

# The Institution of Engineers (India)

## TIRUCHIRAPPALLI LOCAL CENTRE

BHEL Main Office Road, Tiruchirappalli – 620 014

# NEWS LETTER

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### EDITORIAL NOTE

Dear Readers

On behalf of the Board of Institution of Engineers, Tiruchirappalli local Centre, it is a great pleasure to greet you all through this Issue 12 of the News Letter. This new letter brings you the various activities organized by IEI TLC, especially technical seminars in the emerging field with eminent speakers.

The IEI team was efficiently working towards the development of IEI TLC chapter and also to initiate more IEI activities various thrust areas. The IEI TLC committee meeting was regularly conducted to discuss about the activities organized by IEI Centre.

This newsletter has many interesting articles delivered by guest speakers on emerging topics like under the leadership of Er. N.Rajasekaran, on Future Electric vehicles, Conserve energy saves for the future, and Living in nature versus Living with nature.

Thank You

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### THE TEAM

#### Editors

Er.R.Selvaraj MIE

Dr.Ravimaran MIE

Dr.S.Titus MIE

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Er. N.Rajasekaran FIE

#### Hon. Secretary

Dr. Kevin Ark Kumar, MIE

#### Joint Secretary

Er.S.P.Lakshmanan MIE

#### Joint Secretary

Dr.P.R.Venkateswaran MIE

### Important Communication from IEI

The 36th Indian Engineering Congress held in physical mode at Vigyan Bhawan, New Delhi during 26-28 December 2021 on the theme "Engineers for Viable Technology and \$5 Trillion Economy". Er.N.Rajasekaran, Chairman-IEI, Tiruchirappalli Local Centre & Deputy General Manager (Retd) Bharat Heavy Electricals Ltd, Tiruchirappalli, given keynote address on 07.12.2021 on "National Innovation Day" celebration.



## About IEI Tiruchirappalli Local Centre (TLC)

The Institution of Engineers (India) or IEI is the largest multidisciplinary professional body that encompasses 15 engineering disciplines and gives engineers a global platform to share professional interest. Tiruchirappalli Local Centre of the Institution of Engineers (India) is located in Bharat Heavy Electrical Limited (B.H.E.L.) factory campus, Tiruchirappalli. Tiruchirappalli Centre was inaugurated in the year 1973.

Technical lectures are being conducted every week covering all branches of engineering. The new committee was constituted from 1<sup>st</sup> November 2021 under the chairmanship of Er.N.Rajasekaran, and leadership of Dr. Kevin Ark kumar Hon Secretary, Er.S.P.Lakshmanan Joint Secretary and Dr.P.R.Venkateswaran Joint Secretary.

## Guest Lecture Given by IEI Chairman, TLC:

The Institution Innovation Council of K.Ramakrishnan College of Engineering organized “**National Innovation Day**” on 07.12.2021. The chief guest **Er.N RAJASEKARAN**, Chairman -The Institution of Engineers (India), Tiruchirappalli Local Centre & Deputy General Manager (Retd) Bharat Heavy Electricals Ltd, Tiruchirappalli – 620 014. **Er.N RAJASEKARAN**, Chairman –IEI, Tiruchirappalli Local Centre & Deputy General Manager (Retd) Bharat Heavy Electricals Ltd, Tiruchirappalli addressed the students about the Innovation, Startups and Entrepreneurs. He has explained briefly about the Innovations with so many practical examples and problems which they have solved in BHEL. The students and faculty members were more benefited and enjoyed the session and it was interesting and motivational session to all Engineering students.



# Technical activities carried out by Tiruchirappalli Local Centre

Name of Centre / Overseas Chapter:		TIRUCHIRAPPALLI LOCAL CENTRE	
Title of Activity:		Future of E - vehicles	
Activity under Divisional Board		Electrical & Electronics Engineering	
Date:	07-12-2021 at 5.30 p.m.	Mode:	Online-Zoom

No. of Participants : 50

**Speaker :**

**Mrs S Rakkammal,**  
HOD, Department of Electrical & Electronics Engineering,  
MAM College of Engineering & Technology,  
Tiruchirappalli.



The Tiruchirappalli Local Centre of The Institution of Engineers (India), organized a lecture on 07<sup>th</sup> December 2021 at 5.30 pm through virtual mode. **Mrs S Rakkammal**, HOD, Department of Electrical & Electronics Engineering, MAM College of Engineering & Technology, Tiruchirappalli. delivered the lecture on the Topic **“Future of E - vehicles”**. More than 50 participants have attended the online programme. Er. N. Rajasekaran, Chairman, Tiruchirappalli Local Centre of IEI presided over the event and welcomed the gathering. Er. S. Samidas, Past Chairman introduced the speaker to the audience. Dr. S. Dharmalingam Past Chairman of IEI Tiruchirappalli Local Centre proposed the vote of thanks. Er. R. Selvaraj, Past Chairman conducted the proceedings.

### Challenges in Indian EV Industry

- The average on-road price of electric vehicles in India is not attractive enough for consumers.
- Inadequate charging infrastructure.
- Reliance on battery imports.
- Range anxiety among consumers.
- Inadequate electricity supply in parts of India.
- Lack of quality maintenance and repair options.
- Changing the mindset of consumers, i.e. adopting to a new technology.

Mrs.S.Rakkammal, Head of Department, Department of Electrical and Electronics Engineering, M.A.M. College of Engineering and Technology, Srirangam, Tiruchirappalli - 621 105.

### Types of electric cars

- BEV** - This means the car runs purely on electricity and gets all its power when it's plugged in to charge. This type doesn't need petrol or diesel to run so doesn't produce any emissions like traditional cars.
- Plug-in hybrid** - These cars mainly run on electricity but also have a traditional fuel engine so you can use petrol or diesel too if they run out of charge. When running on fuel, these cars will produce emissions but when they're running on electricity, they won't. Plug-in hybrids can be plugged into an electricity source to recharge their battery.
- Hybrid-electric** - These run mainly on fuel like petrol or diesel but also have an electric battery too, which is recharged through regenerative braking.
- switch between using fuel engine and using "EV" mode at the touch of a button. These cars cannot be plugged into an electricity source and rely on petrol or diesel for energy.

Mrs.S.Rakkammal, Head of Department, Department of Electrical and Electronics Engineering, M.A.M. College of Engineering and Technology, Srirangam, Tiruchirappalli - 621 105.

- Brushless DC motor (BLDCM)
- Permanent magnet synchronous motor (PMSM)
- AC Induction motor (ACIM)
- Interior Permanent magnet motor (IPMM)
- Permanent magnet switched reluctance motor (PMSRM)

01.12.2021 Mrs.S.Rakkammal, Head of Department, Department of Electrical and Electronics Engineering, M.A.M. College of Engineering and Technology, Srirangam, Tiruchirappalli - 621 105.

### Degrees of Hybridization

The vehicle is a ...

If it...	Mild Hybrid	Light Hybrid	Full Hybrid	Plug-in Hybrid
Automatically stops/starts the engine in stop-and-go traffic	Yes	Yes	Yes	Yes
Uses regenerative braking and recovers above 40% of its energy	Yes	Yes	Yes	Yes
Uses an electric motor to assist a combustion engine	Yes	Yes	Yes	Yes
Can drive at times using only the electric motor	No	No	Yes	Yes
Recharges batteries from a wall outlet for extended all-electric range	No	No	No	Yes

Mrs.S.Rakkammal, Head of Department, Department of Electrical and Electronics Engineering, M.A.M. College of Engineering and Technology, Srirangam, Tiruchirappalli - 621 105.

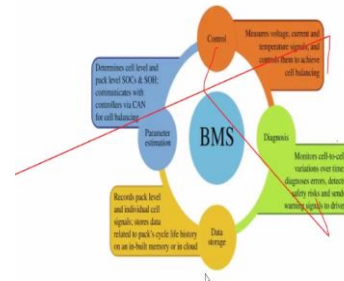
### What India needs to focus on to boost EV Industry

- India must develop strong Research and Development (R&D) capacity leading to commercialization in Electric vehicle ecosystems keeping in mind 'Make in India' goal.
- Rolling out incentives to the consumers for purchasing EVs as well as to the manufacturers/traders in the form of tax benefit/tax discount.
- The charging infrastructure should be rapidly developed. Installation of chargers should be allowed on street parking, parking lots and any public charging space.



Mrs.S.Rajkumar, Head of Department, Department of Electrical and Electronics Engineering,

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Mrs.S.Rajkumar, Head of Department, Department of Electrical and Electronics Engineering, M.A.M. College of Engineering and Technology, Tiruchirappalli - 612 002.

## The Tiruchirappalli Local Centre is planning to conduct the weekly lecture programme on every Tuesday evening by Hybrid Mode from Jan 2022 onwards, subject to the guidelines of Govt. of Tamil Nadu.


### Technical Write up On “The Future of E-Vehicle”

In recent years, about a century after reaching their first prime in the early 1900s, electric vehicles (EVs) have received growing attention again. Politicians in various countries have recognized EVs as a promising technological alternative to fossil fuel driven cars in combating global warming. However, for a broader market penetration considerable barriers have to be removed. The most important are high investment costs and low driving ranges, both caused by the major weakness of EVs—their battery. Electric Vehicles have not yet reached a point where they are common technology. We are currently a nation that is centered around a divasting technology that has little benefit for the future.

For the past century electric vehicles have remained out of the market due to a lock-in that the internal combustion engine created. Furthermore, in order for electric vehicles to be successful they must break this lock-in. For this to happen, changes have to occur within three different aspects: the national system of innovation in our country, the supply of technology and the demand for that technology .The costs related to it are still high for people to want to buy into it. Furthermore, many of the attributes that people want in a car are not being delivered by the electric vehicle firms. In order to increase the supply and create scale economies and learning by doing someone needs to invest in the technology. In my paper I outline a couple of different sources. Firstly there is a direct way to deliver the technology. This is through venture capital firms, universities or government investment. Other method to supply technology is through indirect sources or spillover from related fields. Possible sources of this could be from the military, space program or niche markets. Niche markets are places where electric vehicles would be used because they solve transportation requirement better than gas-powered vehicles. The next area we looked at was the demand for electric vehicles.

Currently people’s preferences make them better off using the current technology. A larger environmental awareness and concern is key for getting people to switch. The demands that people have are for electric cars to be used sometimes, like short-range travel. In this sense hybrid cars might be a perfect way to move people towards electric vehicles. In general, the demand is not there for electric cars yet.

**EVENT:2**

Name of Centre / Overseas Chapter:		<b>TIRUCHIRAPPALLI LOCAL CENTRE</b>	
Title of Activity:		<b>Energy Conservation Day Theme: Conserve Energy Save the Future</b>	
Activity under Divisional Board		<b>Statutory day</b>	
Date:	<b>14-12-2021 at 5.30 p.m.</b>	Mode:	Online–Zoom
<b>No. of Participants : 25</b>			
<b>Speaker :</b> <b>Dr. J. Sathiyarayan, MIE.,</b> Senior Section Engineer, Golden Rock Railway Workshop, Tiruchirappalli.			

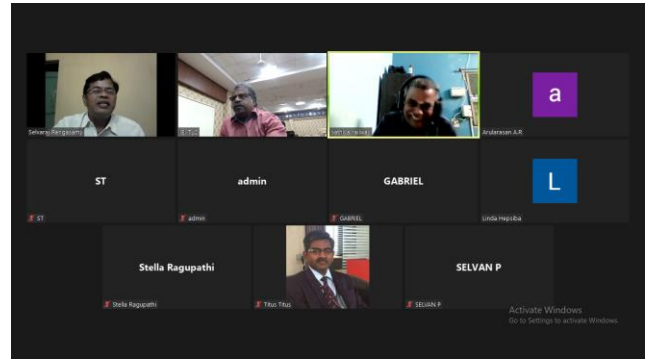
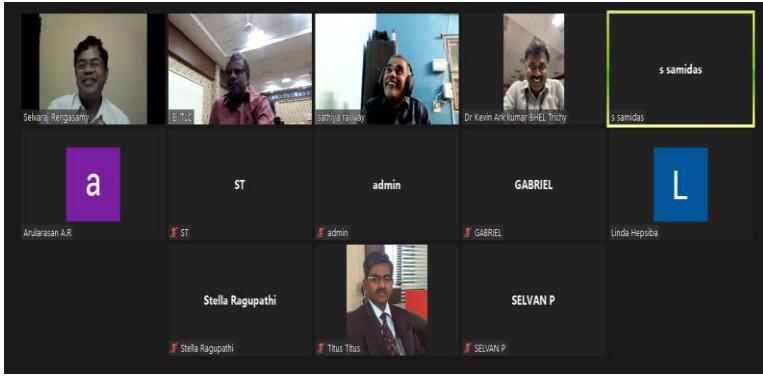
The Tiruchirappalli Local Centre of The Institution of Engineers (India), celebrated the Energy Conservation Day 2021 with a lecture programme on the theme “**Conserve Energy Save the Future**”. **Dr. J. Sathiyarayan, MIE.,** Senior Section Engineer, Golden Rock Railway Workshop, Tiruchirappalli, delivered the theme talk. More than 25 participants have attended the online programme. Er. N. Rajasekaran, Chairman, Tiruchirappalli Local Centre of IEI presided over the event and welcomed the gathering.

In his address, Er. N Rajasekaran explained the importance of energy saving to save the planet earth. He also said, “Energy savings efforts are not to bring profit alone, but it is for the profit of all living things in the world. Restoring the ecological balance with zero emissions are the only way to save living things and to maintain the ecological balance”.

During the lecture Dr Sathiyarayan said, “Energy efficiency should be measured not only on electrical power savings but also on TOE. TOE is nothing but the Tonne of Oil Equivalent (TOE). It is a unit of energy defined as the amount of energy released by burning one tonne of crude oil. It is approximately 42 gigajoules or 11.630 megawatt-hours, although as different crude oils have different calorific values, the exact value is defined by convention; several slightly different definitions exist”.

He also explained about the energy losses due to idle running and keeping the gadgets in ON condition when not in use. That amount of energy is being wasted without any realization. He also advised the participants to keep the gadgets in off condition to avoid higher electricity bills and it is one of the ways to contribute energy savings by households”.

Er. S. Samidas, Past Chairman introduced the speaker to the audience. Dr. S. Titus Committee member of IEI Tiruchirappalli Local Centre proposed the vote of thanks. Er. R. Selvaraj, Past Chairman conducted the proceedings. Dr. Kevin Ark Kumar, Hon. Secretary graced the occasion.



### Definition of Energy Management

Energy Management is defined as "The strategy of adjusting and optimizing energy, using systems and procedures so as to reduce energy requirements per unit of output while holding constant or reducing total costs of producing the output from these systems"

### Sector wise Energy Consumption

Type of Consumer	Percentage of Consumption
Agricultural	5
Industry	49
Transport	22
Residential	10
Others	14

### Energy Law/Basics

- Energy is defined as the ability or the capacity to do work. Energy exists in several forms such as heat, kinetic or mechanical energy, light, potential energy, electrical or other forms.
- For example, two billiard balls colliding, may come to rest, with the resulting energy converting to sound and perhaps a little bit of heat, at the point of collision

I Law- Law of Conservation  
Energy can be neither created nor destroyed. It can be transformed from one form into another form. Total **quantity** of energy in the universe remains constant

II Law (Entropy)-Law of degradation  
Entropy is a measure of disorder or uncertainty about a system. The **quality** of this energy is degraded irreversibly.

**BUT ENERGY CAN BE WASTED**

### Energy Conservation in Distribution Transformers

- Use of energy-efficient transformers (amorphous-core transformers(Fe, Ni, and Co and a metalloid or glass former such as silicon, boron, or carbon, lowest core loss) to reduce no-load losses. Typical core-loss savings are illustrated below:

Transformer Capacity	Losses with silicon steel	Losses with amorphous metal
25KVA	100W	25W
63KVA	180W	45W
100KVA	260W	60W
1000KVA	2600W	600W

### ENERGY EFFICIENCY

- Energy efficiency is the practice of using less energy to provide the same amount of useful output from a service (Tungsten, CFL, LED)
- Energy efficiency is "one of the easiest and most cost effective ways to combat climate change, clean the air we breathe, improve the competitiveness of our businesses and reduce energy costs for consumers."
- Either by cutting the wastage or by introduction of new technology
- Examples are Use of LED lights, star rated fans, inverter AC plants

### When the motor starts at full load and runs at < 40 % loading, this low cost Automatic Delta to Star controller helps to achieve energy savings from 5 to 30 %

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**Technical Write up on "ENERGY CONSERVATION DAY PRESENTATION"  
TITLE: CONSERVE ENERGY AND SAVE THE FUTURE,**

The presentation contained slides starting from self-introduction giving details of presenter, the presentation structure, various terms used in the field of energy with their definition and difference, between them, tips for energy conservation in home and industries and specific ways to conserve energy in industrial machineries such as compressors, diesel generators, lighting system, etc.


Starting with Energy Basics & Laws, various types of energies available viz mechanical, thermal, chemical etc. were explained. In the next slides briefly talked about the difference between energy efficiency, energy audit and energy management. The term **toe** was explained in brief with conversion factors to convert other energy units as **toe**.

Sector wise possible energy consumption and possible energy saving percentage in those sectors were briefed. As a whole in the country the possibility of energy saving and gains that can be obtained by energy conservation methods were explained. Carbon emission quantity due to use of various energy sources and ways to follow to reduce emission by cutting the wastages were elaborated. Then spoke about various types of energy audits followed industries and conducting procedures of such audits .

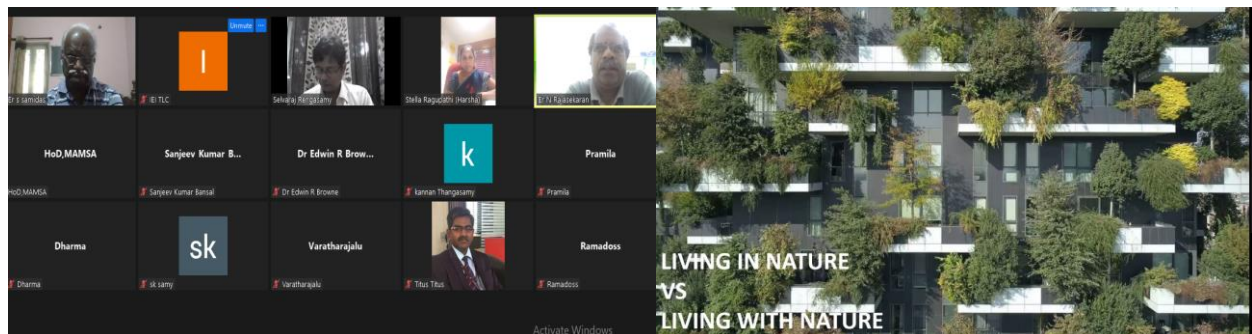
The tariff chart followed by TANGEDCO for homes & industries including penalties for violations was shown. The specific ways to save energy In industrial machineries such as compressors, Diesel Generators, lighting system and water saving methods were explained in detail. Quantifying of energy wasted due to idle run of utilities at home and financial loss due to above were explained in detail. Then spoke about benchmarking and methods to do benchmarking industries were explained.

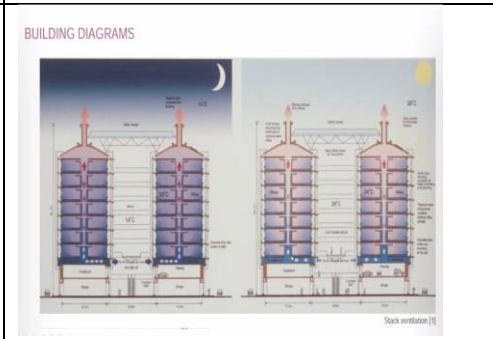
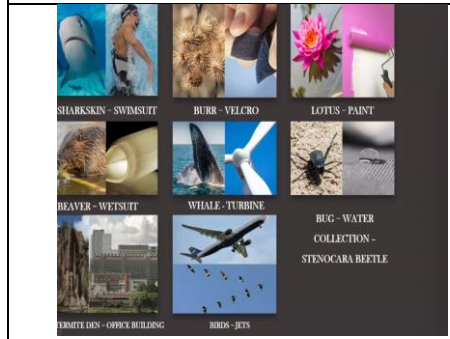
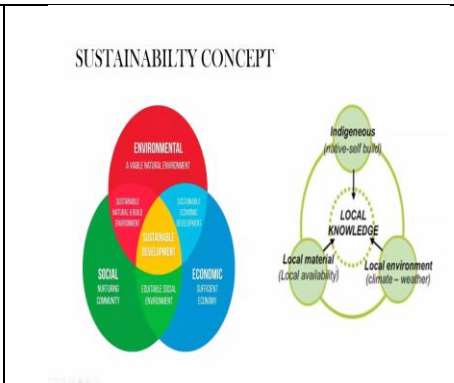
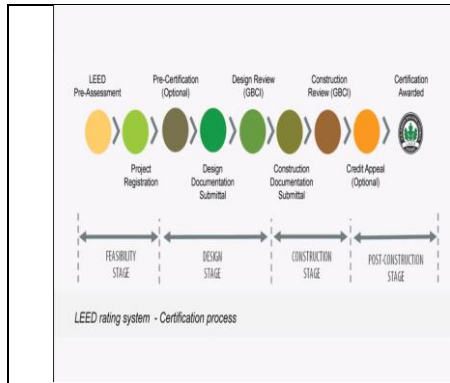
Finally the presentation ended with an interactive session of answering the questions from the audience.

**EVENT:3**

Name of Centre / Overseas Chapter:		TIRUCHIRAPPALLI LOCAL CENTRE	
Title of Activity:		Living in Nature Vs Living with Nature	
Activity under Divisional Board		Architectural Engineering	
Date:	21-12-2021 at 5.30 p.m.	Mode:	Online–Zoom
<b>No. of Participants : 30</b>			
<b>Speaker :</b> Ar. S. Stella Mary, HOD, Department of Architecture, M.A.M School of Architecture, Tiruchirappalli.			

The Tiruchirappalli Local Centre of The Institution of Engineers (India), organized a lecture on 21<sup>st</sup> December 2021 at 5.30 pm through virtual mode. Ar. S. Stella Mary, HOD, Department of Architecture, M.A.M School of Architecture, Tiruchirappalli, delivered the lecture on the Topic “**Living in Nature Vs Living with Nature**”. More than 30 participants have attended the online programme. Er. N. Rajasekaran, Chairman, Tiruchirappalli Local Centre of IEI presided over the event and welcomed the gathering. Er. S. Samidas, Past Chairman introduced the speaker to the audience. Dr. S. Karuppasamy, Past Chairman of IEI Tiruchirappalli Local Centre proposed the vote of thanks. Er. R. Selvaraj, Past Chairman conducted the proceedings.





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**Technical Write up on “Living in Nature VS Living with Nature”**

The comparison of Lifestyle with previous 20 years, comparison of individual family set up in villages and houses lifestyle Tamilnadu and India. The comparison deals with construction of houses with open spaces and Vegetation background. The Timeline development of an individual location will be discussed in presentations. The eye opening of Combined Building Regulations – important regulation standards for a house construction will be discussed in presentation. The concepts of Sustainable buildings will be discussed with GREEN ARCHITECTURE Agencies –LEED, GRIHA. Software and EXAMS for GREEN REATING Agencies. Introduction of Bio mimicry Architecture and Biophilic Architecture. Construction techniques of green terrace section and design works of awardee architects to learn about the design techniques of architecture. The presentation mainly deals with the BIOMIMICRY and BIOPHILIC ARCHITECTURE.





## **Future Events – January 2022**

<b>S. No</b>	<b>DATE &amp; TIME</b>	<b>EVENT TITLE</b>
1	04.01.2021 / 17.30 Hrs.	<b>Know - How of Indian patent system</b>
2	11.01.2021 / 17.30 Hrs.	<b>Deep Learning</b>
3	18.01.2021 / 17.30 Hrs.	<b>Top Trends in Aerospace sector and Smart Technologies</b>
4	25.01.2021 / 17.30 Hrs.	<b>Sustainable Transformation in Manufacturing</b>

**Published by,**

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Tiruchirappalli Local Centre

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