

Highlights of the IEM-IET Energy Conference 2011 (IIEC 2011)

IEM ELECTRICAL ENGINEERING TECHNICAL DIVISION AND IET MALAYSIA NETWORK



by Ir. Kok Yen Kwan (IEM-EETD) and Dr. Nadia Tan Mei Lin (IET, Malaysia Network)

THE Electrical Engineering Technical Division (EETD) of IEM marked another milestone in its long history by successfully co-organising the IEM-IET Energy Conference (IIEC 2011) recently from 10 to 12 October 2011, together with The Institution of Engineering and Technology (IET), Malaysia Network. The Conference was held at the Palace of the Golden Horses, Kuala Lumpur, MALAYSIA; and attended by more than 300 local and overseas participants.

Aptly themed "Sustainable Solutions for Energy Utilisation", the Conference provided the perfect forum for all participants to share their experiences, research, studies and views on wide-ranging issues, such as Energy Efficiency and Conservation, Power Quality, Green Technologies, Sustainable Energy, Renewable Energy, Alternative Energy, Energy Policies, Best Practices and Case Studies.

A technical exhibition was also held concurrently with the Conference to highlight on the latest design solutions and application of sustainable solutions for energy utilisation.

IIEC 2011, which consisted of a one-day Tutorial Session (on 10 October 2011), and two-day Conference (on 11 and 12 October 2011), brought together both international and national experts and policy makers to discuss on the relevance and importance of energy in the context of a sustainable future.

10 OCTOBER 2011 – TUTORIAL SESSION

On the morning of the Tutorial, Dr Douglas Henderson (Edinburgh Napier University, UK) shared his knowledge on 'Renewable-Based Distributed Generation System', with the session divided into 6 sections, as follow: -

- (a) Introduction to Distributed Generation Systems,
- (b) Renewable Plant for Distributed Generation Systems,
- (c) Generators for Distributed Generation,
- (d) Power Conversion Equipment,
- (e) Power System Calculations,
- (f) Impact of Renewable-Based Generation on an Existing System.

Dr Henderson began his tutorial by investigating the common renewable energy generation types, such as: -

- (i) Hydroelectric; Wind Power and Turbines (basic wind turbine types were discussed, e.g. Darrieus, H-Darrieus, Cup-Type, Savonius, Upwind and Downwind),
- (ii) Solar PV (various PV technologies such as Polycrystalline, Mono-crystalline, Thin Film and their respective efficiencies were highlighted) and Solar Thermal Electric,

- (iii) Biomass (which, according to Dr Henderson, offers opportunities for storage that some other renewable technologies did not).

The session then continued with the introduction and comparison of Synchronous Generators and Induction Generators. Among some of the salient points discussed were on the Basic Construction, Equivalent Circuits, Basic Operation and Excitation Requirements of both types of generators.



Dr Douglas Henderson delivering his tutorial on "Renewable-based distributed generation systems"

After a short tea break, the tutorial continued with discussion on Power Conversion Equipment, or more specifically the rectifiers and inverters used for connection of renewable energy sources to the grid. Dr Henderson focused his discussion on PV and Wind Generators, explaining that the fundamental component of the rectifiers and inverters was the Power Electronic Switching Device.

Dr Henderson also discussed on Power System Calculations (with an introduction of the Per Unit System and relevant examples, the need for Power System Analysis with specific mention on the control of Reactive Power and Voltage, Load Flow Analysis and Calculation with examples, and the definition of Fault Levels and the impact of generation on it).

He concluded his session by speaking on the ultimate aim of achieving technical integration of renewable energy generation into the existing systems (which are largely fossil-fuelled based).

Dr Volker Pickert (Newcastle University, UK) took over the afternoon session of the Tutorial and shared his experience



Dr Volker Pickert delivering his Tutorial on Green Technologies for the Automotive Industry

on Green Technologies for the Automotive Industry. He started by bringing the audience through a brief history of Alternative Powered Vehicles, which started way back in Year 1769 with N.J. Cugnot constructing the first self-propelled road vehicle – a military tractor with a top speed of 2.5mph driven by a steam engine.

He also briefly discussed on other important components of Electric Vehicles, such as the Power Train Drive; the pros and cons of a pure Electric Vehicle; researches being conducted on both Pure and Hybrid Electric Vehicles; Engine Improvements and Light-Weight, etc.

Dr Pickert then showed a video of a high-performance electric car to the audience before continuing his lecture with the following area of discussions: -

- i) current oil and gas scenario around the world,
- ii) global CO₂ emission and the impact cars have on it,
- iii) power demands in vehicles,
- iv) rise of renewable energy generation and consumption.

He then introduced some of today's most technologically advanced Electric Vehicles and their characteristics, such as the Ford Focus Electric, Tesla Roadster, Chevrolet Volt, Toyota Plug-in Prius, Honda Insight, etc.

Dr Pickert concluded his Tutorial session by discussing on some of the future technologies that can be expected in the Automotive Industries, citing relevant examples.

11TH OCTOBER 2011 – CONFERENCE DAY 1

The day began with the official Opening Ceremony of IIEC 2011, with the IEM President; Ir. Vincent Chen Kim Kieong delivering his Welcoming Address to all delegates of the Conference. In his speech, Ir. Chen reminded all that IIEC 2011 is part of IEM and IET's joint-efforts to promote a sustainable society as we face the challenges of limited supply of oil and gas fuels. He also took the opportunity to express his appreciation to all who has strongly supported IEM and assisted in raising funds for Wisma IEM – the Institution's newly purchased building to serve all members.

The Conference continued with the Guest-of-Honor; Y. B. Senator Dato' Ir. Donald Lim Siang Chai delivering his Opening Address. He shared several methods that the Malaysian government is currently undertaking in facing the limited oil and gas supply in the country, i.e. the five fuel diversification and the exemption of import and excise duty for hybrid electric and electric vehicles. He also praised IEM and IET for organising such a conference which is both appropriate and timely. In addition, he welcomed feedbacks from the three-day of discussions between all participants.

At 9.25 a.m., Y. B. Senator Dato' Ir. Donald Lim officiated the opening of IIEC 2011.

The opening ceremony continued with a simple ceremony of thanking all major sponsors of IIEC, which have all contributed significantly to the success of this Conference. Y. B. Senator Dato' Ir. Donald Lim was invited to present tokens of appreciation to the following sponsors: -

- i) Malakoff Corporation Berhad – Platinum Sponsor,
- ii) Ajiya Berhad – Silver Sponsor,
- iii) Tenaga Nasional Berhad – Bronze Sponsor,
- iv) Powertek Berhad – Bronze Sponsor.

Y. B. Senator Dato' Ir. Donald Lim also showed his strong support for IIEC 2011 by staying on for the first Keynote Address of the Conference before launching and touring the Technical Exhibition Booths.

Prof. John Loughhead (IET Past President and Executive Director) presented the first Keynote Address, which was on 'Sustainable Energy Use: A European Perspective'. He presented the European and United Kingdom targets for reduction in CO₂ emission and increase in renewable energy generation. He also challenged all engineers to conduct research to exploit thermodynamic potentials because by doing so, he believes the energy consumption can be reduced by 30% of the existing consumption level. He further showed that 45% of the present CO₂ emissions are from existing buildings, whereby 27% of that is emitted from residential houses.

He therefore emphasized on constraining energy demands by persuading people to use more efficient devices and promoting efficiency labels on devices. As consumer habits are not easy to change, Prof. Loughhead commented that the methodology for change to happen should be targeted on consumer's pride and regulation, and he believes that fuel-cell and electric vehicles are the future transportation for low carbon emission.

After a short tea break, the Conference continued with the 1st Plenary Session of the day, which was chaired by Ir. Chen Thiam Leong (Managing Director, Primetech Engineers Sdn Bhd) with the sub-theme 'Energy Efficiency in Buildings'.

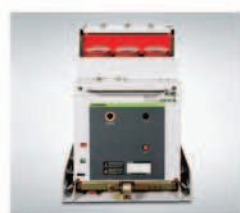


IEM President, Ir. Vincent Chen Kim Kieong (2nd from right) presenting a token souvenir to Y. B. Senator Dato' Ir. Donald Lim Siang Chai for officiating IIEC 2011; and accompanied by IIEC 2011 Organising Chairmen – Ir. Assoc. Prof. Dr Vigna Kumaran (left) and Ir. Lee Kok Chong (right), and IET Past President – Prof. John Loughhead (2nd from left)

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Ir. Francis Xavier Jacob began the session by delivering the second Keynote Address of the day, entitled 'Towards Energy Efficiency in Buildings'. In his address, he outlined the methodologies to achieve an energy efficient building; some of these methods included: -

- conduct an energy audit,
- minimise air conditioning load by considering the Overall Thermal Transfer Value (OTTV) of a building,
- improve lighting efficiency through usage of efficient lamps such as the T5, CFL, and LED with longer life spans,
- use roof insulation, and
- use smart meters for energy management.

Ir. Francis also informed that Malaysia plans to phase out all incandescent lamps in the near future, and as such, more efficient lamps will be sold at subsidised prices to initiate the switching over process. The Malaysian government initiatives for promoting energy efficiency has also been established, i.e. the five fuel policy, fiscal incentives (e.g. exemption of tax on green projects), R & D, regulations on energy ratings and labelling, and introduction of EE courses in universities.

All Plenary Speakers (PS) were allocated 20 minutes of presentation time and at the end of each Plenary Session, was conducted a brief Question and Answer (Q & A) session.

The first PS was Dr Paul Carey (Co-Founder, Zero Energy Design), who shared with the audience on the usability of Computational Fluid Dynamics (CFD) as a tool in Building Energy Modelling. According to Dr Carey, this tool can be used for both commercial and residential buildings in building energy models as it allows for efficiency and air flow analysis, and also troubleshooting. The increase in cost and time in using CFD analysis could be offsetted by the benefits derived as the study helps to save a considerable amount of energy in the building in the long run.

Next, Dr Eric Roberts (Co-Founder, Zero Energy Design) presented on 'Building Information Modelling (BIM)'. BIM is a repository for design information and a means of improving an end product.

The third speaker of the session was Mr. Bikash Kumar Sinha (Director, C2C Project Management), who spoke on the topic of 'Understanding Carbon'. He gave a detailed explanation of the changing climate around us and the ever-increasing level of Green House Gases (GHGs), before speaking on the Carbon Market.

This was followed by Ar. Sarly Adre Sarkum's presentation on 'Low-Tech Ideas: A Green Designer's Best Friend'. Ar. Sarly (Director, BDA Architects) is passionate about employing simple methods to achieve a green impact. According to him, several examples of the low-tech green ideas that have been implemented are bicycle library, solar tree that produces 20 to 50% more efficiency than present solar arrays, and interstitial urban parks.

The final speaker of the session was Mr. Daniel Wang (Division Senior Accounts Manager, Schneider Electric Taiwan), who talked about 'Leading Techniques for Energy Saving in Commercial Office Buildings'. He proposed an integrated control system consisting of Variable Frequency Drives (VFDs); card access that triggers HVAC and lighting, reporting and billing; smart circuit breaker; 3rd party equipment; and central monitoring and control in commercial buildings.

The second Plenary Session continued after lunch break, chaired by Ir. Mah Soo with the sub-theme of 'Energy Policy'. The session started with the third Keynote Address of the day, delivered by Tuan Haji Badaruddin bin Mahyudin (Deputy Secretary General, KeTTHA), entitled 'Sustainable Energy Policies in Malaysia'.

His speech encompassed the various programs initiated by KeTTHA with regards to energy efficiency, which included: -

- rebate given for energy efficient appliances, e.g. 5-star refrigerator and air-conditioning units,
- all government buildings are to set the air-conditioner temperature control to a level not less than 24°C,

- c) introduction of Small Renewable Energy Program (SREP) to promote renewable energy programs in Malaysia,
- d) introduction of both the Renewable Energy (RE) Act 2011 and Sustainable Energy Development Authority (SEDA) Act 2011, which have been passed in April 2011, and,
- e) re-structuring of electricity tariffs in Malaysia, whereby all subsidies will be reduced by year 2015 because cheap electricity results in wastage.

Tuan Haji concluded by expressing his hope that IIEC will be a platform for further debate on sustainable solutions for energy utilisation that can then be forwarded to KeTTHA.

The first PS was Ir. Dr Herman Darnel Ibrahim (Committee Member, National Energy Council of Indonesia), who explained about the 'Low Carbon Energy Development in Indonesia'. He opined that the subsidy of oil and electricity is a major barrier for RE and low carbon development due to lack of competitiveness. Presently, Indonesia's renewable energy policy is to maximise renewable share and to remove subsidy of electricity. Other initiatives on low carbon development included appliance labelling for televisions, air-conditioners, refrigerators, fans, and washing machines. In line with industry and building energy efficiency practices, green building council, green airport, and green cities have also been proposed.

Next, Mr. Su Jin-Sheng (Director of Energy Technology Division, Bureau of Energy, Ministry of Economic Affairs, Taiwan) shared Taiwan's perspective on developing green energy industry, which included the implementation of Green Energy Industry Program based on the following five pillars: -

- a) Key Industries for Development,
- b) Taiwan's Competitive Advantages in Developing a Green Energy Industry,
- c) Five Driving Forces in Green Energy Industry Development,
- d) Vision and Current Status,
- e) Projected Benefits.

Dr Tilak Siyambalapatiya (Visiting Lecturer, University of Moratuwa, Sri Lanka) was the last speaker of the session and he presented a paper on 'Policy Initiatives in Sri Lanka to enhance Energy Security and Energy Economy'. He highlighted the energy scenario in Sri Lanka, where its energy sources are mostly petroleum and hydro, with 90% of households having active grid connections and 3% of households with off-grid services.

Dr Tilak also informed that Sri Lanka has no indigenous fossil fuels, and the Sri Lanka Energy Policy in 2008 is targeted at shifting from a two-fuel energy policy (hydro and oil) to four-fuel energy policy (i.e. to include coal and non-conventional renewable energy). He also mentioned that electricity customers are normally the forgotten stakeholder at all energy seminars and hopes that discussions would continue with them in mind.

After a short tea break for refreshment, the third and final Plenary Session for the day started with Ir. Francis Xavier Jacob (Director, Energy Management and Industry

Development Department, Energy Commission of Malaysia) as the Session Chairman and sub-theme of 'Energy and Resource Management'. There were four PS in this session and the first speaker was Dr Douglas Henderson, who spoke on 'UK/Scottish Energy Policies'. He articulated that the UK's energy policy is driven by carbon reduction due to the diminishing fossil fuel and it is adopting sustainable technologies to keep the lights on.

Speaking next was En. Hishamudin Ibrahim (Country Expert and Local Trainer for Malaysia, AEMAS), sharing his views on 'Energy Management Gold Standard for Sustainability in Energy Management: Malaysia Experience'. He opined that in order to establish a gold standard in energy management, certification of energy managers and professional energy managers are required to empower the industries. There is also a need for continuous improvement to achieve Sustainable Energy Management (SEM), and the ASEAN Energy Management Accreditation Scheme (AEMAS) is a good certification scheme.

Mr. Tzueen-Liang Kuo (Sales Director, TATUNG) was the third PS of the session, and he demonstrated that using a hot water heat pump system can be an efficient way of heating as it results in 70% savings. He also discussed on the requirement for consideration in the heating of water, such as usage, number of persons, and open schedule facility, and also showed some case studies.

The final PS of the day was Prof. Dr Gary Chang (Professor, National Chung Cheng University), who discussed about 'Development and Application of Advanced Power Quality Measurement Techniques'. He affirmed that power quality of supply is important to ensure no loss or malfunction of sensitive loads that will cost billions of dollars. In order to ensure power quality of supply, power quality monitoring, advanced communication system, and data acquisition are essential elements.

12 OCTOBER 2011 – CONFERENCE DAY 2

The day opened with the 4th Plenary Session of the Conference, with the sub-theme "Green Development" and was chaired by Ir. Looi Hip Peu (Vice President, MGBC). Ir. Looi started the session by introducing the Keynote Speaker for the session – Ar. Von Kok Leong, the current President of the Malaysia Green Building Confederation (MGBC).

Ar. Von addressed the audience by giving a short introduction of MGBC and the importance role it plays in pushing for a more sustainable built environment in the country. He continued by discussing on the Green Building Index (GBI) – Malaysia's own green building rating tool, and the two key elements that should be considered carefully in all projects – OTTV and Passive Design.



Mr. Matthias Gelber delivering his 'green agenda'

The first speaker of the session was Mr. Matthias Gelber (Greenest Person on the Planet, 2008), who shared some of his thought-provoking stories and insights from a sustainability practitioner's point-of-view. A champion of green causes and firm believer in preserving the planet's natural environment, Matthias delivered an inspirational talk with practical examples of going green and urged everyone in the audience to 'walk-the-talk' and not hide behind a 'green-mask' in our efforts to create a green energy and sustainability revolution.

The session continued with Ir. Thirukumaran Jallendran (Project Manager, Lend Lease), sharing his thoughts on the global environmental impacts on the property sector and discussing on some key examples from his firm (e.g. The Gauge in Melbourne, Setia Alam Mall and Menara Public Mutual).

The session concluded with Mr. Richard Tu (Senior Vice President, CTCL Corporation) speaking on Build-In Power Efficiency Improvement. Among the concepts that he shared on Built-in Efficiency included lighting system design; power factor adjustment; hi-efficiency motors; amorphous metal transformers; and conductors.

After a short tea-break, the day continued with the 5th Plenary Session of the Conference, with Ir. Lam Sing Yew chairing the session with the sub-theme of "Energy Efficiency in Industries".

The session began with Mr. Chih-Chien Liang (Taiwan) speaking on Power Quality (PQ) Control of Taipower System, a Taiwan Power Utility Company. According to Mr. Liang, PQ problems are complex and often require a thorough understanding before a suitable, cost effective solution can be provided. He also stressed that comprehensive monitoring and analysis shall be a pre-requisite of any PQ mitigation plans.

Next, Ir. Thomas K.C. Chan (Chairman, IET Hong Kong Network) shared his thoughts on the need for high level of PQ for buildings in a world-class city (e.g. Hong Kong), where reliable operations are essential. In his speech, Ir. Chan focuses on the issues of PQ in the design of modern power distribution systems and rising mains for a world class city, taking into account all adverse effects caused by harmonics and voltage dips. The relating energy issues and standards/requirements of PQ as set out in the Electrical Energy Code were also discussed.

The third speaker, Mr. Bernard Lee of EATON Singapore spoke on the importance of Energy Advantage Architecture in UPS design. He further explained on the Variable Module Management System (VMMS) and how the system maximizes efficiency with lighter loads.

The session next had Mr. Roger Chia of Honeywell Singapore – the fourth speaker, who presented on Energy Performance Contract and the 5W2H (5W – Who, What, Why, When, Where and 2H – How, How Much) of Energy Efficiency.

Er. Lee Keh Sai (Principal, K.S. Lee and Associates) was the last speaker of the session and shared his vast experience in energy savings through rational and efficient

use of electrical energy. His lecture focused on Motor Driven System Efficiency – which according to Er. Lee depended on many factors such as: -

- (a) motor efficiency and motor speed control,
- (b) proper selection and sizing,
- (c) power supply quality and distribution losses,
- (d) maintenance, etc.

The Conference continued after lunch break with the 6th Plenary Session, which was chaired by Ir. G. Lalchand with the sub-theme "Renewable Energy". The session opened with Dato' Ir. Azman bin Mohd. (Chief Operating Officer, Tenaga Nasional Berhad) delivering his Keynote Address titled TNB's Vision for Renewable Energy.



Dato' Ir. Azman bin Mohd. delivering his Keynote Address at IIEC 2011

In his speech, Dato' Ir. Azman discussed shortly on a wide variety of issues, such as the Background of Energy Utilization globally; National Policy on Green Technology; Incentive Packages offered by the Government of Malaysia and TNB's own initiatives in supporting sustainable clean power options. In summarising his Address, Dato' Ir. Azman reiterated TNB's firm commitment towards sustainable clean power and its aim of becoming a primary driver of Green Energy in Malaysia by the Year 2015.

After the presentation of a small token of appreciation by the Session Chairman to Dato' Ir. Azman, the Conference continued with the first speaker of the session – Mr. Hing Wai Toong (District Sales Manager, National Instruments Malaysia) presenting his topic on Digitising the Power Grid.

He presented a case example of Distribution Grid Automation, introduced Phasor Measurement Unit (PMU) and explained on the ever evolving challenges of the power grid. One of the key points mentioned was on the bottom line of the power grid being – smart sensors will be the building blocks for monitoring, controlling and automating all existing and future transmission and distribution power systems.

The session continued with Mr. Anthony J. Jude (Director of Energy Division SEA Department, Asian Development Bank) presenting on Financing of Energy Efficiency Projects. Apart from sharing of the many case studies of EE projects in the Asian region, Mr. Jude also discussed on some of the key issues and challenges facing the Malaysia energy sector, e.g. the ever-increasing urban population, forecast of being net energy importer by 2015 and highest per capita energy consumption among all ASEAN countries.

Ir. Ali Askar bin Sher Mohamad (UNITEN Lecturer and IEM EETD Honorary Secretary) was the last speaker of the session and gave an interesting overview of the possible alternative energy options and availability to Malaysia (e.g.

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Small Hydro, Biomass, Biogas, Solar PV, Geothermal, Wind Energy, Ocean Technology, and Nuclear). He envisaged that the Feed-in-Tariff (FIT) (which will be launched on 1st December 2011) shall kick-start the RE Power Development in the country, and by the Year 2050 more than 70% of the Maximum Demand require in the country will be met by RE sources.

After a short tea break, Datuk Ir. Prof. Dr Ow Chee Sheng (Past President, IEM) chaired the last Plenary Session of the Conference by introducing the first speaker, Dr Volkert Pickert.

Dr Pickert spoke on the topic of Latest Development in Green Technologies for Transportation Systems and began by introducing the Greener Transportation Roadmap, followed by examples of Solar-Powered Planes and Electric Bikes. Some of the latest technologies were also discussed, including Batteries fuelled by air; Lithium-ion capacitor technology system; Electrification of Ancillaries; Phase Change Materials, etc.

Ir. Thomas Chan was the next speaker and he presented his second paper on The Present and Potential Future Sustainability and Renewable Energy Solutions in the Building Environment. As an introduction, he discussed shortly on the global human population, temperature and sea level scenarios before zooming on Hong Kong's position. Ir. Chan also stressed on the importance of designing sustainable solutions into buildings and introduced on the various green building assessment system available, i.e. LEED, HK-BEAM, BREEAM, Green Star Australia, CASBEE Japan and Malaysia's very own Green Building Index (GBI).

The third speaker of the session was Mr. Baptiste Kervyn (CEO, Biotec International Asia Sdn Bhd), who shared his experience on Biogas Capture and Electricity Generation. After briefly introducing his company and giving a general overview of the biogas industry, he proceeded to show the many case studies of Biogas-to-Electricity projects that have been or currently undertaken in Malaysia and the rest of the world.

Mr. Terence Lee (Chief Engineering Technical Specialist, FM Global Asia Operations) has the privilege of being the last speaker of the session and the IIEC 2011, and enlightened the crowd with his subject on Risks and Hazards of Wind Power, From An Insurer's Perspective. He started his



Prof. John Loughhead and Ir. Thomas Chan in a group photo with members of IIEC 2011 Organising Committee and IEM Secretariat staff

presentation by explaining some of the key components in Wind Farm (WF) design, before moving on to the key risk and hazard areas in insuring WF. Terence then concluded his presentation by pointing out on the potential impacts of high wind power penetration.

CONCLUDING REMARKS

The IIEC 2011 concluded with the MC inviting Prof. John Loughhead to officially close the Conference with his closing remarks. Besides thanking all the speakers for sharing their expert knowledge throughout the 3-day conference, Prof. Loughhead also expressed his gratitude towards members of the Organising Committee, the Conference Secretariat staff and all participants for contributing towards the success of IIEC 2011.

He also urged the audience to reflect on the wealth of information presented during the 3-day IIEC, and review on the lessons learned especially on the urgent need to utilise the world's energy sustainably.

Prof. Loughhead also commented on the growing important role that engineers played in the energy and sustainable development sectors, and encouraged them to continue leading the decision-making processes in the future. He then declared IIEC 2011 officially closed and look forward to meeting all delegates again in the next IEM-IET Energy Conference. ■

On behalf of the IIEC 2011 Organising Committee, the authors would like to record their sincere appreciation to everyone who has contributed to the success of this Conference. For further information, please visit the conference website at www.iiec2011.com.

ANNOUNCEMENT

Please note that, at the 466th Excomm Meeting held on 19 September 2011, the Sub-Committee on Membership Drive and Career Guidance has been renamed as the **Sub-Committee on Membership Drive and Promotions (MDP)** with immediate effect.

CONDOLENCE

With deep regret, we wish to inform that Allahyarham Ir. Mohamad Aris bin Ramlan (M 20573), has passed away on 26 August 2011. On behalf of the IEM Council and management, we wish to convey our condolence to his family.

Regards,
IEM Editorial Board

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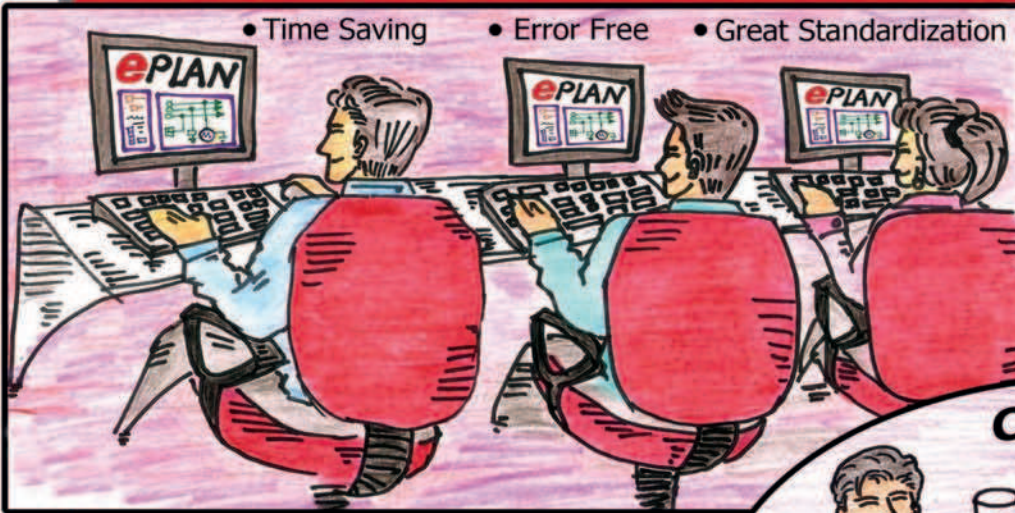
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