IEI - TLC - NEWS

IN-HOUSE NEWS LETTER OF

THE INSTITUTION OF ENGINEERS (INDIA)

TIRUCHIRAPPALLI LOCAL CENTRE

www.ieitiruchi.org

Issue No. 2018/08-09

IEI - TLC – NEWS Wishes It's Readers

The Institution of Engineers (India)
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Er R Selvaraj FIE.,
Chairman ✆: O: 0431-257-5195, Mob: 9442146623

Er S Lakshmanan MIE.,
Hon. Secretary ✆: O: 0431-257-1901, Mob: 9442113936

"98 Years of Relentless Journey towards Engineering Advancement for Nation Building"

NOTICE FOR 46th ANNUAL GENERAL MEETING

The Business Session of the 46th Annual General Meeting of the Institution of Engineers (India), Tiruchirappalli Local Centre will be held at 17.30 Hrs. on 31st October (Wednesday) at our Institution premises. The Corporate Members of the Local Centre are requested to be present at the meeting and participate in the deliberations.

AGENDA

1. **Welcome address by the Chairman.**
2. **To receive and adopt the Annual report for the year ending March 31, 2018.**
3. **To receive and adopt the Audited Accounts for the year ending March 31, 2018.**
4. **appointment of Auditor for the year 2018-19 and fix his remuneration**
5. **Announcement of Result of the Election of Chairman & Hon Secretary.**
6. **Declaration of the Election result for the New Committee Members.**
7. **Taking over by New Chairman and Hon Secretary.**
8. **New Chairman declaring the new committee members and nominating the candidate(s) for the vacant post(s).**
9. **Address by Incoming Chairman**
10. **Any other points for discussion with the permission of the Chair**
11. **Vote of thanks by the incoming Hon. Secretary**

Tiruchirappalli - 14
4th October 2018

Honorary Secretary

Programme for the 45th Annual General Meeting on 31st October 2017 (Wednesday)

Venue	: Institution Building (BHEL Main Office Road)
Time	: 5.00 PM Flag Hoisting by Chairman, IEI, TLC : 5.15 PM High Tea : 5.30 PM 46th Annual General Meeting

The Institution of Engineers (India)
(ESTABLISHED 1920, INCORPORATED BY ROYAL CHARTER 1935)

REPORT OF THE 45th ANNUAL GENERAL MEETING HELD ON 30.10.2017

The business session of 45th Annual General Meeting of the Institution of Engineers (India), Tiruchirappalli Local Centre was held on 30.10.2017 in the evening hours at Dr. A. P. J. Abdul kalam lecture hall of Institution premises.

The meeting was presided over by Er. R. Selvaraj, Chairman, who welcomed the gathering and conducted the proceedings. In his welcome address, he extended a hearty welcome to the Corporate Members and the Committee Members attached to our Tiruchirappalli Local Centre. He expressed his gratitude for the co-operation extended by the Hon. Secretary, Committee Members of Tiruchirappalli Local Centre in the weekly lecture programmes, during his tenure of his office. The Chairman requested further co-operation from all the committee members, corporate members to increase the strength of the corporate members to our centre to induct at least one hundred members.

Er. S. Lakshmanan, Hon. Secretary presented the Annual Report for the year ending 31.03.2017. and was unanimously adopted by the General Body. Dr. S. Dharmalingam FIE proposed for the approval of the Annual Report and this was seconded by Er. N. Rajasekaran FIE.

Er. S. Lakshmanan, Hon. Secretary presented the Audited Accounts for the year ending 31.03.2017 and sought for the approval. Er. S R Kannan, Corporate Member raised a point that how the accounts can show receivables from EX staff of TLC? On reply from Chairman, the member did not get satisfied and raised a point that pending enquiry at Head Quarters this should not be shown. After detailed deliberations, the accounts are adopted with the assurance from chairman that TLC will contact HQ and will communicate the same of the members through EGM. The adoption was proposed by Dr. G. Swaminathan for approval of the Accounts and seconded by Er. D. Varatharajalu.

Er. S. Lakshmanan, Hon. Secretary moved the proposal to appoint M/s Ponraj &Co, Diamond Jubilee Building, Cantonment, Tiruchirappalli-620001 as auditor for the financial year 2017 - 2018, at a remuneration of Rs. 7500/- (Rs. Seven thousand five hundred only). The AGM unanimously approved the proposal. It was proposed by Er. R. Sivaramakrishnan and was seconded by Dr. N. Kumaresan FIE.

In his vote of thanks Er. S. Lakshmanan, Hon. Secretary conveyed his thanks to Chairman for giving him enough freedom to complete his duties and to each and every Committee Members who had extended full cooperation during the year. He thanked BHEL Management for the support it has been extending to our Local Centre for all its activities. He thanked the office staff Mr. P. Marimuthu & Ms. S. Muthalaki for their active co-operation in completing the official duties. He once again thanked all the Committee members and corporate members for their cooperation.

Sd/-

HON. SECRETARY

CHAIRMAN SPEAKS.....

Dear Engineers,

Warm & Best Greetings to all.

Very happy to meet all of you through our IEI-TLC E Newsletter.

It is a great pleasure for me to appreciate that the editorial team of IEI-Tiruchirappalli Local Centre in bringing out the thirteenth issue by taking lots of initiatives.

From April 2018 up to 09th October 2018, so for we have conducted & covered the following Seven engineering disciplines technical programmes. (I.e.) Civil Engineering, Computer Engineering, Electrical Engineering, Mechanical Engineering, Production Engineering. Environmental Engineering, Metallurgical & Materials Engineering and General & Inter Disciplinary area. So for we have covered about 30 Technical programs from April 2018 up to 09th October 2018.

We have conducted the 51st Engineers Day at our Institution Premises with more than 225 members' participation which was conducted in a Grand Manner.

We have also celebrated the following Statutory days, (1) World Telecommunication and Information Society Day. (2) World Environment Day. (3) Royal Charter Day. (4) World Habitat Day apart from (5) 51st Engineers Day. I request all the members to attend the forth coming technical programs & get benefitted.

We are motivating our Technicians & Senior Technicians to form study circles & promote our AMIE Studies. We extend all our support for the same.

I request all our members to motivate new members to join our IEI to increase our strength.

Our Beloved Engineer T. M. GUNARAJA got elected as President of IEI for the Session 2018-2019 at the 702 Council Meeting Held at Goa on 22nd September 2018.

He will assume the office of President at the 99th AGM of the Institution to be held at Udaipur on 22nd December, 2018.

We from IEI – Tiruchirappalli local centre wish him all success to take our IEI to Greater Heights.

A full pledged Library for our IEI- TLC is under construction.

Our Beloved IEI President Er Sisir Kumar Banerjee FIE and the Executive Director of BHEL – Tiruchirappalli Complex Er R. Raja Manohar FIE have unveiled the foundation stone in the presence of Dr P. Rajamani FIE on August 30, 2018

For the members of IEI-TLC who are regularly visiting our institution, A Renovated & Modified toilet is under construction which shall be shortly opened.

We solicit your support to make our local centre to be the best Centre to disseminate the Engineering knowledge to this part of our country.

My Advance Wishes to You & Your Family for a Happy Deepavali.

With Best Wishes .

(R. SELVARAJ)

SECRETARY'S DESK.....

Dear Member,

Warmest Greetings to you and your family.

SPIRITUAL INTELLIGENCE

Being Spiritual: To be 'spiritual' is to think, act and interact from an awareness of self as spirit not form, soul not body. Most of us are taught to believe we are our physical forms, and so we identify with our body or the labels we give to our bodies such as nationality, race, gender, profession etc. This is limited sense of self is what creates all fear, anger and sadness in life. From a spiritual point of view these emotions are always the result of ego (misidentification), which then blocks access to our true spiritual nature which is peaceful, loving and joyful.

Having intelligence: Intelligence is to use what we know in the right way at the right time in the right place with the right intention. For example, if we 'know' ourselves as a spiritual being we will also 'know' that we do not own or possess anything. When something in our life is damaged or lost, it does not affect us in any way - we are able to use our spiritual power to accept and move on. If someone praises the clothes we wear, or insults us in any way or comments negatively about our looks, we are NOT affected because we 'know' that our real beauty lies within our character, within our nature, which no one can ever take away. In that moment we draw on the inner power of that knowledge and use it to remain stable in the face of others negativity. In effect we are drawing on our spiritual strength which is only released when we know who and what we are, and then using that strength in the right way, in the right place at the right time.

Difference between spiritual intelligence and spirituality: Spirituality is to 'know' who we are and Spiritual Intelligence is to 'realize' who we are and to live life in that awareness. We have always been who we are and, in truth, we can never be other than who we are, but it requires 'realization' i.e. that moment when we 'see it', when we 'get it' and then we 'be it'.

Spirituality is the knowledge of ourselves as spirit / soul, and the understanding of our highest spiritual qualities and attributes, which are love, peace, purity and bliss. Spiritual Intelligence is the expression of these innate spiritual qualities through our thoughts, attitudes and behaviors. Being spiritual means the ego has dissolved, virtue has been restored to character and spiritual values connect our inner and outer worlds (thought to action). It is the ability to see every other human being as soul / spirit, and thereby transcend all the false identities of race, color, gender, nationality, profession and religion. It is in this awareness that we are then able to recognize and connect with the Supreme Power.

With Warm Regards,

(S. Lakshmanan)

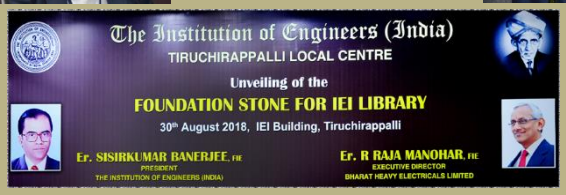
Er. SISIR KUMAR BANERJEE

PRESIDENT, IEI

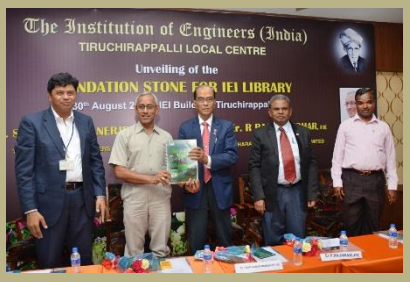
VISITED

IEI TLC

On 30th August 2018, our beloved President, Er. Sisir Kumar Banerjee visited IEI TLC and laid Foundation Stone in the august Presence of Er. R Raja Manohar, Patron of IEI TLC and Executive Director of BHEL and Er. Rajamani, Vice President (IEI).




TIRUCHIRAPPALLI LOCAL CENTRE
Unveiling of the
FOUNDATION STONE FOR IEI LIBRARY
30th August 2018, IEI Building, Tiruchirappalli


The Institution of Engineers (India)
TIRUCHIRAPPALLI LOCAL CENTRE
Unveiling of the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Unveiling of the
FOUNDATION STONE FOR IEI LIBRARY


The Institution of Engineers (India)
LOCAL CENTRE
Unveiling of the
FOUNDATION STONE FOR IEI LIBRARY
30th August 2018, IEI Building, Tiruchirappalli
R RAJA MANOHAR, FIE

Er. Sisir Kumar Banerjee, President, IEI visited the Tiruchirappalli Local Centre on 30th August 2018 and laid foundation stone to the new library at the centre's premises. Er. P. Rajamani, Vice President accompanied the president during his visit.

Er. R Selvaraj, Chairman IEI along with the committee and past chairmen of the centre accorded a warm reception at the institute complex. Er. R. Raja Manohar, Executive Director of BHEL Tiruchirappalli Complex joined with the president during the occasion. On arrival both the dignitaries garlanded the statue of Sir. Visvesvaraya and proceeded to lay the foundation stone for the Library. After unveiling the foundation stone plaque, the president addressed the members. During his address he said, "The Howrah bridge which consumed 26,500 tonnes of steel is made of 23,000 tonnes from Tata Steel. A committee under the Chairmanship of Sir R. N. Mukherjee, the former President of IEI recommended a suspension bridge to be built across the River Hoogly. The fabrication and erection of this challenging work was done by a local engineering firm known as the Braithwaite, Burn & Jessop Construction Co. This is one of the testimony for the capabilities of Indian Engineering for over 7 decades". He also said, "For accelerated growth India should ensure more active interaction between the industry and institutes. IEI is working to develop a platform to address the expectations of the industry in the curriculum for engineering. IEI is going to organise Industry – Institute meets in five regions across the country to bring the major industries and the institutes".

Speaking on the occasion, Mr. R Raja Manohar said, "the IEI Tiruchy is conducting knowledge dissemination programmes on every Tuesday evening. These programmes are more useful to the practicing engineers and the students aspiring to become engineers."

Addressing the gathering, Er. P Rajamani, vice president hoped that the Library will be useful to the students who are studying engineering. He also said, "IEI Tiruchy can take up more technical programmes by enrolling more members from the engineering fraternity." Earlier, Er R Selvaraj, Chairman of IEI Tiruchy welcomed the gathering. Er. S Lakshmanan, Secretary proposed the vote of thanks.

After the meeting, the president had an interactive session with the committee members of the centre. He advised the committee to look into more avenues to serve the society and to guide the student and technician chapter members to complete their AIE. He also appealed to the committee to arrange for hands on training to the students and technicians in association with the engineering colleges nearby so that they can become full-fledged engineers.

The president was taken around the complex and apprised about the facilities available. He appreciated the upkeep of the complex and focus to keep more neat and tidy. He also visited the Grand Anaicut (DAM) built across river Cauvery, which is the world's first man made dam across a river. Briefing the president, the chairman of the centre Er Selvaraj said, "The dam which was built in 2nd century AD is constructed from unhewn stone spanning river about 329 m long, 20 m wide and 5.4 m high. The dam is still in excellent condition, and supplied a model to later engineers, including Sir Arthur Cotton's 19th century dam across the Kollidam, the major tributary of the Kaveri. The area irrigated by the ancient irrigation network is about 69,000 acres". The president is appreciative of the engineering skills of the ancient people in constructing the dam.

to Er. T M GUNARAJA, President, Elect

Er T M Gunaraja has been elected as the President of The Institution of Engineers (India) for the session 2018-2019 at the 702nd Council Meeting held at Goa on 22nd September, 2018. He will assume the office of President at the 99th AGM of the Institution to be held at Udaipur on 22nd December, 2018.

Er. Gunaraja's association with the Institution of Engineers dates back to the year 1994. He has served the Institution in the capacities of committee Member (1994- 96), Honorary Secretary (1996- 2000) and is currently a council member. He has been instrumental in upgrading the activities of the Tamil Nadu State Centre. He has been prime motivator and supporter of the construction of the guest house from 1998 onwards. He was instrumental in opening the new local centre at Tuticorin. The state centre has always felt his leading presence in several national and international conventions, seminars, lectures and visits. He was the Vice- Chairman for FIB 2000 and currently is a member of the Mechanical Engineering Division Board. He is also a member of the Board of Governors of National Design and Research Forum, Rural Development Forum, a member of the organizing committee for the World congress on Natural Disaster Mitigation February 2004, Press & Publicity, inter- Disciplinary Committee and Sustainable Development Forum. He has elevated to the highest position of the Vice President of the Institution of Engineers (India) during the period 2005- 2006 and Chairman of the Student chapter during 2009- 2010.

He is a member of the academic board of many polytechnics. He is the Founder Chairman of the Institution of Mechanical Engineers- TNSC. The latest of his acclamation is that he has been the recipient of the Meritorious Mechanical Engineering Award awarded at the 19th national Convention OII 19th September 2003 at Neyveli.

Er. T. M. Gunaraja has traversed the globe to associate with technologist's abroad. His unquenchable spirit for fellowship and service has led to his association with many social organizations. The Lions International acknowledges his genius with several International awards. Vast Experience. Leading Presence and Exuberance are his traits. Er. T. M. Gunaraja with his zest to achieve improved efficiency and newer bounds in innovation will contribute significantly towards the Institution of Engineers India scaling new heights.

On Behalf of IEI, Tiruchirappalli Local Centre and its corporate members, we convey hearty congratulations and best wishes to the President Elect. Pray for all success during his tenure and the IEI excel its commitment to the engineering fraternity as a whole.

The Institution of Engineers (India)
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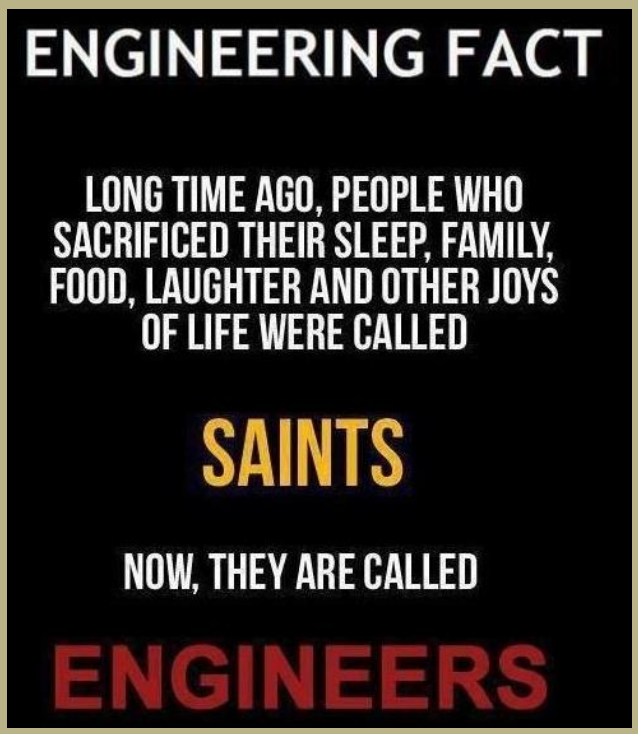

The Institution of Engineers (India)
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September
15

CELEBRATES

Engineers Day 2018


51st Engineers' Day


The Institution of Engineers (India)
TIRUCHIRAPPALLI LOCAL CENTRE
Bharat Ratna Sir M Visvesvaraya Auditorium
51st Engineers' Day
Chief Guest
Dr. Bhimaraya Metri


Dr. Bh
Indian Institut
Er.


TIRUCHIRAPPALLI LOCAL CENTRE
Bharat Ratna Sir M Visvesvaraya Auditorium
51st Engineers' Day
Chief Guest
Dr. Bhimaraya Metri


Dr. Bhimaray


Bharat Ratna Sir M Visvesvaraya Auditorium
51st Engineers' Day
Chief Guest
Dr. Bhimaraya Metri


The Institution of Engineers (India)
TIRUCHIRAPPALLI LOCAL CENTRE
Bharat Ratna Sir M Visvesvaraya Auditorium
51st Engineers' Day

The 51st Engineers' day was celebrated by the Tiruchirappalli Local Centre of the Institution of Engineers (India) to commemorate the birth anniversary of Engineer Sir M. Visvesvaraya, as part of nationwide celebrations.

In the colourful function held at the IEI premises at Tiruchy, Mr. P. Raguraman, general manager, Unit II, BHEL, Tiruchirappalli delivered his presidential address. During his speech he said, "Engineers play a very significant role in every walk of our lives. They convert theoretical knowledge of basic sciences into actual products and thus make our lives easy. Engineers in India contribute greatly to the nation's technological and industrial growth, the role of Engineers in a Developing India is not only diverse but it is also very significant."

The Chief Guest Dr. Bhimaraya Metri, Director, Indian Institute of Management, Tiruchirappalli delivered the Theme address "Digital Transformation – A New Industrial Revolution".

In his address, Mr. Metri showered praises on Sir MV and recalled his great contributions to the country. He called Sir MV as the Economic planner of the country. He said, "Sir MV is the pioneer in project management and a great example for commitment and dedication.

Further he said, "The revolutions in the digital field has created an imbalance in the industry. Since the evolution of smart manufacturing or Industry 4.0, the topography of employable skills are changing. New skill sets are becoming the order of the day. Existing skill sets are becoming redundant to outdated.

Industry 4.0 leads to new opportunities for employment at the same time it disturbs existing jobs. For example, the advent of mobile has affected about 57 jobs in various sectors like banking, photography, etc. E mobility will lead to a drastic reduction in the number of parts in a car which will come down to a 2 or 3-digit figure from the current level of 12000 to 15000. This will create lots of interruption in the supply chain and the existing product portfolios of large, medium and small sectors industry. This will affect the business environment and will increase the strains on all stakeholders. But we could not have any excuses. Industry 4.0 is for moving to next level. It will create a new world which will be amphibious, disruptive and complex.

We are moving driverless cars and even there may be a situation where nobody will own a car but enjoy the luxury of a car by getting cars on demand. People may not be interested in investing upon a car which is used barely 2,5% of our time. Similarly, privacy may become a question mark. The Television at the house may capture all the happenings and the households in the house and that may be beamed to the outside world. Anybody can peep into others private life. Robots can take better decisions than doctors, can argue cases legally better than lawyers and what is impossible today will became possible.

Comparatively small companies will acquire big companies like the cases of TATA acquiring JAGUAR, Arcelar Mittal acquiring Luxemburg, etc.

In the digital era, the complexity of competition has increased in manifold. One cannot know who is and who will be the competitor. The existing lead players will be wiped off from the market by technology. Updation of technology cannot be discreet or selective, it should be seamless and continuous.

In the last to 6 years, Brand India has been built not only due to the effort of the Government but also due to the Indian Business community. In the digital world, team work and team efforts are important for success. One can learn about team work from the Japanese as well as from the Dubbawalas of Mumbai.

Let us the analyse the case of Maruti. There are 12 to 13 auto manufacturers in India in that market segment of Maruti. But at a given period 50% models coming out are from the stable of Maruti. Maruti is practicing team work not only within its campus but also with the external environment also. It is working on Collaboration, Co-operation and Competition. Maruti is purchasing steel with other companies and still it competes with them. We have to learn how to optimise the cost. The vehicle which is transporting the car to dealers' places brings tyres or other components back to Maruti. So there is a need to change our way of doing business in the changing environment.

Proactiveness and foresight to evaluate the emerging markets is another ingredient for success in the digital era. For example, when L & T started its hydro carbon business many thought it was crazy. L & T proved others wrong and hydrocarbon will become a major business to L & T.

The impact of digitalization could be well understood if one could go through the list of top 20 companies in the world. All these companies are having an age of less than 20 only. Even agricultural economy is becoming a knowledge economy.

In the digital era, the companies should invest in people as people makes the difference. India is having potential to become the world leader if we work unitedly".

He appreciated the effort by the Tiruchirappalli Local Centre of the Institution of Engineers (India) for conducting lecture programmes every Tuesday, for the last 26 years as a remarkable achievement. He also said, "the outcome of our activities should create an impact on individual, industry, society and to the public".

Earlier chairman of The Centre, Er. R Selvaraj welcomed the gathering and honoured the past Chairmen and Secretaries of the Centres. Floral tributes were offered to the photo of Sir M. Visvesvaraya by the Chief Guest and other dignitaries including the past office bearers of the centre.

During the occasion, Er. S Siddharth, Dean, Mother Terasa College of Engineering and Technology and the recipient of Young Engineer Award of IEI. The chairman honoured Er. P K Thiagarajan, FIE for getting elected as Chairman of Institution of Valuers and for receiving the Eminent Engineer Award from IEI, Bengaluru.

To motivate the budding engineers, the centre has conducted essay, elocution and quiz competitions for the members of the student chapters as well as for the members of technician and sr. technician chapter of the centre. The top three winners from each chapter were honoured with a certificate and plaque. In total 50 prizes were distributed during the occasion.

Er. R Kumar & Er. D Harsha, past chairmen of the centre, Dr. N Kumaresan, Chairman Elect of the centre and Convener of the celebrations Er. N Rajasekaran offered their felicitations. More than 100 members including Er. S. Samidas, past chairman, Er Salai Kuberan & Er D Varatharajalu, past secretaries, senior members Dr. Anantharaman, Er. Ramadoss, graced the occasion with their august presence. Er. S Lakshmanan Hon. Secretary proposed the vote of Thanks. The function ended with National Anthem.

Royal Charter Day

AT

IEI TLC

On September 09, 2018, the Tiruchirappalli Local Centre of the Institution of Engineers India, celebrated the ROYAL CHARTER DAY with a lecture programme. In the colourful function held at the institute premises, Er. N Rajasekaran, Dy. GM, BHEL, Tiruchy and alumni of IEI, delivered a lecture on "INDIAN ENGINEERING & TECHNOLOGY – THE PAST, PRESENT AND FUTURE AND THE ROLE OF ENGINEERS".

Er. R Selvaraj, Chairman of the local centre welcomed the participants for the function and explained the importance of Royal Charter and its exclusiveness.

In his address, Er. Rajasekaran recalled the contributions of the ancient India in engineering including metallurgical, civil, architecture, aerospace, etc. with examples. He also said, "Inadequate documentation and knowledge dissemination and sharing lead to the disruption of the highest knowledge to the subsequent generations. This can be avoided by encouraging the experts to share their knowledge and skills to the younger generations. IEI TLC can take it as a mission project and conduct free lecture programmes in the engineering institutions including polytechnics and ITIs in and around Tiruchy. The services of eminent engineers who have retired from active services could be utilised for this purpose".

He also traversed back on the history of charters and the uniqueness of the Royal charter status of IEI. He further said, "The British monarchy has issued over 980 royal charters. Of these about 750 remain in existence. Among the past and present groups formed by royal charter are the Company of Merchants of the Staple of England (13th Century), the British East India Company (1600), the Hudson's Bay Company, Standard Chartered, the Peninsular and Oriental Steam Navigation Company (P&O), the British South Africa Company, and some of the former British colonies on the North American mainland, City livery companies, the Bank of England and the British Broadcasting Corporation (BBC). IEI is the only professional body in the country to have this unique distinction".

He thankfully recalled the services of great engineers and technocrats of the independent India for their contributions in increasing the life expectancy after birth, increasing the installed

power utilities from 1362 MW to 335 GW, the achievements in aerospace, communication, electronics, IT, infrastructure, defence, etc.

He lauded the efforts of IEI TLC in disseminating knowledge through weekly lecture programmes and through the newsletter. He also said, "It is confined to the members alone and it can be a motivating tool to make more people to join as members. But taking the technology to the doorsteps of the engineering institutions will enable the students to understand the current trends in addition to their curriculum. This will have wider reach and make them as employable engineers, which is the need of the industry."

Er. S Samidas, past chairman of the centre offered his felicitations. Er. Leelavinothan proposed vote of thanks. Er. S Lakshmanan, Hon. Secretary conducted the proceedings.

IEI TLC CONGRATULATES

Er R Ramdoss

Chairman (Elect)
Tamil Nadu State Centre &

Er P Gomathinayagam

Secretary (Elect)

Visit our Website

http:ieitiruchi.org

and send your feedback to

ieitlc1973@gmail.com

IEI – TLC – NEWS solicits technical articles from members on various topics for publication.

RECENT Lectures

Electric Vehicle Technologies

Division: Electrical Engineering

On 7th August 2018, IEI TLC organized a lecture programme by Er. P. Padmagirisan, NIT, Tiruchirappalli on "ELECTRIC VEHICLE TECHNOLOGIES" at the institute premises.

In the well-attended lecture programme he briefed about the ongoing research works in the emerging technology.

Earlier, Er. N Rajasekaran, Committee member of IEI TLC welcomed the gathering and introduced the speaker. Er. A Leelavinothan, Sr. Member and Alumni of IEI presented the memento to the speaker and offered his felicitations. Er. G Balakrishnan proposed the vote of thanks. Er. S Lakshmanan, Hon. Secretary conducted the proceedings.

Neural Networks and their Applications

Division: Computer Engineering

NEURAL NETWORKS AND THEIR APPLICATIONS was the topic of the lecture delivered by Dr. S. Devi, Professor, Electronics & Communication Engineering, PRIST University, Thanjavur, on 14th August 2018 at IEI TLC premises.

In the lecture programme organized in association with the Computer Society of India, Tiruchirappalli Chapter she briefed as detailed below.

"Neural networks technology is not trying to produce biological machine but is trying to mimic nature's approach in order to mimic some of nature's capabilities. A neural network is a massively parallel distributed processor that has a

natural propensity for storing experiential knowledge and making it available for use. It resembles the brain in two respects:

1. Knowledge is acquired by the network through a learning process and
2. Interneuron connection strengths known as synaptic weight are used to store the knowledge.

The Human Brain is five to six orders of magnitude slower than silicon logic gates. It has 60 trillion synapses or connections. It can be considered as a highly complex, nonlinear, and parallel computer.

Nonlinearity, Input-Output Mapping, Adaptivity, Evidential Response, Contextual Information, Fault Tolerance, Implementability, Uniformity of Analysis and Design and Neurobiological Analogy are the benefits of Neural Network.

The following are the basic types of Neurons.

- A set of synapses or connecting links, each of which is characterized by a weight or strength of its own.
- An adder for summing the input signals, weighted by the respective synapses of the neuron; the operations described here constitute a linear combiner.
- An activation function for limiting the amplitude of the output of a neuron……"

Earlier, Er. S. Madhavan, Former Committee member of IEI TLC welcomed the gathering and introduced the speaker. Er. A Leelavinothan, Sr. Member and Alumni of IEI offered his felicitations. Er. R Selvaraj, Chairman, IEI TLC presented the memento to the speaker. Er. D Senthil kumar, Former Treasurer of CSI Tiruchy proposed the vote of thanks. Er. S Lakshmanan, Hon. Secretary conducted the proceedings.

Applications of Value Engineering in Various Industries

Division: Production Engineering

Er. P. Arjunraj, Manager R & D, Power Train- Research& Development, PSA AV Tech Power Train Pvt Ltd, Hosur made a technical presentation on "APPLICATIONS OF VALUE ENGINEERING IN VARIOUS INDUSTRIES" at the institute premises on 21st August 2018. The excerpts of his lecture are furnished below.

"Value Analysis (VA) is generally the review of existing established products, processes, facilities, or services to improve function while reducing cost. Value Analysis is the methodical investigation of all components of an existing product / process / service / system with the goal of discovering and eliminating unnecessary costs without interfering with the effectiveness of the product / process / service / system

Value Engineering (VE) is generally the review of products, processes, facilities, and services while they are in the early design phase but prior to being built or production tooled to improve function while

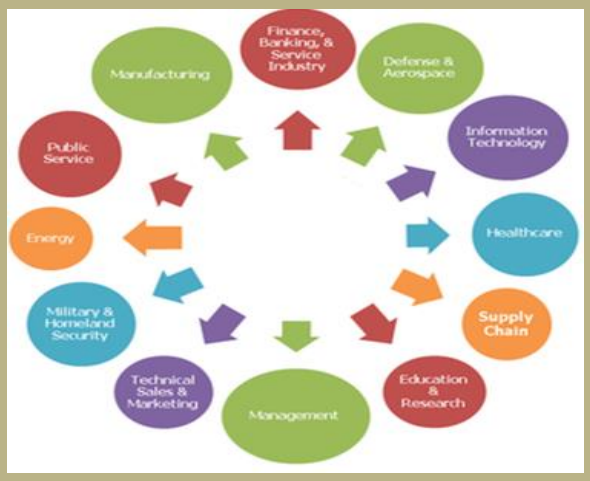
minimizing cost. Value Engineering is a study of all possible ways of developing new product / process / service / system that will perform required and unequivocally defined functions and minimum cost.

Value Methodology (VM) is specifically the systematic process used by a multidisciplinary team to improve the value of a project through the analysis of functions.

The Value is defined as the measurement of how well an item fulfills its function, considering both performance and cost, where 'Cost' may be 'Overall Cost' or 'Life Cycle Cost' for any given product or process.

The industries use Value Engineering to Save Time, Save Money, Build Teamwork, Improve Quality and Satisfy Customers. The value needs to be improved without any compromise on Performance, Quality, Reliability / Maintainability, Safety and Environmental Norms. Value Engineering has four pillars

- Step by Step Approach
- Multi-disciplinary Team
- Function Orientation
- Creativity/Innovation"



Applications of Value Engineering

Er. A Leelavinothan, Sr. Member and former Addl. General Manager, BHEL welcomed the gathering and introduced the speaker. Er N Rajasekaran, Committee Member and Dy. GM, BHEL presented a memento to the speaker. Er Dhinagaran, member, IEI TLC proposed the vote of thanks. Er. S. Lakshmanan, Honorary Secretary, IEI TLC conducted the proceedings

Stainless Steel Welding

Division: Metallurgical & Materials Engineering

The Tiruchirappalli chapter of Indian Institute of Metals and the Tiruchirappalli branch of the Indian Institute of Welding have joined hands with IEI TLC in organising a lecture prorgamme on "STAINLESS STEEL WELDING" at the institute premises on 28th August 2018.

Er. G Rajendran, Senior Dy. GM, BHEL, Tirumayam made a technical presentation on the above subject. During the lecture Mr. Rajendran briefed about various welding process that could be used for SS welding, the issues faced during welding & PWHT of the five families of stainless steels.

In the lecture he said, "In 1913, Harry Brearley discovered 'rustless' steel. Although there had been many prior attempts, Brearley has been credited with inventing the first true stainless steel, which had a 12.8% chromium content. Chromium when added to molten iron produced a metal that did not rust. Chromium is a key ingredient, as it provides the resistance to corrosion. Today, China is the largest producer of stainless steel in the world.

Stainless steel applications are in cookware, cutlery, surgical instruments, major appliances; construction material in large buildings, industrial equipment in paper mills, chemical plants, water treatment and storage tanks and tankers for chemicals and food products Stainless steel's corrosion resistance, the ease with which it can be steam cleaned and sterilized, and no need for other surface coatings has also influenced its use in commercial kitchens and food processing plants.

The chromium in the steel combines with oxygen in the atmosphere to form a thin, invisible layer of chrome-containing oxide, called the passive film. The passive film is a stable layer of only a few atoms thick. If the metal is cut or scratched and the passive film is disrupted, more oxide will quickly form and recover the exposed surface, protecting it from oxidative corrosion. There are five main families, which are primarily classified by their crystalline structure

- Austenitic stainless steel
- Ferritic stainless steels
- Martensitic stainless steels
- Duplex stainless steel
- Precipitation hardening stainless steel

Each family requires different weldability considerations due to varied phase transformation behaviour on cooling from solidification".

During the occasion, Er. K. A. Selvarajan welcomed the gathering and introduced the speaker. Er. K Ramadoss, Former General Manager, BHEL & Sr. Member of offered his felicitations. Er S Samidas, Past Chairman IEI TLC presented a memento. Er N Rajasekaran, Vice Chairman of IIM Tiruchy chapter and National Council Member of IIW proposed the vote of thanks. Er. S. Lakshmanan, Honorary Secretary, IEI TLC conducted the proceedings.

Smart Grid Pilot Project

Division: Electrical Engineering

Er. N S Suresh, Dept. of Electrical Engg., NIT, Tiruchy made a technical presentation on "SMART GRID PILOT PROJECT". In his lecture delivered on 04th September 2018, Er Suresh discussed about smart grid, the gain in terms of energy and money saving

through different smart technical tools. He also briefed about the Payback analysis which explains how the investment in smart distribution network is justified.

Er. A. Leelavinothan introduced the speaker and welcomed the gathering. Er. N Rajasekaran, Committee Member offered his felicitations. Er R Selvaraj, Chairman IEI TLC presented a memento. Er S Anand, Dy. Engineer, BHEL proposed the vote of thanks. Er. S. Lakshmanan, Honorary Secretary, IEI TLC conducted the proceedings

Knowledge Management for an Engineering Organisation

Division: Computer Engineering

The Computer Society of India, Tiruchirappalli chapter has joined hands with IEI TLC in organising a lecture prorgamme on "KNOWLEDGE MANAGEMENT FOR AN ENGINEERING ORGANISATION" at the institute premises on 11th September 2018.

Er. D. Senthil Kumar, Senior Manager, Information Technology Solutions & Services, BHEL, Tiruchy made a technical presentation on the above subject. For the content of the lecture programme the technical pages of this newsletter may be referred by the readers.

Er. A Leelavinothan, Sr. Member and former Addl. GM, BHEL welcomed the gathering & introduced the speaker. Er. K. Ramadoss, Former General Manager, BHEL & Sr. Member presented a memento and it was followed by felicitation by Er C Sivan FIE, Member IEI TLC. Er R Selvaraj, Chairman IEI TLC proposed the vote of thanks. Er. S. Lakshmanan, Honorary Secretary, IEI TLC conducted the proceedings

Quality Circle-A Pathway to a Quality life

Division: Production Engineering

On 18th September 2018, Er. C. Balaji, Senior Engineer, Boiler Production, Unit II, BHEL, Tiruchy made a technical presentation on "QUALITY CIRCLE – A PATHWAY TO A QUALITY LIFE". During the lecture he said, "A quality circle is a participatory management technique that enlists the help of employees in solving problems related to their own jobs. Circles are formed of employees working together in an operation who meet at intervals to discuss problems of quality and to devise solutions for improvements. Quality circles have an autonomous character, are

usually small, and are led by a supervisor or a senior worker. Employees who participate in quality circles usually receive training in formal problem-solving methods—such as brain-storming, pareto analysis, and cause-and-effect diagrams—and are then encouraged to apply these methods either to specific or general company problems. After completing an analysis, they often present their findings to management and then handle implementation of approved solutions. Pareto analysis, by the way, is named after the Italian economist, Vilfredo Pareto, who observed that 20 percent of Italians received 80 percent of the income—thus the principle that most results are determined by a few causes".

He also stressed that to achieve success through quality circles the following are to be followed.

- Quality circles must be staffed entirely by volunteers.
- Each participant should be representative of a different functional activity.
- The problem to be addressed by the QC should be chosen by the circle, not by management, and the choice honored even if it does not visibly lead to a management goal.
- Management must be supportive of the circle and fund it appropriately even when requests are trivial and the expenditure is difficult to envision as helping toward real solutions.
- Circle members must receive appropriate training in problem solving.
- The circle must choose its own leader from within its own members.
- Management should appoint a manager as the mentor of the team, charged with helping members of the circle achieve their objectives; but this person must not manage the QC.

Er. A Anand, Jt. Secretary, IEI, TLC welcomed the gathering & introduced the speaker. Dr. S Dharmalingam, Past Chairman, IEI, TLC presented a memento and it was followed by felicitation by R. Selvaraj, Chairman of IEI TLC. Er S Madhavan, Former Committee Member, IEI TLC proposed the vote of thanks. Er. S. Lakshmanan, Honorary Secretary, IEI TLC conducted the proceedings.

Methane Clathrates

Division: Civil Engineering

A lecture on "METHANE CLATHRATES" was delivered by Dr. Jeevan Joseph, Assistant Professor , Department of Civil Engineering, NIT, Tiruchirappalli on 25th September 2018 at Insttitue premises. Few salinet points of the lecture are as follows.

Methane clathrate ($CH_4 \cdot 5.75H_2O$) or ($4CH_4 \cdot 23H_2O$), also called methane hydrate, hydromethane, methane ice, fire ice, natural gas hydrate, or gas hydrate, is a solid clathrate compound (more specifically, a clathrate hydrate) in which a large amount of methane is trapped within a crystal structure of water, forming a solid similar to ice. Originally thought to occur only in the outer regions of the Solar System, where temperatures are low and water ice is common, significant deposits of methane clathrate have been found under sediments on the ocean floors of the Earth.

Methane clathrates are common constituents of the shallow marine geosphere and they occur in deep sedimentary structures and form outcrops on the ocean floor. Methane hydrates are believed to form by migration of gas from deep along geological faults, followed by precipitation or crystallization, on contact of the rising gas stream with cold sea water. In 2008, research on Antarctic Vostok and EPICA Dome C ice cores revealed that methane clathrates were also present in deep Antarctic ice cores and record a history of atmospheric methane concentrations, dating to 800,000 years ago. The ice-core methane clathrate record is a primary source of data for global warming research, along with oxygen and carbon dioxide.

Methane is a powerful greenhouse gas. Despite its short atmospheric half life of 12 years, methane has a global warming potential of 86 over 20 years and 34 over 100 years. The sudden release of large amounts of natural gas from methane clathrate deposits has been hypothesized as a cause of past and possibly future climate changes. Events possibly linked in this way are the Permian-Triassic extinction event and the Paleocene-Eocene Thermal Maximum.

Climate scientists like James E. Hansen predict that methane clathrates in the permafrost regions will be released because of global warming, unleashing powerful feedback forces which may cause runaway climate change that cannot be halted. Research carried out in 2008 in the Siberian Arctic found millions of tonnes of methane being released with concentrations in some regions reaching up to 100 times above normal.

Economic deposits of hydrate are termed Natural Gas Hydrate (NGH) and are unique in that they store 164 m^3 of methane, 0.8 m^3 water in 1 m^3 hydrate. Most NGH is found beneath the seafloor (95%) where it exists in thermodynamic equilibrium. The sedimentary methane hydrate reservoir probably contains 2–10 times the currently known reserves of conventional natural gas, as of 2013. This represents a potentially important future source of hydrocarbon fuel. However, in the majority of sites deposits are thought to be too dispersed for economic extraction. Other problems facing commercial exploitation are detection of viable reserves and development of the technology for extracting methane gas from the hydrate deposits. Both Japan and China announced in May 2017 a breakthrough for mining methane clathrates, when they extracted methane from hydrates in the South China Sea. However, industry consensus is that commercial-scale production remains years away.

Earlier, Dr. G. Swaminathan, Prof. NIT and Committee Member, IEI, TLC welcomed the gathering & introduced the speaker. Er. D Harsha, past Chairman, IEI, TLC presented a memento and it was followed by felicitation by Er. K. Ramadoss, Sr. Member of IEI, TLC. Er A. Leelavinothan, Sr. Member of IEI proposed the vote of thanks. Er. S. Lakshmanan, Honorary Secretary, IEI TLC conducted the proceedings

The Institution of Engineers (India)
(ESTABLISHED 1920, INCORPORATED BY ROYAL CHARTER 1935)

UPCOMING Events

OCTOBER 2018			
Date	**Division**	**Topic**	**Speaker**
03-10-2018	Civil Engineering	World Habitat Day (02-10-2018)	
09-10-2018	Computer Engineering	Cloud Computing	Er. M K Thanuja Senior Manager (ITS & S) BHEL, Tiruchy – 620 014
16-10-2018	General & Inter-Disciplinary	World Standards Day (14-10-2018)	Er. S Gowrishankar Addl. General Manager (New Growth Areas), Bharat Heavy Electricals Limited Tiruchirappalli - 620014
23-10-2018	General & Inter-Disciplinary	Sound Body – Sound Mind	Er. A. Nallusamy Former Dy. Manager, BHEL, Tiruchy - 14
30-10-2018	Electrical Engineering	Energy Management & Energy Audit	Dr. Kevin Ark Kumar Deputy Manager (M & S), Unit II Bharat Heavy Electricals Limited Tiruchirappalli - 620014
NOVEMBER 2018			
07-11-2018	Electronics Engineering	Micro Controllers	Er. R Muhammad Eshan Sr. Engineer (M & S), Unit II Bharat Heavy Electricals Limited Tiruchirappalli - 620014
13-11-2018	Computer Engineering	Applications of Artificial Intelligence	Prof. P Justina Associate Professor & head Department of CSE MAMCET, Tiruchy
20-11-2018	General & Interdisciplinary	Creativity	Er. N Sekar Former Senior Manager Bharat Heavy Electricals Limited Tiruchirappalli - 620014
27-11-2018	Civil Engineering	Holistic Waste Management & Health	Dr Veerpathman, MSA, Ph.D Professor& Consultant Save Tiruppur Movement, Tiruppur

For Details Please see Tiruchy Today of Leading Newspapers of Tiruchirappalli

TECHNICAL PAGES

KNOWLEDGE MANAGEMENT FOR AN ENGINEERING ORGANIZATION

Er. D. Senthilkumar
BHEL, Tiruchy

What is Data?

A collection of raw, un-interpreted measurements / facts.

For Example: yes, no, 98, 23

What is Information?

Data that has been processed within a context to give it meaning.

For Example: yes – Do You Know about Quest?

98 – Mark of a student in maths

What is Knowledge?

The capability of understanding the relationship between pieces of information and what to actually do with the information.

Experience of using information to make judgments and ability to link for making decisions or actions

What is knowledge Management (KM)?

The Relationship between People as tactic Knowledge and Information as Explicit Information and Process is called Knowledge Management.

Objectives of KM

Using what we know to

- Perform a Task
- Make a decision
- Create something new – Innovate / Invent / Design
- Plan a course of Action

Sources of New Knowledge

Mistakes – Practice

People May Know – Opinions, Experience, their Trial &Error

Professional Sources /Experts – books, websites, lectures, Direct Conversion

Why Knowledge Management?

1. Sustainable Advantage

- Process – know how, know why and know what
- Reinforces company aims and employee's loyalty

2. Unlocking hidden Knowledge

- Employees are better educated
- Intellectual capital

3. Knowledge conversion

- Employees when leave – Knowledge is lost
- Knowledge can be used and reused - To gain significant advantage

A **Company Knowledge** resides in Document as Explicit Knowledge and People as Tactic Knowledge.

Explicit knowledge Vs Tactic Knowledge	
Explicit knowledge	**Tactic Knowledge**
written down / recorded	In people's heads
Easily transferable, reusable	Rich, interconnected
Requires effort to keep up-to-date	1. Hard to make succinct / concise 2. Imbedded in large amounts of personal context

Knowledge Crisis

When locating the right information is Difficult**.**

Information becomes (economically) valuable

People will Hoard Information Printouts, Won't Share.

Capturing Knowledge

Activities that enable recording and representation of Tactic knowledge in explicit form

- Documenting Knowledge
  - Observation of Task/Job Performed
  - Interview with Experts
- Discussion Forums / FAQs
- KM Teams
- Communities of Practice

Accessing & Sharing Knowledge Management

Knowledge is disseminated or requested by users

Sharing Mechanisms:

- Common access to explicit, recorded knowledge
- Directory of experts
- Mentor / coach / apprentice
- Joint projects - resource lending
- Meetings - in person, virtual

Factors Affecting Knowledge Sharing

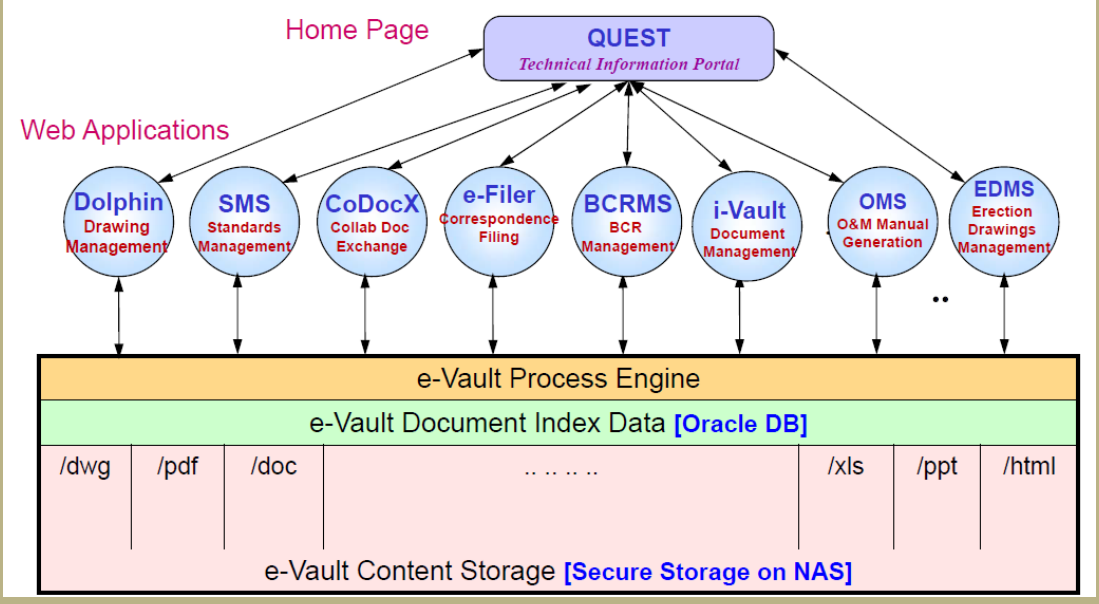
Compensation	Recognition
Ability Utilization	Creativity
Good Work Environment	Autonomy
Job Security	Moral values
Advancement	Achievement
Independence	Social Status

Enterprise KM System in BHEL Trichy - Quest a website developed by ITSS Department.

KM Initiatives – Engineering Organization

- Quest developed as the common Engineering Information site to access
  - Reference Information:
    - Tender Documents online reference facility added
    - Collaborator Standards
    - National / International Standards
      - BS, DIN, IEC and ASTM standards brought on-line through consortium approach
      - BIS, ISO and BPS also available on-line
  - Computerized Engineering Processes
    - BCR, Dolphin, O&M
  - Document Management applications
    - e-Filer / i-Vault

3-Tier Web Application Architecture



SMART GRID PILOT PROJECT

Er. N S Suresh

Dept. of Electrical Engg., NIT, Tiruchy

Smart Grid is a well-known concept being rapidly introduced in the power industry. New transformation of Indian power network has begun with 14 SG pilot projects across the nation. One of such projects has been successfully commissioned in Puducherry. The motive of this research work is to analyse the techno-economic aspects of a smart distribution network before being implemented nation-wide, so as to facilitate efficient planning and deployment of technology. This paper presents techno-economic analysis of Smart Grid via a case study of Puducherry pilot project. Covered in this paper are different components of investment which convey an idea about services and their proposition as well as technical advancements with their benefits. This paper discusses the gain in terms of energy and money saving through different smart technical tools. Payback analysis explains how investment in smart distribution network is justified.

Electric power has become backbone to economic growth of any nation, across the globe. World's electrical energy production in 2014 was 22433 TWh, out which 66 % was from coal, gas and oil. Existing fossil fuel based power infrastructure is bulky, complex and non-eco-friendly. In Global smart grid federation (GSFG) explained how the existing power grid network is not capable to meet requirements of 21st century. At present, power network structure is in accordance with the concept of centralized power generation. Smart grid (SG), the new facet of power infrastructure, facilitates decentralization of power generation. Smart grid has shown its competence to meet power availability, reliability, quality, economic, efficiency, safety, security and other essential parameters along with environmental issues.

India has an installed capacity of more than 280 GW, and has opted for smart grid to meet the power deficiency, green energy challenges and other needs of the country. Concept of smart grid, its technologies, challenges and difficulties in implementation have been discussed in detail on several platforms. With the approval of the Indian Govt., fourteen smart grid pilot projects are being developed across the country. Under such circumstance, techno-economic analysis of smart grid pilot projects becomes very essential. A study has been carried out on Puducherry smart grid pilot project, jointly developed by Power Grid Corporation of India Ltd (PGCIL) and Puducherry Electricity Department (PED), to understand the techno-economic aspects. The pilot has completed its interim stage and is operating with a good power quality. Rooftop solar PV systems with net metering facilities were also installed in this pilot project to show-case integration of clean energy solutions.

Motivation for this work is to better understand the techno-economic issues of smart grid for future advancement of SG technology and expansion of pilots across the country. For effective planning, it is essential to understand both positive and negative aspects of the SG technologies. Implementation of any technology reflects in terms of investment sought and its success is measured by profit by both investor and society.

ELECTRIC VEHICLE TECHNOLOGIES

Er. P. Padmagirisan

NIT, Tiruchy

Electric vehicles (EVs) are used in alternative to internal combustion engine (ICE) based vehicle due to its key benefits such as sustainability, efficiency, convenience, and economy. They are becoming popular nowadays due to its several advantages such as high efficiency, zero tailpipe emission, less maintenance, less noise and better acceleration. It is propelled by an electric drivetrain taking power from a rechargeable battery or from a portable, refillable, electrical energy source (like fuel cell, solar panels, etc.), which is manufactured for use on public roads. EVs are costly due to the cost of the battery. Presently, there are two important challenges faced by the EV industries; they are driving range and cost. The driving range is the total distance traveled by the vehicle in a single charge. Driving range depends on the capacity of the battery, the power of the electric motor and efficiency.

Increasing the capacity of the battery will increase the cost of the vehicle. It also increases the total weight of the system. Hence, recent researches are involved in increasing the efficiency of the system. The efficiency can be improved by the method called regenerative braking where, the battery can be charged during braking. By using this technique, the kinetic energy wasted during braking (mechanical) is used to charge the battery. As a result, both energy regeneration, as well as braking of the vehicle, is achieved.

Further, the efficiency of the system can be improved by proper sizing of powertrain components and effective powertrain control algorithm. The powertrain is the mechanism that transmits the drive from the engine/motor of a vehicle to its axle. Based on the powertrain mechanism the vehicle are classified into conventional powertrain (ICE based), fully electric powertrain (Electric machine (EM) based), series hybrid powertrain (ICE and EM-based) and parallel hybrid powertrain (ICE and EM-based). In series hybrid powertrain, ICE is coupled to an electric generator which further used to charge the battery through a power electronic interface. In this method, ICE is used only to charge the battery and will not aid the vehicle in propulsion. In parallel hybrid powertrain, ICE is used to aid the vehicle in propulsion. Each powertrain mechanism has their own merits and demerits and can be chosen based on the design of EVs.

The future technology for EV will ensure its reliability, efficiency, and dominance over the conventional vehicle. Technologies like battery swapping, self-driving, charging batteries from the renewables are going to play a significant role in the future EVs. The battery swapping is the technique to replace the drained battery in the vehicle with a fully charged one. It is a promising idea for the EV which save a considerable amount of time. This technique is similar to refueling the conventional gasoline-based vehicle in gas stations. Installing photovoltaic (PV) panels on the rooftop of the EV will, in turn, makes the system more reliable and cost-effective. PV panels are used to charge the battery as well as aids in vehicle propulsion. Wireless charging yet another exciting feature of EV to charge the battery using wireless inductive power transfer technique.

Excerpts from the Presidential Address of Er. P Raguraman, GM, BHEL…….

"……..This year Institution of Engineers (India) have given the theme *"Digital Transformation: A New Industrial Revolution"* for the Engineers Day Celebrations.

When we talk about Industrial Revolution we should look at *'How manufacturing has evolved and what is the future ahead'*

Tracing the history of manufacturing, starting from a water mill in 600 AD to Industrial age in 1800's, it is continuously evolving to today's global manufacturing system.

The manufacturing industry, since its birth 2 centuries ago, has seen many changes in systems - *from craftsmanship to Mass production to the latest Mass customization.*

During eighties, manufacturing was viewed as a functional area of production. However, these days manufacturing is considered to be an integrated concept at all levels from machines to production systems to an entire business level operation based on the customer requirements.

Today's consumers want something more, something unique and tailored/customized just for them.

100 years after Henry Ford changed the manufacturing story, we are finally on the verge of another shift - *the birth of a new era and a new epoch of manufacturing* – "Digital transformation in manufacturing"

Technological advancements in *Automation and Robotics* have transformed the manufacturing shop floor from "*dark, dirty and dangerous*" to *clean, high-tech centers of efficiency* offering challenging and highly skilled jobs.

A report from *General Electric* predicts there will be 9 million new positions in advanced manufacturing by 2022, and many of these new jobs will require skills not traditionally associated with Industry.

As production lines become *"Smarter"* — (*collecting data and using that data to change processes and create efficiencies*) — and more *Flexible*, workers will be expected to adapt in the same way.

Some of the biggest challenges include:

- **Robots and machines will become less like equipment and more like co-workers, meaning workers will need to *collaborate and interact with robots* and other sophisticated technology in a highly skilled manner;**
- **Production processes will become more open-ended, the ability to move machines around to suit the manufacturer's processes or fill-in for other broken equipment, workers will need to exercise the same flexibility understanding a variety of machines instead of just one;**
- **Beyond mechanical and electrical knowledge, in the future workers will need to have IT-based skills and knowledge to understand how to use, troubleshoot, and fix equipment that is connected online.**

Changes in manufacturing will continue, and in some cases take place at faster rates.

Some of the Technological Applications Impacting Manufacturing Innovation include;

1. ***Additive Manufacturing / 3D Printing***
2. ***Advanced Materials***

3. *Cloud Computing*
4. *Internet of Things (IoT)*
5. *Nanotechnology*
6. *Advanced Robotics*

The digitization of manufacturing through advancements such as the Industrial Internet of Things and Industry 4.0 has radically changed manufacturing. To fully realize the benefits of Industry 4.0, employers need a trained and educated Workforce.

For industry, that means great gains in productivity and efficiency, and for consumers, the potential of significant savings and availability of more options.

While some argue that these advancements in automation will do away with jobs, and in some ways that's true, but this will also make way for millions of highly skilled, good paying jobs, changing the face of manufacturing in future.

In our own country, our honorable **Prime Minister has launched the initiative *"Make in India"* with the primary goal of making India a global manufacturing hub, by encouraging both multinational as well as domestic companies to manufacture their products within the country.**

The initiative aims @

- ***Increase the share of manufacturing in the country's GDP from 16% to 25% by 2022***
- ***Create 100 million additional jobs by 2022 in manufacturing sector***
- ***Render appropriate skill sets among rural migrants and the urban poor for inclusive growth.***
- ***Increase domestic value addition and technological depth in manufacturing***

Changes in manufacturing will continue, and in some cases take place at faster rates. Stake holders need to train and educate the workforce to fully realize the benefits and ensuring that manufacturing continues to be a viable career path for talented individuals.

Digital transformation today is happening very fast, every company is developing its own digitalization plans and progressing in their own way. Some companies are investing more, some less. Some are following a very traditional path, while others are finding new, disruptive opportunities and challenging the status quo……. "

On behalf of the Institution of Engineers (India), Tiruchirappalli Local Centre, published by Er. S. Lakshmanan, Hon. Secretary, IEI, TLC

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