some 20 miles away where he anticipated Thevar's attack. At the edge of the forest, they could see Tinnevely but chose to wait till night to begin their invasion. By dawn they had infiltrated into the town in several bands through unguarded points.

### **Siege of Palamkotta, 1756**

Thevar seized Tirunelveli by surprise and camped there for two days. Mudali, who heard that he had been outwitted, rushed back but instead of attacking Tirunelveli, assembled his troops at Palamkotta fort. Thevar had no artillery so ordered his cavalry to encircle the fort and burn a large area around the fort to deprive them of supplies. His troops could not scale the fort walls because of gun-fire by Mudali's troops; their only option is to wait and starve the enemy. Thevar learnt that Yusuf Khan was on the march in order to relieve the fort so he ended the siege and rushed with all his forces to meet Yusuf Khan.

### **Battle of Gangai Konda [1756]**

The armies met at Gangai Konda, north of Tirunelveli. Thevar's troops attacked from all sides but suffered huge losses as Yusuf Khan's artillery took its toll on Thevar's ranks. Thevar realised that the battle was lost and ordered a retreat. Thevar's army split into three; the forces of Polygars under Thevar fled into the jungle, Mian with his horsemen went to Madura and Nabi Khan

retreated towards Srivilliputtur. As they had no artillery to breach the walls, they attempted to climb the walls but failed, so he and his men left Srivilliputtur. Puli Thevar had not lost hope. He opened talks with agents of Mysore at Dindigul and offered them 5 lakh rupees in exchange for military help. He also tried to persuade the corrupt officers of Mahfuz Khan to give up Cholvandan, a region through which the only road between Dindigul and Madura passed through a mountain defile. In order to tempt Mahfuz Khan to join his side, Thevar also tempted him with promise of his office in Mysore. Thevar's plan was to oust both Nawab of Arcot and the British from the kingdom of Madura and to restore a member of the ruling dynasty of Madura as the king. The English soon got reports of this effort for a third confederacy and despatched a large force under Yusuf Khan and Mudali; a third of this force was posted at Tirunelveli and another third was assembled in the fort of Palamkotta.

As the English prepared for war, Thevar persuaded Mian and Nabi Khan to join with their cavalry troops at Nelkattumseval. Once Yusuf Khan found that Mian and Nabi Khan were on their way to join with Thevar's troops, he marched into Srivilliputtur. Yusuf's plan was a show of might so as to dissuade other Polygars from joining hands with Thevar. Mudali tried to negotiate a peace agreement, sending his agent Alagappa to Thevar's camp. Mudali offered large land grants if Thevar were to join Nawab's side but Thevar was too shrewd to fall for this trick. Instead of refusing outright, he sent his agent along with Alagappa into Yusuf Khan's camp along with a force of 300 Marava guards for negotiations. Thevar sent his main army to rendezvous with Mian and Nabi Khan and sent another force to ravage the enemy territories west of Tirunelveli, intending to cause the negotiations to fail. The Nawab's people themselves withdrew from the talks. As a man driven by a great vision, he had no interest in conceding for paltry gains.

Soon Thevar got what he wanted-Yusuf Khan put to death some of Thevar's Maravas of Thevar, alleging that they had stolen horses and oxen from his camp. Immediately, Thevar's agent and Marava guards fled to Thevar's castle and reported this event. Thevar declared that he could in no way tolerate such a cruelty on his own people. Mahfuz Khan himself was an unscrupulous character and soon thought that his future depended on the good will of Thevar, so he came to Nelkattumseval with his troops by end of 1756. Several of Nawab's officers in Madura revolted and took control of Madura but as Mahfuz Khan was reluctant to engage in a war, they got no support and were chased away by English troops led by Calliaud. Calliaud and English troops made the mistake of leaving, as Thevar had completed his preparations for a third attempt to liberate Western Tamil country.

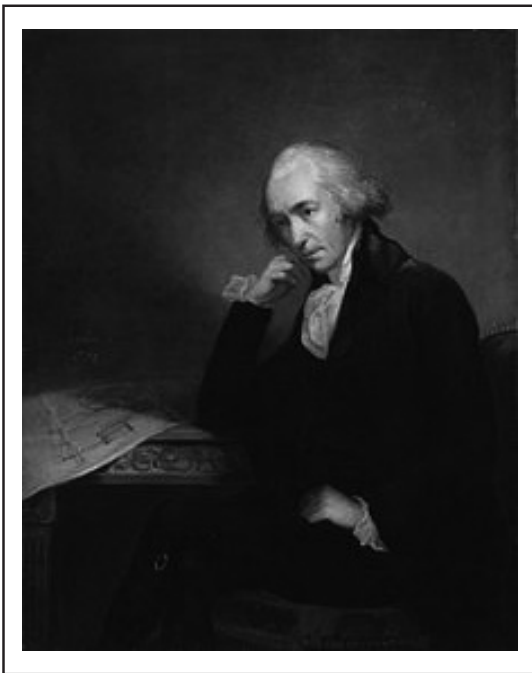
*(To be continued)*



# JAMES WATT (1736 - 1819) - 1

## Biography

James Watt was born on 19 January 1736 in Greenock, Renfrewshire, a seaport on the Firth of Clyde. His father was a shipwright, ship owner and contractor, and served as the town's chief baillie, while his mother, Agnes Muirhead, came from a distinguished family and was well educated. Both were Presbyterians and strong Covenanters. Watt's grandfather, Thomas Watt, was a mathematics teacher and baillie to the Baron of Cartsburn. Despite being raised by religious parents, he later on became a deist. Watt did not attend school regularly; initially he was mostly schooled at home by his mother but later he attended Greenock Grammar School. He exhibited great manual dexterity, engineering skills and an aptitude for mathematics, while Latin and Greek failed to interest him.



When he was eighteen, his mother died and his father's health began to fail. Watt travelled to London to study instrument-making for a year, then returned to Scotland, settling in the major commercial city of Glasgow intent on setting up his own instrument-making business. He made and repaired brass reflecting quadrants, parallel rulers, scales, parts for telescopes, and barometers, among other things. Because he had not served at least seven years as an apprentice, the Glasgow Guild of Hammermen (which had jurisdiction over any artisans using hammers) blocked his application, despite there being no other mathematical instrument makers in Scotland. Watt was saved from this impasse by the arrival of astronomical instruments to the University of Glasgow that required expert attention. Watt restored them to working order and was remunerated. These instruments were eventually installed in the Macfarlane Observatory.

At first he worked on maintaining and repairing scientific instruments used in the university, helping with demonstrations, and expanding the production of quadrants. In 1759 he formed a partnership with John Craig, an architect and businessman, to manufacture and sell a line of products including musical instruments and toys. This partnership lasted for the next six years, and employed up to sixteen workers. Craig died in 1765. One employee, Alex Gardner, eventually took over the business, which lasted into the twentieth century.

## Early experiments with steam

In 1759 Watt's friend, John Robison, called his attention to the use of steam as a source of motive power. The design of the Newcomen engine, in use for almost 50 years for pumping water from mines, had hardly changed from its first implementation. Watt began to experiment with steam though he had never seen an operating steam engine. He tried constructing a model. It failed to work satisfactorily, but he continued his experiments and began to read everything he could about the subject. He came to realize the importance of latent heat in understanding the engine, which, unknown to Watt, his friend, Joseph Black, had previously discovered some years before. Understanding of the steam engine was in a very primitive state, for the science of thermodynamics was not in place for another 100 years or so.



In 1763, Watt was asked to repair a model Newcomen engine belonging to the university. Even after repair, this engine only barely worked. After much experimentation, Watt demonstrated that about three-quarters of the heat of the steam was being wasted - consumed in heating the engine cylinder on every cycle. This energy was wasted because later in the cycle, cold water was injected into the cylinder to condense the steam to reduce its pressure. Thus the engine expended much of its energy in repeatedly heating the cylinder rather than in delivering mechanical force.

Watt's critical insight, arrived at in May 1765, was to cause the steam to condense in a separate chamber apart from the piston, and to maintain the temperature of the cylinder at the same temperature as the injected steam (by surrounding it with a "steam jacket"). This meant that very little heat was absorbed into the cylinder itself on each cycle, and thus more heat from the steam was made available to perform useful work. Watt had a working model later that same year.

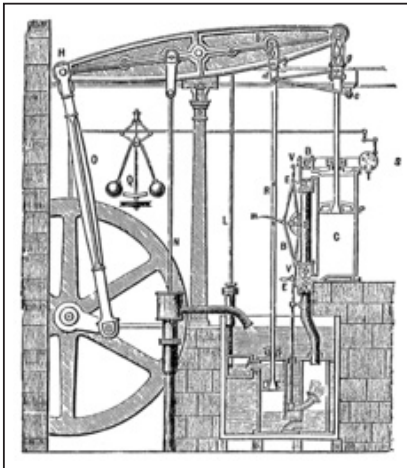
Despite a potentially workable design, there were still substantial difficulties in constructing a full-scale engine.

This required more capital, some of which came from Black. More substantial backing came from John Roebuck, the founder of the celebrated Carron Iron Works, near Falkirk, with whom he now formed a partnership. Roebuck lived at Kinneil House in Bo'ness, during which time Watt worked at perfecting his steam engine, in a cottage adjacent to the house. The shell of the cottage, and a very large part of one of his projects, still exist to the rear.



### First engines

In 1776, the first engines were installed and working in commercial enterprises. These first engines were used to power pumps and produced only reciprocating motion to move the pump rods at the bottom of the shaft. The design was commercially successful, and for the next five years Watt was very busy installing more engines, mostly in Cornwall for pumping water out of mines.



These early engines were not manufactured by Boulton and Watt, but were made by others according to drawings made by Watt, who served in the role of consulting engineer. The erection of the engine and its shakedown was supervised by Watt, at first, and then by men in the firm's employ. These were large machines. The first, for example, had a cylinder with a diameter of some 50 inches and an overall height of about 24 feet, and required the construction of a dedicated building to house it. Boulton and Watt charged an annual payment, equal to one third of the value of the coal saved in comparison to a Newcomen engine performing the same work.

The field of application for the invention was greatly widened when Boulton urged Watt to convert the reciprocating motion of the piston to produce rotational power for grinding, weaving and milling. Although a crank seemed the obvious solution to the conversion Watt and Boulton were stymied by a patent for this, whose holder, James Pickard, and associates proposed to cross-license the external condenser. Watt adamantly opposed this and they circumvented the patent by their sun and planet gear in 1781.

Over the next six years, he made a number of other improvements and modifications to the steam engine. A double acting engine, in which the steam acted alternately on the two sides of the piston was one. He described methods for working the steam "expansively" (i.e., using steam at pressures well above atmospheric). A compound engine, which connected two or more engines was described. Two more patents were granted for these in 1781 and 1782. Numerous other improvements that made for easier manufacture and installation were continually implemented. One of these included the use of the steam indicator which produced an informative plot of the pressure in the cylinder against its volume, which he kept as a trade secret. Another important invention, one which Watt was most proud of, was the parallel motion which was essential in double-acting engines as it produced the straight line motion required for the cylinder rod and pump, from the connected rocking beam, whose end moves in a circular arc. This was patented in 1784. A throttle valve to control the power of the engine, and a centrifugal governor, patented in 1788, to keep it from "running away" were very important. These improvements taken together produced an engine which was up to five times as efficient in its use of fuel as the Newcomen engine. Because of the danger of exploding boilers, which were in a very primitive stage of development, and the ongoing issues with leaks, Watt restricted his use of high pressure steam – all of his engines used steam at near atmospheric pressure.

### Copying machine

Before 1780 there was no good method for making copies of letters or drawings. The only method sometimes used was a mechanical one using linked multiple pens. Watt at first experimented with improving this method, but soon gave up on this approach because it was so cumbersome. He instead decided to try to physically transfer some ink from the original to another sheet of paper which was thin enough for the ink to go through to the other side, thus reproducing the writing exactly. Watt started to develop the process in 1779, and made many experiments to formulate the ink, select the thin paper, to devise a method for wetting the special thin paper, and to make a press suitable for applying the correct pressure to effect the transfer. All of these required much experimentation, but he soon had enough success to patent the process a year later. Watt formed another partnership with Boulton (who provided financing) and James Keir (to manage the business) in a firm called James Watt and Co. The perfection of the invention required much more development work before it could be routinely used by others, but this was carried out over the next few years. Boulton and Watt gave up their shares to their sons in 1794. It became a commercial success and was widely used in offices even into the twentieth century.

*(To be continued)*



## FORMER FOREIGN SECRETARY A.P. VENKATESWARAN PASSES AWAY

(2<sup>nd</sup> September 2014)

Bangalore / New Delhi, DHNS: Former Foreign Secretary A.P. Venkateswaran passed away in Bangalore on Tuesday afternoon after brief illness.

The 82 year old resident of BTM Layout in Bangalore breathed his last at a private hospital around 2 pm, said a source close to the family. Venkateswaran is survived by his wife and daughter.

Former Indian ambassador to China and France CV Ranganathan told Deccan Herald that Venkateswaran was currently the chairman of the Bangalore – based Asia Centre, which seeks a promote political, economic, technological, cultural and social exchanges with Asian countries.

“Venkateswaran was a brilliant Indian Foreign Service officer who rose to become the foreign secretary,” he remarked. Venkateswaran had an illustrious career in Indian Foreign Service, but it was his unceremonious exit from the office of the foreign secretary in 1987 that remained unforgettable in the Ministry of External Affairs.

He resigned on January 21, 1987, after the then prime minister Rajiv Gandhi made public his displeasure with the top diplomat at a press conference in New Delhi. “You will be talking to a new foreign secretary soon,” Gandhi told a Pakistani journalist, who had pointed out contradictions in his and Venkateswaran’s statements about the possibility of his visit to Islamabad.

Gandhi was apparently unhappy as Venkateswaran had told a news conference in Islamabad about a month ago that the prime minister would visit different Saarc countries, including Pakistan. When he was asked about his plan to visit Pakistan, Gandhi replied in the negative, apparently in view of the tense relations between New Delhi and Islamabad those days. This prompted journalists to point out the contradiction between the statements. Venkateswaran was also present when Gandhi was interacting with the journalists. He was shocked and resigned from the Indian Foreign Service the same day.

The ace diplomat, however, had an illustrious career spanning over 35 years before the unceremonious end. He joined the foreign service in 1952 and was sent to Oxford University to study international law. He also studied Slavonic and East European affairs at the university College London from 1953 to 1954.

He was first posted at the Indian Embassy in Prague from 1955 to 1957. He subsequently served as the consulate general of India in New York before being sent to Addis Ababa as the first secretary to the Indian Embassy in the Ethiopian capital in 1959. He was in the MEA headquarters as deputy secretary from 1962 to 1964. He served in the Indian missions in Moscow and Bonn between 1964 and 1969, before being appointed New Delhi envoy to Fiji. He again went to study at Harvard University between 1974 and 1975. Venkateswaran was appointed India’s ambassador to the United States in August 1975. He was India’s permanent representative to the United Nations offices in Geneva from 1980 to 1982, and was later sent to Beijing as New Delhi’s envoy to China.

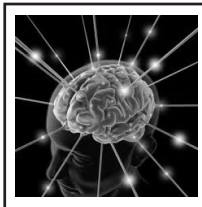
*Courtesy: Deccan Herald (Bangalore); dt: 03.09.2014*



## POWER YOUR MIND

### GOD SURELY COMES

God surely comes  
Not to him who wants  
But to him who struggles  
Not to him who shouts  
But to him who yearns  
Not to him who sleeps  
But to him who is awake.

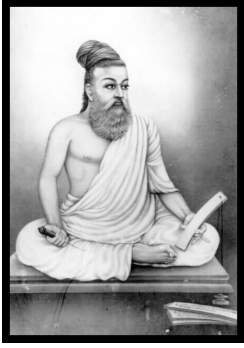


*Courtesy: Swami Srikantananda*

### SERVE MAN AS GOD

Where do you go in search of God  
He is here in the midst of all.  
Open your eyes  
And give them a call  
Come, come Oh living gods on earth  
Please accept my gift small.

## TIRUKKURAL AND MANAGEMENT IN A 'NUTSHELL' - 17



In the competitive World of Business today, Leadership Qualities and Resolve and carrying the Team along are very important aspects to carry out the Plans and keep progressing.

Tiruvalluvar deals with these aspects and stresses these points clearly in some of the Kurals. 3 such Kurals are chosen from the Chapter or "Adhikaram" dealing

with Leadership in Execution of Plans.

In the first one, Valluvar brings out the need for determination and not to get panicky while in progress with the Business Plan.

*Arumai Udaithuenru Asaavaamai Vendum  
Perumai Muyarchi Tharum Kural 611*

அருமை உடைத்துஎன்று அசாவாமை வேண்டும்  
பெருமை முயற்சி தரும். குறள் 611

"Shrink not from any work saying it is impossible, for labour will give the strength to achieve anything".

In the second Kural chosen here, he stresses the need to carry on and proceed to complete the Plan or the

Project, as it is only the successful completion and the results that will be finally judged. This certainly requires contingency planning which should always be ready.

*Vinaikkan Vinaikedal Ombal Vinaikkurai  
Theerndharin Theerndhanru Ulagu Kural 612*

வினைக்கண் வினைகெடல் ஓம்பல் வினைக்குறை  
தீர்ந்தாரின் தீர்ந்தன்று உலகு. குறள் 612

"Beware of leaving any work unfinished; for the world careth not for those that do not complete the work that they have once begun".

In the third Kural chosen, Valluvar brings out the importance of total involvement of the Leader and of the Team and the collective contribution, to achieve which the Leader must continuously solve the problems and sufferings of the team members.

*Inbam Vizhaiyaan Vinaivizhaivaan Thankelir  
Thunbam Thudaituoonrum Thoon Kural 615*

இன்பம் விழையான் வினைவிழைவான் தன்கேளிர்  
துன்பம் துடைத்துஊன்றும் தூண். குறள் 615

"The man who loveth not pleasure but loveth work, should be a pillar of strength unto his team members and wipe out their problems and sufferings".

## HOME FESTIVALS

### Aippasi(October/November)



Skanda shasti is the first festival of this month(right), commemorating the victory of Lord Murugan over the demon Sura, of the higher, spiritual self over the lower nature. Dipavali is the major event of Aippasi,

celebrated everywhere Hindus live and by Buddhists and Jains, too. In one story of its origins, Vamana, the dwarf avatar of Lord Vishnu, requests the amount of land from King Bali that he can cover in three steps. Granted the request, Vamana covers with his first step all of the Earth, with the second all of the sky, and then asks the king where to take the third step. The king offers his own head (lower left), and in commemoration of the king's humility, the day was established. In another story, Lord Vishnu (center) kills the demon Naragasvaran with His discus. The various observances (lower right) of Dipavali include an oil bath, gifts of new clothes, fireworks (sufficiently indulged in Chennai to rattle dishes off the kitchen shelves), oil lamps for display and abundant pots of delicious food. The early morning bath is always considered to be in the Ganga itself, so one greeting of the day is, "Did you have the Ganga bath?" (To be continued)

**The whole world is one drama. God is the script writer. - H.H. Shri Paramacharya**





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**Steinbeis Solar  
Research Centre**

**V**ie Soleil Engineers Pvt Ltd, is a sister concern of Velohar Infra Private Limited, thus establishing a combined experience of 15 years in the clean energy sector. As a turnkey EPC company we specialize in the engineering, design and manufacturing of solar energy products and systems.

Our vision is to contribute 100 MW to the nation through solar rooftop, power parks and solar products. As a company we strive towards excellence in everything we do. We expect and value those that take this approach and will recognize and promote them accordingly.



**W**e have designed and developed several rooftop solar projects ranging from 1kW to 100kW. Some of the notable projects in

South India include

- 60kW Grid Interactive plant at Pioneer Inc, Chennai
- 30kW Grid Interactive plant at Le Palace, Chennai
- Design consultancy for a 100kW rooftop plant at an International School, Chennai
- Supply and installation of 53 Nos of Street lights at Swan Lake, Puruvankara.
- A 100kW BOOT model project at an university in Meerut.
- Development of a 10 MW grid connected project in Assam

**W**e have technical tie up with Steinbeis, a German organization involved in promoting solar research activities and Technological Transfers. The joint activities pursued are

- Development of Indigenous solar String Inverter, cost effective combiner box and family of structures.
- Financing solar projects with attractive PPA ranging from 20kW to 500kW through BOOT Model.
- Conducting In house Training Programs for solar EPC companies.



With 450 kW of rooftop projects and 50MW of Grid connected projects in pipeline, VieSoleil aspires to be a leader in the solar field in the fore coming years. Through SSRC, we also aim to reach at a global level to seek technical assistance and endeavour to contribute to the world's energy needs.