



ISSUE 08/2013

THE YEAR IN REVIEW

TECHNOLOGY FOCUS

From transport to renewables

Highlights of some technology articles

TECHNICAL COMMITTEE AFFAIRS

Focus on specific TC work

TC 29, TC 77 and TC 82 in the spotlight

IEC FAMILY

What happened since Oslo

Management changes at the top,
Young Professionals, Affiliates and more

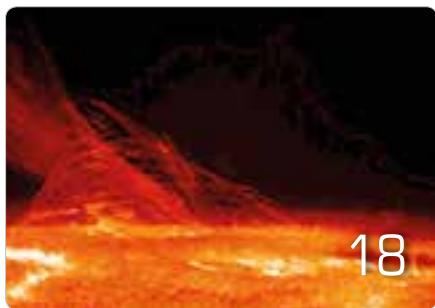
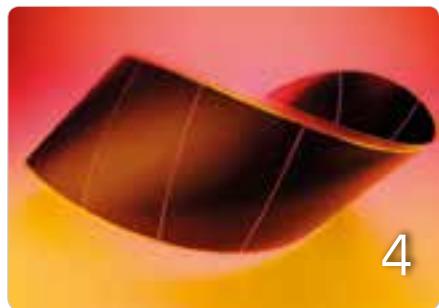
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The year in review

This issue focuses on the 12 months since the IEC General Meeting in Oslo and highlights some of the technologies and TC work that were featured in e-tech. It provides an update on the Young Professionals and Affiliate programmes and goes back to the numerous international events the IEC participated in.

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Editorial

International Standards are more important than ever



Message from Frans Vreeswijk,
IEC General Secretary & CEO

My first year as IEC General Secretary has comforted me in the belief that IEC International Standards and Conformity Assessment Systems are more important than ever before.

IEC work plays a crucial role in enabling global trade

The need for standardization will continue to grow due to technological integration. Advanced technology fields and the corresponding highly profitable markets all depend on standardization for their large-scale deployment.

International Standards are also increasing in importance because economies have never been more interdependent. Today, products that are consumed in one market have transited through many others. They are no longer "made in a country"; they are "made in the world". Standards in combination with conformity assessment are used by companies and countries as a strategic instrument in accessing more markets faster and at less cost. In everyday life Standards help reduce transaction costs and information asymmetries.

Be part of the global value chain

Electronic goods and components are among the most traded industrial products. For electronic and electrical devices, IEC International Standards and Conformity Assessment Systems are an absolute must. They are the basis for innovation and key for trading internationally.

Energy is key to economic development

Without electricity economic development and international trade are impossible. Countries who want to participate in global value chains need a steady and reliable supply of electricity to build up their infrastructure and economy.

The IEC provides the large majority of technical Standards for electric power generation from coal, gas, nuclear, oil and all renewable energy sources. It also provides the Standards for the transmission and distribution of electricity to cities, buildings, offices and homes where it is used by millions of devices.

I thank you all for your work and your commitment and wish you a fruitful General Meeting.

Frans Vreeswijk



IEC provides the large majority of International Standards for electrical power, from generation to transmission and distribution to cities, buildings, offices and homes



Without electricity, economic development and international trade are impossible

Disruptive but creative technologies

Printed electronics and nanotechnologies are transformational processes

Morand Fachot

Printed electronics and nanotechnologies are set to revolutionize the electronics industry and many other domains. These disruptive, yet creative processes are expected to become two of the key technologies of the 21st century. They will provide opportunities for the development and production of new, smaller and low-cost electronic devices and other products.

The new printing revolution

Printing is no longer just about reproducing text and images with ink on paper or another support. 3D printing, rapid prototyping or additive manufacturing, as it is often called, has seen the creation of various objects by adding successive layers of materials to create a product.

PE (printed electronics) is another form of 3D-related printing. It consists in the creation of electronic devices and components using various printing methods, equipment and material. This technology makes it possible to

produce a wide variety of products that can be used in countless applications. It has other advantages, such as much lower production costs than for conventional electronics and it can be applied to flexible or rigid supports (or substrates).

Wide range of materials

PE transforms the way electronic devices are made and employed. Using materials (inks and substrates) that have conducting, semiconducting, non-conducting, electroluminescent, PV or other properties, and different printing methods (e.g. lithography, inkjet, or screen printing,) allow great design flexibility and possibilities.

Both inorganic and organic materials are used for printed electronics. Organic materials can be found in products such as OLED (organic light-emitting diodes) displays used in televisions sets, computer monitors or mobile phones, and OPVC (organic PV cells).

Innovative materials such as carbon nanotubes allow new or enhanced

applications for batteries, new types of solar cells, ultracapacitors and electrical circuits.

Engineers throughout the world use printed electronics to design a variety of components and products, such as TFT (thin film transistor), flexible displays that can be unfolded to make up a large television, PV (photovoltaic) cells that fit windows or the roofs of cars or innovative and energy-efficient lighting solutions.

In the short- and medium term, hybrid systems – combining printed, flexible electronics with building blocks containing classical (silicon) electronics will be introduced.

Multiple applications

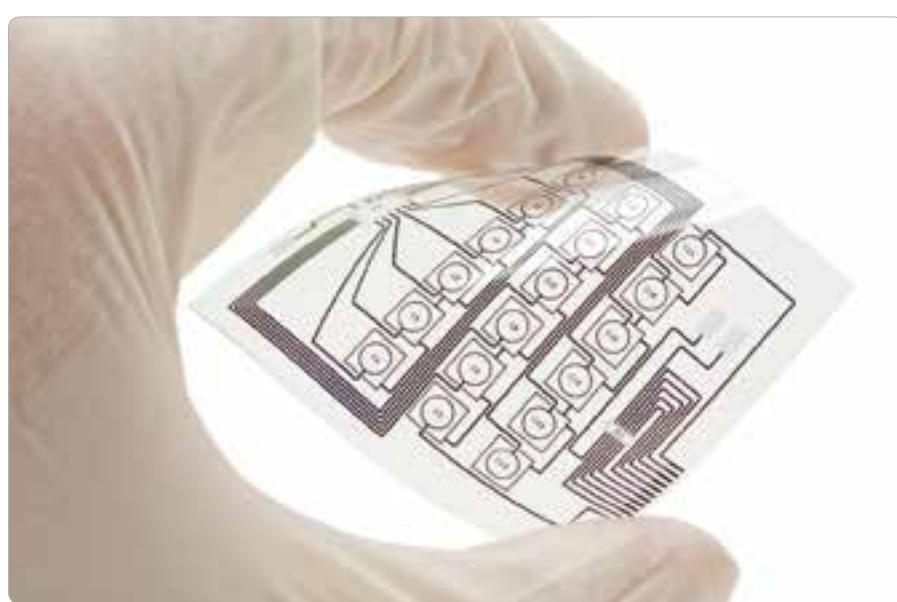
PE are already widely used in RFID (radio frequency identification) tags on product packaging to protect against shoplifting and to identify items during transport. They are also used in the production of flexible electronic circuits which are widespread in products where space constraints are significant, such as in small consumer electronics devices (i.e. digital cameras, mobile phones).

Technologies are being developed that make it possible to print electronic components, such as sensors, transistors, light-emitters, smart tags and labels, flexible batteries to power flexible and printed electronics, memory, etc.

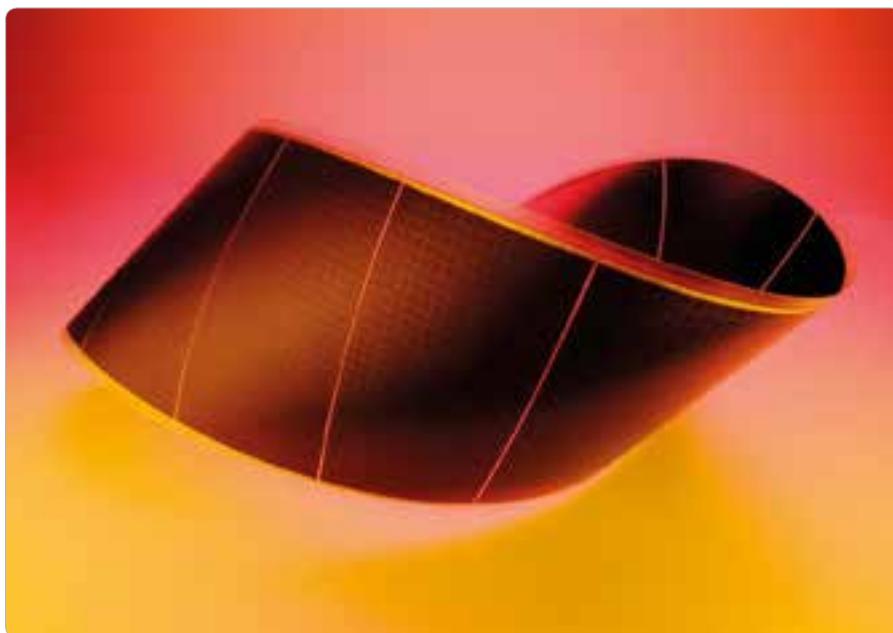
New printed electronics applications are emerging, opening up possibilities not envisaged before.

From research to industrial design and to marketable products

Printed electronics are being found in more and more mass-produced items,



Printed electronics processes allow the production of flexible electronic circuits



Printed photovoltaic panel (Photo: Solamet)

in particular in the automotive, consumer electronics and pharmaceutical industries, as well as in packaging where smart labels can provide item-level tracking of quality data for goods such as pharmaceuticals and perishable food.

The printed electronics industry currently covers 5 main areas:

- Lighting, including both OLED and electroluminescent products
- Organic PV
- Flexible displays
- Electronics and components, including RFID, memories, batteries and other components
- ISS (integrated smart systems) that include smart objects, sensors like MEMS (micro electro mechanical system) and smart textiles.

IEC contribution

The 5 areas that see widespread use of printed electronics are already covered by several IEC TCs (Technical Committees). However, printed electronics industry experts stressed, at their regular trade meetings and events, a need for standardization in a number of PE-specific areas. These include terminology, materials, processes, equipments, products as well as health, safety and environment issues. As a result of this

need the IEC SMB (Standardization Management Board) decided to create TC 119 to prepare standardization work in the field of printed electronics. TC 119 was established in October 2011. It has 11 participating members and 7 observer members. Given the rapid growth of the PE industry in recent years and its prospects in the future the obvious need for PE standardization points to a very dynamic future for TC 119.

Very small but global

Nanotechnology, the manipulation of matter on atomic and molecular scales, is expected to be another key technology of the 21st century, providing opportunities for the development of new products that are covered by many IEC TC/SCs. Its rapid growth requires International Standards for its move into an industrial phase. IEC TC 113: Nanotechnology standardization for electrical and electronic products and systems, was established in 2006 to prepare Standards that address materials as well as so-called gratings, which are objects used in nanotechnology.

Defining the infinitely small

Nanotechnology covers objects at a nanoscale, which is defined as ranging from 1-100 nm (nanometre). A nanometre is

equal to one billionth of a metre (or 10^{-9} m). Standardization in nanotechnology starts at the features and gratings levels.

Features are, in general, three-dimensional objects. They can also be nano-objects and have different shapes, such as a dot, a line, a groove, etc. They might be symmetric or non-symmetric and can be located on the surface of, or within, the substrate ("buried feature").

Gratings are periodically-spaced collection of identical features.

Challenging work

Measuring and obtaining accurate parameters at such minute scales is extremely difficult and challenging. It requires a precise definition of measurement and assessment specifications and procedures.

To achieve this and also allow the production of components and systems, TC 113 published a number of Standards, Technical Reports and Specifications that cover nanomanufacturing and test methods.



Self-powered nanosensors developed by Georgia Tech (Photo: Gary Meek)

The TC's work thus paves the way for the industry to manufacture nano-enabled systems and goods that will emerge soon in areas including energy production, efficiency and storage; electric vehicles; next generation consumer electronics; lighting and other products, so sustaining industries expected to generate some USD 2 500 billion in 2015.

IEC work supports renewables' expansion

Standardization work for renewable sources gathers pace

Morand Fachot

With growing global energy needs and concern about the adverse impact of burning fossil fuels, efforts are under way to tap all possible sources of RE (renewable energy). IEC TCs (Technical Committees) and SCs (Subcommittees) prepare International Standards for all renewables sources. EES (electrical energy storage) solutions are also needed to balance the increasing levels of intermittent RE generation from wind and sun.

Pumped storage key to optimizing other renewables

Hydropower is the oldest and largest renewable source of electrical power. In the form of pumped-storage, it is also key to balance intermittent RE generation from wind and solar installations and represents an essential EES solution.

The IEC strongly supports EES. The IEC MSB (Market Strategy Board) recently

published two White Papers, the first on EES, the second analysing the role of large-capacity EES systems, integrating large-capacity RE sources. Both White Papers stress the crucial importance of EES in future installations.

IEC TC (Technical Committee) 120: Electrical Energy Storage (EES) Systems has been created to prepare International Standards for such systems.

Of all energy storage technologies, including those under development, pumped-storage hydropower is the most cost effective and technically viable. It currently accounts for more than 99% of installed storage capacity for electrical energy worldwide: around 127 GW (gigawatts), according to the EPRI (Electric Power Research Institute – the research arm of America's power utilities) and Germany's Fraunhofer Institute.

The work of experts within IEC TC 4: Hydraulic turbines, also supports the construction, operation and maintenance of pump-turbine storage sites.

Established benefits of pumped storage

Pump storage installations are highly cost-effective, reducing electricity costs by using electricity produced at off-peak times when the price is lower, to pump water from the lower to the upper reservoir, turning electrical energy into gravitational potential energy. When power is needed, water is released back down to the lower reservoir, spinning a turbine and generating electricity along the way.

Systems demonstrate low maintenance costs and typically achieve one of the highest cycles per lifetime at some of the lowest costs. High-performance hydropower equipment can frequently run without interruption for extended periods of time and hydroelectric plants have a life-time of at least 50 years, making hydropower and pump storage a profitable long term investment.

Interest in pumped-storage is increasing, particularly in those regions and countries with the most variable renewable resources and where new installations of traditional hydropower are harder to achieve. The vast majority of installations are currently found in Europe, Asia (Japan in particular) and the US.

Experts involved in IEC TC 4 are seeing increased demand for clean energy pumped-storage installations because of the known benefits of pump-turbines. In addition, associated production and monitoring equipment provides increased revenues for producers and more affordable pricing for end-users.

Small but by no means insignificant

Small hydropower schemes are not as spectacular as large hydro projects but they play an important and growing role in bringing electricity to more people worldwide.



Upper and lower basin of Limberg II pumped storage plant, Austria (Photo: Voith)



AR 1000 tidal turbine being loaded onto a ship (Photo: Atlantis Resources Corporation)

Small means different things to different people. In the hydroelectric domain small, for the IEC, means installations of up to 15 MW, but in some countries it may cover systems of up to 30 MW.

The concept covers a wide range as it includes micro-hydro schemes, which can be as large as 500 kW and are generally run-of-the-river developments for villages, and pico-hydro systems that have a capacity of 50 W to 5 kW and are generally used for individuals or clusters of households.

TC 4 prepared Standards that describe the installation and operating conditions of small power stations and that set out acceptance tests of small hydroelectric installations.

Harnessing power from the oceans

After developments in the solar and wind sectors, harnessing marine energy is set to provide essential additional sources of clean power in the future. IEC TC 114: Marine energy - Wave, tidal and other water current converters, is developing International Standards in this domain. Oceans cover more than 70% of Earth's surface; they are sources of huge kinetic energy from waves, currents and tides, and of thermal energy in the form of heat they harness from the sun. They could,

in theory, cover a sizeable share of the world's energy needs.

Marine kinetic energy is very strong as the density of water is roughly 850 times that of air. It comes from different sources – waves, tides or current – some more powerful and predictable than others. Therefore, its conversion into electrical energy requires a wide range of technologies to cover all its aspects.

The main criteria for selecting sites at which to tap into marine energy sources are tidal current velocity, wave formation and turbulence, water depth and bathymetry, and access to grid connection.

OTEC (ocean thermal energy conversion) uses the temperature difference between cold deep waters and the warmer waters near the surface to run heat engines that produce electricity. OTEC works best when the temperature difference is around 20° C, typically found in tropical coastal areas.

OTEC has a substantial potential, however, what is currently technically recoverable is much less significant. TC 114 set up a Project Team to look at guidelines for design assessment of OTEC systems.

Addressing essential aspects

TC 114 prepares International Standards that aim to address essential aspects for all forms of marine kinetic energy conversion.

Equipment, such as submarine cables and connecting equipment is also essential to transmit power produced from marine energy installations to grids.

International Standards for power cables and cables for ships and mobile and fixed offshore units are developed by IEC TC 20 and SC 18A, respectively.

Underwater connectors are also essential to link cables together or to link to renewable energy equipment, to hubs and to the power grid. International Standards for such connectors are prepared by TC 20.

Going with the wind

Wind energy is currently the most cost effective new renewable energy source. Many countries have goals for wind to supply more than 20% of their energy generation by 2030, with offshore turbines playing a significant role in some countries.

Wind power now supplies the greater part of the world's non-hydropower renewable electricity capacity. Global wind power capacity was 238 GW (gigawatts) at the end of 2011, up from just 18 GW at the end of 2000, with a CAGR (compound annual growth rate) of over 25% over the past five years.

The supply of wind turbines is a global business, with the six largest producers all based in different countries and the 10 top manufacturers accounting for nearly 80% of global production. IEC International Standards, prepared by IEC TC 88: Wind turbines, are ever more central to the successful development of the industry and have proven essential to meet the complex challenges and set of issues faced by the wind power industry. The global nature of that industry means that

International Standards play a vital role in ensuring the proper production, testing, worldwide installation and acceptance of wind power turbines, whether large or small and installed on land or offshore.

Synergies and conformity assessment

The scope of TC 114 is being extended to cover aspects of river currents as the technology deployed for certain marine tidal and current installations is also relevant for specific river applications. TC 114 AHG (*ad hoc* Group) 2, is tasked with assessing the "power performance (...) of electricity producing river current energy converters". Some tidal turbines are now being installed in marine and river environments. As the

technologies used in small hydro can apply TC 4 and TC 114 liaise on certain aspects.

Since marine energy projects share some technical issues with offshore wind farms on common elements, such as mooring and floating installations, TC 114 is liaising with TC 88: Wind turbines.

The IEC CAB (Conformity Assessment Board) set up WG (Working Group) 15 to develop a Framework for an internationally standardized approach of addressing the conformity assessment needs of the marine energy industry.

This follows the establishment of WG WT CAC (Wind Turbine Certification Advisory Committee).

Essential standardization work for RE expansion

Standardization work carried by TC 4, TC 114, TC 88, as well as by TC 82: Solar photovoltaic energy systems, TC 117: Solar thermal electric plants, and TC 120: Electrical Energy Storage (EES) Systems will ensure that the growing demand for more power for RE sources can be best integrated in the future global energy mix.



Siemens SWT-3.0-101 DD 3 MW direct drive turbine (Siemens press picture)

Robots enter all domains

Home, factories or hospitals are some of the environments where robots can be found

Morand Fachot

Deployed in car manufacturing to replace workers for hazardous tasks just over 50 years ago, robots were later introduced into other domains, such as homes and medical premises to take over chores or carry out complex tasks efficiently. Robots of all sorts have improved and expanded the range of their activities significantly, thanks in great part to IEC International Standard.

Robots: reshaping manufacturing

The first industrial robots, automated die-casting machines, were installed at a General Motors plant in the US in 1961 to take over hazardous tasks from workers.

In a logical move, they graduated from their original assignments in die-casting and welding to lifting and moving car parts for assembly. Initially the US and



Hybrid battery/solar-powered robotic lawn mower (Copyright: Husqvarna Group)

Japanese car industries were the main outlets for industrial robots, accounting for around 40% of the total number used in the early 1980s. The potential

of robots to carry out relatively simple tasks accurately, without interruption and at a quick pace, led to their adoption in many other industrial sectors such



Robotic cell-based solutions for spot welding (Photo: KUKA Systems)

as electronics, the food industry and handling some products.

Industrial robots gained in popularity rapidly as they allowed high productivity as well as accuracy and quality.

Huge market

According to the IFR (International Federation of Robotics), "total accumulated sales, measured since the introduction of industrial robots at the end of the 1960s, amounted to more than 2 310 000 units by the end of 2011".

In 2011, the sales of industrial robots increased by 38% to 166 028 units and the worldwide market value for robot systems (including the cost of software, peripherals and system engineering) for that year was estimated at USD 25,5 billion. The systems therefore represent a major industrial sector, which has the added benefit of increasing industrial productivity.

Contrary to widely-held assumptions robots do not destroy but create many jobs both directly and indirectly, according to a Metra Martech report for the IFR. Examining the correlation between increased robotization and declining unemployment rates in 6 countries, the report states that robots carry out work in areas that would be unsafe for humans, that would not be economically viable in

a high wage economy and that would be impossible for humans.

More than a fixed one-armed machine

The first generation of industrial robots could best be described as one-armed manipulators that were installed in a permanent position and carried out simple tasks and routines. Safety represented a major issue. However, advances in robotics have enabled new characteristics to be introduced to industrial robots. They include so-called "cooperative working": the skills of human workers are combined with the precision and force that robots can provide, allowing both to work side by side without compromising workers' safety. This, and major advances in various kinds of tactile (e.g. pressure), optical or proximity sensors make it possible to have humans and certain types of robots work side by side.

IEC SC 47E: Discrete semiconductor devices, prepares the IEC 60747 series of International Standards for semiconductor devices, which cover many sensors and improve safety. Other TCs involved in the safe operation of industrial robots include TC 44: Safety of machinery – Electrotechnical aspects, TC 17: Switchgear and controlgear, working on safety and emergency stops

and switches, and TC 79: Alarm and electronic security systems.

IEC TC 2: Rotating machinery, prepares International Standards for rotating electrical machines such as drives and motors used in industrial robots. International Standards prepared by TC 22: Power electronic systems and equipment, and its SCs, are also central to components used in robot drives and other systems.

Changing industrial landscape

Ever since their introduction, industrial robots have carried out difficult and hazardous tasks. While they will continue to be irreplaceable in this role, they are also able to:

- carry out work that would otherwise not be economically viable
- enhance manufacturing jobs by increasing productivity, flexibility and competitiveness
- improve process quality
- reduce operation costs and material waste
- improve quality of work for workers by carrying out repetitive tasks
- improve health and safety for workers
- reduce labour turnover and recruitment difficulties

In countries where labour costs are traditionally high, a benefit of introducing more industrial robots is inshoring: the repatriation to the local country of activities – and jobs – previously outsourced to low-wage countries.

All signs from the industry point to a healthy growth in years to come as traditional markets in North America, Europe and Asia increase or renew their assets and emerging industrialized countries equip their factories. IEC International Standards will contribute significantly to this global growth of the robotics industry

Chores made easy

For decades science fiction literature and films helped shape the general

perception of domestic robots. Until fairly recently, for most people a robot in the home environment meant a machine with some human features that could stand upright, move around, communicate and carry out a variety of tasks. However, the complexity of designing and manufacturing such multipurpose android robots, not to mention their cost, meant they have remained confined to the domains of science fiction or research.

Some robotics designers and engineers saw the potential for developing cost-effective robots that could carry out a single set of tasks in the home environment. This led them to build small automated vacuum cleaners, the first of which, the Trilobite, was launched by Electrolux in 2001, with other manufacturers following shortly after. These machines, along with robotic lawn mowers, were the first to usher in robots to the home environment.

Automated vacuum cleaners and their washing peers, like their traditional counterparts, must be able to clean in tight places and on different surfaces such as hard floors and carpets. In addition the former must be able to navigate their way independently in

rooms cluttered with furniture and other obstacles. They must do so safely and without damaging their environment.

The safety of cleaning robots, like that of all household appliances, is essential. IEC TC 61: Safety of household and similar electrical appliances, has prepared an International Standard which covers the safety aspects of vacuum cleaning robots.

Hard labour outside too

Domestic tasks are not limited to indoor environments. While mowing the lawn, scrubbing swimming pools or cleaning gutters may be seasonal occupations, they are nonetheless time-consuming, tedious activities, with the potential to be unsafe. Several manufacturers have developed automated machines that can work outdoors to carry out these chores.

A number of garden appliance manufacturers began launching electric robotic mowers from the mid-1990s. The latest models incorporate a number of sensors that allow them to avoid obstacles such as trees and garden furniture, to recognize boundaries and even to stop operating and return to their charging dock if it starts to rain.

Robotic domestic mowers are niche products but their sale has literally exploded in Europe, in spite of their rather hefty price. Sales were up 30% in 2012 on the previous year and are forecast to grow by as much as 20% a year over the next 5 years.

Robotic mowers are mature products that have evolved into professional areas such as golf course care or the weeding and edging of commercial sites.

A growing market

The domestic service robot industry is a highly significant and fast-expanding economic sector. The IFR estimates that 1,7 million domestic robots of all types (vacuum cleaning, lawn-mowing, window cleaning and other types), were sold in 2011 (up nearly 19% on 2010) at a total cost of about USD 454 million. The IFR projects sales of almost 11 million units for the period 2012-2015, with an estimated value of USD 4,8 billion.

The expansion of this market, which is very important to the future of the world economy, is underpinned by countless International Standards prepared by many IEC TCs and SCs and covering many components and systems central to the proper and safe operation of service robots.

Dr Robot enters the fray

The introduction of robots into the medical and healthcare environment around the world is recent and carries the obvious need to ensure safe usage for patients and medical staff alike.

New applications for robots are emerging in the medical sector. Many medical device regulatory regimes, such as the European Commission's Medical Device Directive, classify these robots as medical equipment or medical devices.

The SCs (Subcommittees) and WGs (Working Groups) of IEC TC 62: Electrical equipment in medical practice, have been responsible for carrying out the bulk of



Surgeons operating using a da Vinci Si Surgical System (Photo: ©2011 Intuitive Surgical, Inc.)

the medical equipment standardization work required to produce the IEC 60601 family of standards. These cover the safety requirements for ME (medical electrical) equipment and MES (medical electrical systems) in current use.

No need to reinvent the wheel

Discussions centring on medical robot standardization issues took place between ISO TC 184/SC 2: Robots and robotic devices, and IEC SC 62A: Common aspects of electrical equipment used in medical practice, and demonstrated that both had a valuable role to play in the work. In April 2011, they set up JWG (Joint Working Group) 9: Medical electrical equipment and systems using robotic technology.

Combining the existing expertise of both SCs enabled the key issues to be investigated. This also allowed the medical robot standards needed to fit into the IEC 60601 family to be produced

without having to start from scratch and "reinvent the wheel".

It was decided that the first step should be to develop a horizontal medical robot standard, making the link between robots and medical electrical equipment; once this had been done, the work could be followed with a variety of vertical standards for different types of medical robots.

Extensive remit, wide international participation

JWG 9's remit is to "develop general requirements and guidance related to the safety of medical electrical equipment and systems that utilize robotic technology. The work encompasses medical applications (including aids for the disabled) covering invasive and non-invasive procedures such as surgery, rehabilitation therapy, imaging and other robots for medical diagnosis and treatment". The group started with 33 experts from 11 countries, it has now 60 experts from 16 countries.

Full workload in coming years

In spite of their high purchase prices, medical robotic systems are cost-effective as they cut some hazards (such as surgical complications, postoperative infections or bleeding) and the overall length of hospitalization. The fact that they are now being introduced in many developing countries is further proof that they are seen as making economic sense.

Transparency Market Research has estimated the global medical robotic systems market at USD 5,48 billion in 2011, with surgical robots forming the largest segment at USD 3,77 billion. It expects the market to grow at a CAGR (compound annual growth rate) of 12,6% from 2012 to 2018 to reach USD 13,64 billion in 2018, with the market for surgical robots worth USD 8,47 billion.

This exceptional expansion of the medical robotic market suggests a heavy workload for IEC SC 62A/JWG 9 experts for years to come.

Personal and public electric transport

Adoption of EVs for personal and public use is expanding, in particular in urban areas

Morand Fachot

Public and personal transport vehicles are increasingly dependent on electrical systems for propulsion and countless other functions, even more so in urban environments. Many IEC TCs (Technical Committees) and SCs (Subcommittees) prepare International Standards for these vehicles.

The electric car is already with us

Electrical and electronic systems are wholly responsible for the advances made in many areas of the automotive industry. This is particularly true for electronics, which has made a spectacular contribution to the increase in overall

value of cars in recent years. In the mid-2000s, electronics accounted for 10-15% of the total production cost of mid-range cars and 20-30% of the cost of luxury models.

Today they represent some 20-30% of the total cost for all categories of car, and this share is expected to reach 40% or so by 2015. The figure is nearer 50% if all electrical systems are included, and is even higher for electric vehicles.

Main factors for wider adoption of electronics in cars

Improving the driveability of vehicles has been a major contributor to the adoption of electronic components in cars. Power windows, light and rain sensors that



Toyota iRoad personal mobility vehicle
(Photo: Toyota)

automatically switch on lamps and wipers, electric power steering, cruise control that allows drivers to maintain a constant speed and advanced parking support systems that manoeuvre cars automatically into a selected parking space contribute, along with many

other aids, to better driveability, increased comfort and reduced driver distraction.

Improved safety is another major factor. Sensors play a crucial role – for example by setting off airbags if accidents occur. Safety looks likely to improve further with the introduction of many other devices, such as pre-crash systems that control the brakes and steering automatically so as to mitigate the seriousness of accidents, and collision-avoidance systems that detect hazards or alert careless or drowsy drivers by issuing sound, vibration or light warnings.

Environmental considerations are also implicit in the introduction of additional electronic systems to cars. These allow better and leaner engine management, which translates into reduced consumption of fuel and levels of noxious emissions.

Significant growth in personal EV numbers

According to US-based analyst firm, Navigant Research, global sales of plug-in hybrid vehicles (PEVs) – containing an internal combustion engine and rechargeable battery – and all-electric cars have grown rapidly in the last two years, reaching 137 950 units in 2012.

By 2020, John Gartner, an analyst with Navigant, predicts annual sales of PEVs and all-electric cars will have raced to 1,75 million, while the hybrid market will have progressed steadily to around 2 million units.

Consumer choice

Some 25 automotive manufacturers presented more than 50 hybrid and electric cars at this year's International Motor Show, Geneva. Mainstream auto-makers showcased concept and production vehicles while niche players displayed their latest models.

It is clear that alternatives to the conventional internal combustion engine are on a roll. But why now?

Gartner believes increases in the price of petrol and diesel are helping drive growth right now. Gartner also points to concerns over climate change and carbon dioxide emissions, as well as countries' desires to reduce reliance on energy imports.

Crucially for plug-in hybrid and all-electric vehicles, there is a growing infrastructure of charging stations. So-called slow-charging stations used for work-place and overnight charging are becoming more commonplace while fast-charging networks are also emerging.

Recent IEC standards have been instrumental in driving up the numbers of vehicle chargers ensuring safe, efficient and reliable charging of present and future electric vehicles. In November 2011, the IEC removed a major hurdle for charging infrastructures when IEC SC 23H: Plugs, socket-outlets and couplers for industrial and similar applications, and for electric vehicles, published two international electric vehicle standards for plugs and sockets.

Complex standardization landscape

"The standardization landscape has been very complex", says Professor Peter Van Den Bossche, from the Mobility, Logistics and Automotive Technology Research Centre at Erasmus University College, Brussels, and IEC TC 69 Secretary. "But at least for the charging infrastructure we have detailed a limited number of options that are actually being adopted by industry."

IEC TC 21: Secondary cells and batteries prepared IEC 62660-1 to provide guidance for performance testing of lithium ion battery systems and cells in electric road vehicles. As Van Den Bossche notes, one of the key challenges of electric vehicle standardization work has been to achieve collaboration between the electrotechnical world and automotive manufacturers.

Electric urban transport - A revival after a long decline

More than half the world's population now live in cities, according to United Nations data, and that percentage is forecast to hit 60% by 2030. By 2025 there will be 37 megacities (22 of them in Asia), each home to more than 10 million people. The growing use of electric buses, trams and metropolitan "light railways" offers an environmentally friendly option to reduce local emission of pollutants significantly in the expanding cities of the future.

With transport systems estimated to account for between 20% and 25% of world energy consumption and CO₂



Fuel cell unit for Daimler fuel cell bus (Photo: Daimler AG)

CO_2 (carbon dioxide) emissions, electric vehicles offer greater efficiency than their diesel counterparts. Using their brakes, they can generate kinetic energy to be recycled back into the power network. Electric engines on buses and trams cause less vibration, making journeys more comfortable for passengers and reducing maintenance time and costs.

Several IEC TCs (Technical Committees) prepare International Standards for the electric buses, trams, trolleybuses and metro/light rail vehicles used in public urban transport networks, as well as the batteries, capacitors and fuel cells used in propulsion systems, and many other components.

Buses and trolleybuses

Electric buses, which require neither great range nor speed and can be partially recharged during their journeys as they stop for passengers, are seen as the most promising area for potential growth of green urban public transport. The US-based market research and consulting firm Pike Research forecast in August 2012 that the global market for all electric-drive buses including hybrid, battery electric and fuel cell buses would grow steadily over the next six years, with a CAGR (Compound Annual Growth Rate) of 26.4% from 2012 to 2018.

Trolleybuses are electric buses that use spring-loaded trolley poles to draw their electricity from overhead lines, generally suspended from roadside posts, as distinct from other electric buses that rely on batteries. Because they do not require tracks or rails, they are more flexible than trams and drivers can cross the bus lane, making the installation of a trolleybus system much cheaper. Trolleybuses operate in some 370 cities or metropolitan areas worldwide, according to the Trolley Project.

Trams, metro and light rail

In the 1960s the tram saw a decline in favour of diesel driven buses, but the backlash in recent years against pollution and dependence on fossil fuels has seen

a resurgence of interest in electric trams as another urban transport system that can carry large numbers of passengers efficiently and generates no emissions at the point of use. In a December 2012 study SCI Verkehr GmbH, an international management consultancy based in Germany, forecast the global growth in railway electrification at a CAGR of 3.4% up to 2016.

Market growth is mainly driven by new metro and electric light rail urban transport projects under way on most continents.

A metro rapid transit system is an electric passenger railway in an urban area with a high capacity and frequency, typically located either in underground tunnels or on elevated rails above street level. It allows higher capacity with less land use, less environmental impact and a lower cost than typical light rail systems.

Light rail systems use small electric-powered trains or trams that generally have a lower capacity and lower speed than normal trains to serve large metropolitan areas. They usually operate at ground level, but can include underground or overhead zones.

All urban rail systems rely on International Standards developed by IEC TC 9: Electrical equipment and systems for railways. Areas covered include rolling stock, fixed installations, management systems (including communication, signalling and processing systems) for railway operation, their interfaces and their ecological environment. These standards deal with electromechanical and electronic aspects of power components as well as electronic hardware and software components.

Batteries and fuel cells

Buses, which have defined, short routes and daily travel distances of less than 200 km, are well suited to battery-only electric technology. Li-ion (Lithium-ion) technology is the most commonly used. Pure electric buses divide into those using high power density Li-ion batteries



Light rail system in Nottingham, England
(Photo: Bombardier)

alone and those with large banks of supercapacitors in the roof to manage fast charge and discharge and increase battery life. Hydrogen powered fuel-cell vehicles provide longer range than battery electric vehicles. Refuelling times are short and comparable with present internal combustion engine vehicles. Currently, the main drawbacks of hydrogen powered vehicles are the high cost, mainly due to expensive fuel cells, and the lack of refuelling infrastructure. IEC TCs prepare International Standards for batteries and fuel cells used in urban transport systems.

IEC TC 21: Secondary cells and batteries, has prepared standards covering requirements and tests for batteries for road vehicles, locomotives, industrial trucks and mechanical handling equipment. Its work includes standards for performance, reliability, abuse testing and dimensions for hybrid and plug-in hybrid Li-ion batteries, which are seen as one of the most promising types of secondary batteries.

IEC TC 105: Fuel cell technologies, is responsible for standards for fuel cell commercialization and adoption. It focuses on safety, installation and performance of both stationary fuel cell systems and for transportation, both for propulsion and as auxiliary power units.

Almost all fuel cell buses incorporate a battery for energy storage and there is also a balance to be struck in the

hybridization of the fuel cell power plant and the supporting battery pack. While fuel cell costs remain high and hydrogen infrastructure sparse, it may be more economical to use battery-dominant buses with fuel cell range extenders.

Conductive charging

Wireless or induction/conductive charging technology to charge electric vehicles, including buses and light rail trains, is in use or undergoing testing in many countries, including South Korea, the USA, Canada, the United Kingdom, Germany, Belgium and Italy.

Wireless charging plates built into the road at bus stops and terminals enable electric buses to be charged wirelessly through a brief connection while passengers get on or off the bus at a stop. This resolves the current battery limitations that prevent an all-electric bus from operating all day off an overnight charge.

There are concerns, however, about different competing wireless or conductive charging technologies, the costs of installing the infrastructure and its capacity to stand up to extreme weather. Meanwhile companies, notably in China and the USA, have developed ultra-fast charging technology capable of charging an electric bus battery in five to ten minutes.

Other features likely to become standard in the electric buses of the future include regenerative charge braking, energy harvesting shock absorbers, solar panels and quickly replaceable battery packs.

IEC TC 69 and SC 23H prepare International Standards for electric vehicle conductive charging systems.

More IEC standardization activities for electric urban transport

Electric urban transport systems depend also on standardization work from many

other IEC TCs and their SCs, such as, TC 22: Power electronic systems and equipment, TC 36: Insulators; TC 40: Capacitors and resistors for electronic equipment; TC 47: Semiconductor devices, and obviously TC 69: Electric road vehicles and electric industrial trucks, to name only a few. Other TCs may be less obvious, such as TC 56: Dependability, which is involved in rolling stock-related standardization work. It maintains liaison activities with TC 9 and stresses that "without dependable products and services (...) transport [would be] non-functioning (...) there would be numerous car, train (...) accidents".

The impressive expansion in the number of personal and public electric vehicles in recent years has been relying to a great extent on IEC standardization work and the healthy prospects for the industry point to a steady workload for all IEC TCs and SCs involved.

Working for a brighter and greener future

IEC Standards help lighting the way forward



Commercial premises, like this hair and beauty salon, benefit from innovative lighting solutions (Salon Ziba, New York. Photo: Osram)

Morand Fachot

The world's lighting industry is constantly expanding, driven by many factors that include a need to check power consumption. The quest for energy-efficient lighting

extends beyond lights bulbs alone to include various advanced light management systems that deliver precisely the right light to the right place at the right time in offices, homes and even on roads. Many IEC TCs (Technical Committees) and SCs (Subcommittees) are involved in standardization work that is allowing great advances in new lighting solutions.

A huge and dynamic market

The lighting industry has a major global economic impact. It is very fragmented and complex and extends across three main sectors: general lighting, automotive lighting and backlighting

(for broadcasting, IT and multimedia equipment). It was estimated to have revenues of around EUR 69 billion in 2010; these are expected to rise to EUR 108 billion in 2020, making this sector comparable in size to the global TV market.

General lighting accounts for close to 75% of the lighting market, according to a 2011 McKinsey report. It covers many components and elements, not just the most obvious categories of lamps and fixtures, but also, increasingly, lighting control and management systems. It is the fastest growing segment of the lighting market and is forecast to increase by 69% over the period 2010-2020.

Cutting power consumption

General lighting consumes nearly a fifth of the total global production of electricity. Efforts to curb electricity consumption have become a priority for governments around the world, making the lighting sector a prime target for savings. The quest for energy-efficient lighting has driven the development of new types of light sources in what has been a stable industry for a very long time.

Lighting for residential, commercial and industrial use has relied on the incandescent light bulb for more than 130 years and also, from the 1930s onwards, on fluorescent tubes – the most common lamp in office lighting and many other commercial and industrial applications.

Incandescent bulbs are very inefficient as at most 5% of the power they consume is converted into visible light, while the rest is dissipated as heat. Fluorescent lights are more efficient, converting over 20% of the power input to visible white light.

In addition to being inefficient, incandescent light bulbs have a short rated lifespan of 750 to 1 000 hours. Fluorescent lights can last more than 15 000 hours.

New types of lights

To check consumption of lighting installations governments have taken measures to phase out incandescent lamps and support the introduction of energy-efficient lamps. These come in two main types: CFL (compact fluorescent lamp) and LED (light-emitting diode) lamps.

CFLs are based on the same principle as conventional fluorescent lamps but the tubes are folded or shaped into a spiral to provide compact size and allow them to fit in fixtures and luminaires designed for incandescent bulbs. CFLs are much more energy-efficient than incandescent lights. To provide an equivalent amount of visible light they use only around 25% of the energy an incandescent bulb would need. Another advantage of CFLs over

incandescent bulbs is their longer rated service life, between 6 000 and 15 000 hours.

The other significant recent breakthrough in lighting has been the introduction of LED-based solutions (also called SSL, solid-state lighting). They have been described as a disruptive technology and "the only fundamentally new lamp technology to enjoy commercial success in the last 100 years". LED lamps rely on a semiconductor light source, they use up to a tenth of the energy needed by an incandescent bulb to give an equivalent amount of light. They have a very long service life that can exceed 30 000 hours, cutting maintenance costs drastically for many applications such as industrial, street, public or airfield lighting.

LED lamps, are also very flexible: they can be used in lighting management solutions with dimmers and sensors for commercial, industrial or public lighting and, increasingly, in homes. Their main drawback is their cost, which is still significantly higher than that of incandescent lamps or CFLs as their production process is complex. However, their price is predicted to drop by nearly 38% between 2012 and 2015, and a further 10-15% by 2020.

IEC TC 34: Lamps and related equipment, and its SCs prepare International Standards regarding specifications for lamps (including LEDs) and glow starters, lamp caps and holders, lamp controlgear, luminaires and miscellaneous related equipment not covered by a project of another TC.

Managing lighting assets for improved savings and comfort

Advanced light management systems make it possible to go beyond adequate lighting to deliver precisely the right light to the right place at the right time. This flexibility results in greater comfort and wellbeing for users.

Lighting in many residential, office, commercial and industrial spaces is still

based on installations designed a long time ago when energy was relatively cheap and abundant. They lack flexibility and don't really take into account individual requirements.

Retrofitting energy-efficient lamps or installing new light fixtures are just two of the steps that can be taken to cut energy consumption in lighting. The other most effective additional measure is the introduction of lighting management systems to both control (switch on and off) and regulate (the need for or level of) lighting. Lights can be switched on and off automatically at pre-set times. This can be done with TDS (time-delay switches), which operate for a certain time and can either be manually actuated and/or remotely electrically initiated. International Standards for TDS are prepared by IEC SC 23B: Plugs, socket-outlets and switches, part of TC 23: Electrical accessories.

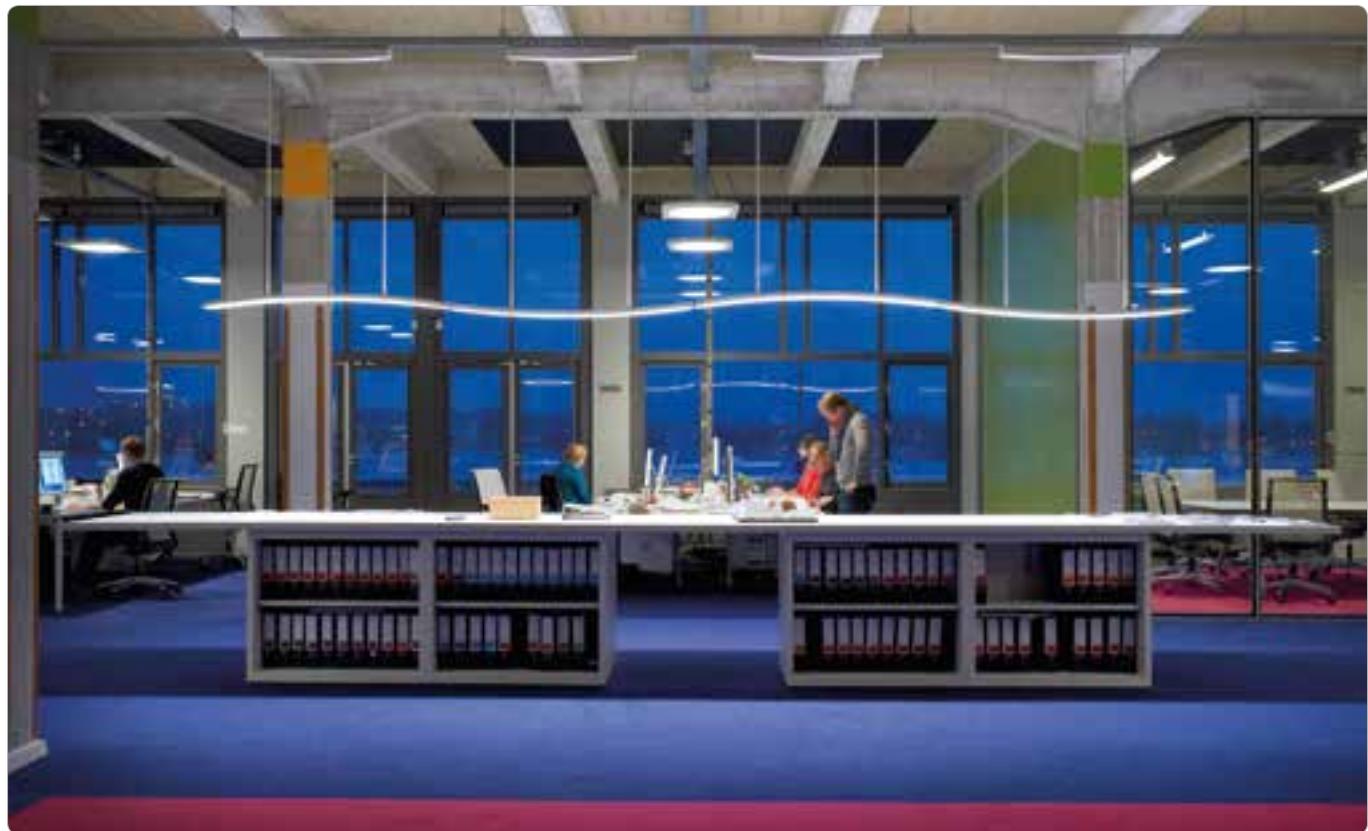
The brightness of lamps can be adjusted with dimmers, which are electronic switches. SC 23B prepares International Standards for this type of switch. Lights can also be activated by special devices that react to a situation – for instance if a presence is detected or there are low levels of light. Such devices can be found indoors – in working spaces, corridors or lifts – or outdoors in security lighting or new urban lighting installations relying on LED lamps (which, unlike conventional outdoor lights, can be switched on and off frequently and dimmed).

A single lamp or luminaire can also combine several sensors – for instance dusk-to-dawn and motion sensors.

These sensors rely on semiconductor and optoelectronic systems. IEC SC 47E: Discrete semiconductor devices, prepares International Standards for these.

Urban lighting: upgrade or replace?

Lighting for public spaces is undergoing a radical transformation with the introduction of new lighting solutions. Public institutions also manage extensive lighting assets for outdoor use.



Advanced light management systems for the right light to the right place at the right time (RAU Architects, Amsterdam. Photo: Philips)

These are large consumers of electricity and many authorities are looking at ways of cutting their energy and life-cycle maintenance bills. The choice they face is between refurbishing, renewing or replacing parts of, or whole installations, with the decision down to costs, and sometimes taken according to short-term constraints rather than long-term considerations.

Urban lighting is complex as it must meet many needs such as helping pedestrians and road users find their bearings and move around safely, illuminate architectural landmarks or outdoor areas, such as parks or sports grounds, provide light at entrances and all around buildings, etc. To fulfil these needs different types of fixtures are needed, such as recessed or low and high column or catenary luminaires for orientation or road lighting, spots or floodlights to illuminate facades, wall luminaires, traffic lights, etc.

The operating costs for the energy consumed, servicing and maintenance of

urban lighting installations may represent a significant burden in the long term and authorities everywhere are looking at ways of cutting these.

Operating costs, rather than initial capital costs, are often the deciding factor in the refurbishing, upgrading or replacement of lighting assets.

Smart lighting for smart cities

Outdoor urban lighting, for streets and paths, and other applications still uses mainly HID (high intensity discharge) lamps like low- and high-pressure sodium vapour lamps and metal halide lamps. These lamps offer the advantages of having long service lives when properly powered, and high luminous efficacy, but present a number of shortcomings in terms of light quality, power consumption and flexibility. Low- and high-pressure sodium vapour lamps have poor colour rendering as they appear bright yellow or intense pink orange when warm. Metal halide lamps provide a whiter light and are used for wide area overhead lighting of commercial, industrial and public spaces.

However HID lamps cannot be dimmed and may see their service life more than halved if switched on and off frequently. A number of cities and local authorities are looking at phasing out these lamps and replacing them with LED-based solutions. Key drivers for the change are the dramatic fall in the price of LED lamps, public policies pushing energy efficiency and investments in smart city infrastructure that will integrate smart street lighting systems.

Smart street lighting systems are equipped with control nodes that, in combination with various sensors, allow for the remote on/off switching and some level of dimming control. IEC SC 47E prepares International Standards for components used in a variety of sensors. As for IEC SC 23B, it prepares International Standards for HBES (home and building electronic systems) switches that can be used for the operation of lamp circuits and dimmers. Pike Research, a market research and consulting company that provides analysis of global clean



Retrofitting London's Tower Bridge with LEDs saved 40-45% energy (Photo: GE)

technology markets, estimates that more than USD 100 billion will be spent in the next 10 years to support smart city development and that "the power and communications ability of a smart street lighting system can provide the backbone for many smart street applications".

The company forecasts unit sales of LED street lights to grow by 24,9% a year between 2012 and 2020, from fewer than 3 million to more than 17 million units.

Balancing tight budgets and saving needs

However, switching from the current system to the more advanced LED lights, even if smart solutions are not introduced, is a complex procedure. Unlike luminaires found in households and many offices, which allows CFLs or LED lamps to replace incandescent light bulbs, LED systems cannot be installed in existing street fixtures designed for HID lights, as they require electronics and ballasts of a different kind. Furthermore, luminaires

for current lamps do not have reflectors or lenses that can control glare from LED lamps or provide the right beams and must be replaced. Therefore, the whole conversion appears quite costly.

However, an important factor to be taken into account is the extremely long life of LED-based street lighting solutions. Reduced maintenance, replacement and power costs make LED street lights attractive solutions in the longer term.

A major economic stake and a cleaner solution

The ban on sales of incandescent lights in dozens of countries across the world, and their limited lifespan, mean that a huge market for replacement energy-efficient bulbs has emerged. The global market for lamps alone is forecast to reach USD 40,4 billion by 2017, according to a November 2011 GIA (Global Industry Analysts) report.

The latest Country Lighting Assessments for 150 countries released by UNEP

(the United Nations Environment Programme) and its partners in June 2012 gives details of the economic and environmental benefits of a switch to energy-efficient lights.

The yearly savings in electricity for a global phase-out of inefficient lights would amount to around 5% of global electricity consumption. The construction of 252 large power plants (500 MW each) could be avoided, resulting in savings on unnecessary investments of approximately USD 210 billion. Additionally, 490 million tonnes of CO₂ emissions a year would be prevented.

The work done by many IEC TCs and SCs in preparing International Standards regarding specifications for lamps, luminaires and all related equipment is proving instrumental in helping the industry introduce reliable energy-efficient lights and in bringing countless economic, energy and environmental benefits to the world.

TC work to help thwart potential threats

Preventing electromagnetic interference from nuclear and other weapons

Morand Fachot

As concerns about potential risks to power and telecommunication grids from nuclear devices and electromagnetic weapons grow, IEC subcommittee work takes centre stage

Known phenomena

Cases of electromagnetic fields from solar activity-induced geomagnetic storms disrupting and damaging power grids have been known for a long time. Another type of electromagnetic field known as HEMP (high-altitude electromagnetic pulse) was discovered when nuclear devices were detonated at high altitudes in the 1950s and 1960s. To develop environmental, protection and test standards for commercial equipment that might be exposed to HEMP, in 1992 the IEC created a SC (Subcommittee) under TC 77: Electromagnetic compatibility. Nowadays its work is proving ever more relevant.

Unwelcome results

In the late 1950s and early 1960s the US and the USSR carried out nuclear tests at high altitudes to study the possibility of using nuclear devices to defeat incoming ballistic missiles and to understand the effects on radio communications. However these HANEs (high-altitude nuclear explosions), besides indiscriminately knocking out the few satellites in orbit in 1962, had unexpected consequences on the ground by disrupting and even damaging a few telecommunication and electric installations, including portions of the power and communications infrastructures. While these effects were not widespread, it is clear that the electromagnetic sensitivities of the electronics controlling today's infrastructures are much higher than they were 50 years ago.

Different parameters for the US and Soviet HANEs (altitudes, weapons' yields and locations -- over water in the Pacific Ocean for US tests, over land for Soviet tests) meant different results.

HEMP from the July 1962 Starfish US test (400 km altitude, 1.4 megaton device) caused burglar alarms and air raid sirens, street lights and telecom systems to malfunction or fail in Hawaii, some 1 400 km away from the burst.

HEMP from several October 1962 Soviet HANEs (300 km, 150 km, and 60 km altitudes, each with a 300 kiloton device) carried out over Kazakhstan in what was then the USSR, fused at least 570 km of overhead telephone lines, overloaded a 1 000 km shallow-buried shielded communications cable and damaged power line insulators, according to information made public by former Soviet scientists in 1994 during the EUROEM 1994 Conference in Bordeaux.

IEC involvement

IEC SC 77C Chairman Dr William Radasky traces back IEC's involvement in the field to 1989 (as a Working Group of TC 77) when it began the development of environment, protection and test standards for commercial equipment that might be exposed to HEMP.

When the pace of the work on HEMP accelerated in 1992, he says, it was assigned to the newly created IEC SC 77C: Immunity to High Altitude Nuclear Electromagnetic Pulse (HEMP). In 1999 the National Committees in SC 77C decided that it was important to extend this work to include high power electromagnetic transients created by electromagnetic weapons producing IEMI (intentional electromagnetic interference), based on concerns raised by URSI (International Union of Radio Science).



High-altitude nuclear explosions can have the same destructive impact...

The new (and current title) of SC 77C is: High power transient phenomena.

SC 77C's scope is to prepare "standardization in the field of electromagnetic compatibility to protect civilian equipment, systems and installations from threats by man-made high power transient phenomena including the electromagnetic fields produced by nuclear detonations at high altitude."

SC 77C has 18 participating member nations and 15 observing member nations that prepare publications within the IEC 61000 series, many of which are basic standards that need to be applied to specific products and industries.

The 20 publications available thus far in the series are divided into 5 major parts covering: general, environment, testing and measurement techniques, installation and mitigation guidelines, and generic standards. Each part is further subdivided into several subparts or sections, and these are published as International Standards, Technical Specifications or Technical Reports.

Radasky says that the basic work covering both HEMP and



...on power installations...

electromagnetic weapons that have the capability to produce IEMI is now complete. He adds that future work is planned that will use the existing basic publications as a "tool box" to solve more complex problems – for example, dealing with the distributed civil infrastructure. In a further example, the Chairman of IEC TC 13 recently asked for support from SC 77C to help develop an immunity test method that would allow Smart Meters (electronics based) to be protected from attacks from stun guns.

Governments, other organizations relying on SC 77C work

As a growing number of countries or non-state actors may gain access to nuclear weapons, and criminals may obtain the ability to inflict IEMI (which is a much more accessible technology), IEC SC 77C work is seen as absolutely essential by governments and organizations that seek to protect infrastructures from high power EM threats.

Recent confirmation of this can be found in evidence, documents and references provided to the UK House of Commons Defence Committee by IEC SC 77C Chairman Radasky and Secretary Dr Richard Hoad, which figure prominently in the Committee's 10th Report of Session 2010–12: "Developing Threats: Electro-Magnetic Pulses (EMP)". In addition, earlier work by the US Congressional EMP Commission included contributions from IEC SC 77C. Their

work is published in two reports available at www.empcommission.org.

As regards standardization and other organizations, IEC SC 77C publications have been adapted in recent years to the needs of the telecommunications industry by the ITU (International Telecommunication Union) in ITU-T Recommendations K.78, and K.81, and to the needs of the international power industry in Cigré (International Council on Large Electric Systems) WG C4.206 where work is underway.



...as powerful solar storms (Photo: NASA)

Tackling noise effectively

IEC TC 29 develops Standards to measure noise and lower its negative impact

Morand Fachot

Noise is second only to pollution in terms of negative environmental impact, a fact often overlooked as it is not as easy to see. Noise is estimated to cost countries huge sums every year: there is evidence that up to 40% of the population within some industrialized countries is affected. IEC TC (Technical Committee) 29: Electroacoustics, work aims to measure and lower the negative impact of noise.



Retec RS 104 sound level meter

Negative health and economic impact

Besides provoking hearing problems ranging from mild to total hearing loss, noise has other negative effects on human health.

Research has shown that long-term exposure to excessive noise levels leads to a higher incidence of cardiovascular and other health problems.

Excessive noise may also affect the unborn. Studies in Japan and the US point to a possible correlation between exposure of the unborn to excessive

noise in the womb and low birth weight and even birth defects.

Excessive noise may result from high volumes of road or air traffic or from noise in the work place. Its economic impact is severe, with noise-induced hearing loss representing the leading occupational illness in industrialized nations, according to the WHO (World Health Organization).

Measuring noise is the first step

The measurement of airborne sound can evaluate whether or not a noise source is excessive. As well as protecting the environment we live in, such measurement helps to control the risk of hearing damage being caused, including at work. TC 29 Standards specify the performance requirements of instruments such as audiometers, which are devices designed to measure hearing for diagnostic purposes or for conserving or restoring hearing. Other TC 29 Standards concern head and ear simulators for the measurement and calibration of hearing aids, as well as other test devices.

A number of TC 29 WGs (Working Groups) and MT (Maintenance Teams) develop new or update existing International Standards for sound measurement instruments.



ANR (active noise reduction) safety earmuffs use electronics to attenuate the low-frequency noise generated by engines, motors, etc. (Photo: Pro Tech Technologies)

Permanent monitoring stations are also required, for example to measure noise around airports, and new technology means in some cases these can be interrogated remotely, often in real-time.

On the ground and in the air

A clear example of the importance of TC 29 work in the domain of environmental protection can be found in several ICAO (International Civil Aviation Organization) documents. ICAO is the UN (United Nations) specialized agency that codifies the principles and techniques of international air navigation.

Aircraft noise has a significant environmental impact. This has led to operational limitations and opposition to airport expansions/constructions. Reducing aircraft noise on the ground and in the air is a priority for ICAO and the civil aviation industry.

Volume I of ICAO's Annex 16 to the Convention on International Civil Aviation - Environmental Protection - Aircraft Noise, makes extensive reference not only to IEC 61265, *Instruments for measurement of aircraft noise*, but also to a dozen other TC 29 International Standards that set out the performance requirements of measurement instruments (precision sound level meters, sound calibrators, microphones, filters, etc.).

Likewise, ICAO's *Environmental Technical Manual Volume I - Procedures for the Noise Certification of Aircraft*, makes reference to several TC 29 International Standards.

These references demonstrate the significance of the TC's work as well as its contribution to reducing the environmental impact and to the expansion of a major global economic sector.

Alleviating adverse impact

Excessive noise can lead to a range of hearing loss of variable severity. A natural development of the basic

work on audiometers has been the preparation of International Standards for hearing aids.

TC 29 has published 13 International Standards for hearing aids in the IEC 60118 series. These cover measurement of electroacoustic and performance characteristics, as well as EMC (electromagnetic compatibility), signal processing for various types of hearing aids and induction loop systems that are installed in public places, transportation networks and other places.

TC 29 has also prepared IEC 60601-2-66, *Particular requirements for the basic safety and essential performance of hearing instruments and hearing instrument systems*, in the Medical electrical equipment series of International Standards.

Cooperation

TC 29 work has an impact in many fields and requires cooperation with a number of IEC TCs as well as with other organizations, such as ICAO mentioned above.

TC 29 is a supplier of standards to a variety of other TCs as well as a customer of theirs. This reciprocal arrangement applies to IEC TC 87: Ultrasonics, TC 100: Audio, video and multimedia systems and equipment and TC 108: Safety of electronic equipment within the field of audio/video, information technology and communication technology.

IEC TC 62: Electrical equipment in medical practice, and TC 106: Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure use TC 29 Standards.

TC 29 is also a supplier of Standards to ISO (International Organization for Standardization) and to its TCs that prepare standards for Acoustics, Noise, and Use and calibration of vibration and shock measuring instruments.

Future work

TC 29 identifies a number of areas that will see significant technological advances in coming years.

Recent developments in cheaper, silicon-based microphones and the ability to modify their characteristics to give a measurement grade device means that options should open up in the future to use wireless distributed arrays of these microphones. This should help provide live ‘noise maps’, which currently are usually generated by software. Future Standards within TC 29 will include these new microphone types. Consideration will also be given to new microphones

with digital outputs, and to those with integrated preamplifiers, as well as to new techniques for optical calibration.

In the hearing aids domain, work is starting to focus on the rationalization of ear simulators and at looking at developing new devices for neonates and children.

Given the growing demand for the wide range of devices and systems covered by TC 29 International Standards, and technological progress that require new or updated Standards, this TC is set to have a full agenda in coming years and beyond.



Ground crews are submitted to loud noise from jet engines (Photo: With the permission of Rolls-Royce plc, © Rolls-Royce plc 2012)

Helping turn solar power into electricity

IEC Technical Committee works on solar photovoltaic energy systems

Morand Fachot

Together with wind and marine resources, energy generation from PV (photovoltaic) systems is a relatively recent source of renewable energy. It has been expanding dramatically in recent years and is set to provide a growing share of the future global energy mix. IEC TC (Technical Committee) 82: Solar photovoltaic energy systems, prepares International Standards that play a central role in the development of PV technology and that contribute to cost reduction and innovation and to safer, better and more efficient PV systems.

Huge and growing market

IEC TC 82 was established in 1981; it has five WGs (Working Groups) and two JWG (Joint Working Groups). About 330 participants from 33 National Committees are represented in this TC, which has published some 60 International Standards since its creation.

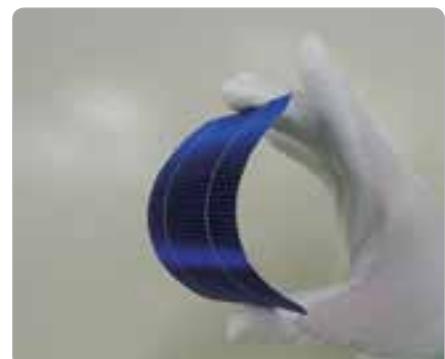
The international PV market has been growing at an astonishing rate with sales of PV modules increasing at a CAGR (Compound Annual Growth Rate) of 40% between 1981 and 2010. It is expected to grow by an additional 30% CAGR until 2020, according to data given by TC 82 Chairman Heinz Ossenbrink. This sector had a turnover in excess of USD 27 billion from the sale of PV modules alone in 2010. Global market growth (in volume) was 14% in 2012.

The international PV market is characterized by a mixed production and deployment structure with Asia, China in particular, producing 72% of the PV modules and systems, and Europe having most (76%) of the grid-connected installations. Asia is set to become a major growth area for the number of systems installed. In May 2011, then Japanese Prime Minister Naoto Kan pledged to cut the cost of solar generation power in the country by 20% by 2020 and to place solar modules on 10 million homes across Japan by 2030.

Future

Ossenbrink identified the major growth areas for PV in the future as the utility grid for peak demand, the rooftops of residential and non-residential buildings, and rural electrification.

Challenges facing the PV industry concern the lifetime energy production of systems and their rates of ROI (return on investment), extending the lifetime of modules beyond 30 years, safety (fire risks) and environmental standards (recycling and clean energy).



Ultra-thin Sanyo solar cell (Photo: Sanyo)

Needs are anticipated in a number of areas that include the construction of large utility plants and concentrator systems, inverters – required to change the DC (direct current) electricity from PV systems into AC (alternating current) for use with home appliances or feed into a utility grid – and interfaces, to name just a few.

All these and new PV technologies will mean more work for TC 82. Measuring the performance of PV modules and ensuring their safe operation are just two areas in which TC 82 prepares International Standards.

Supporting rural electrification

PV systems also offer many benefits for rural electrification; to help the best possible implementation of PV systems for decentralized rural electrification, TC 82 published 18 Technical Specifications in the IEC 62257 series that detail *Recommendations for small renewable energy and hybrid systems for rural electrification*.

The World Bank Group and the United Nations Foundation have recognized the significance of the series. Together with the IEC they announced a new cooperative agreement to provide developing countries with access to these important technical documents that support rural electrification, at a specially discounted price for qualified stakeholders.

Measuring PV energy performance

With new PV technologies being introduced all the time, a growing number



IEC International Standards for PV systems help set up rural electrification projects in developing regions (Photo: Alternative Energy Grids)

of manufacturers offer many products incorporating PV modules. Besides long-established solar modules, these include BAPV (building-attached PV), BIPV (building-integrated PV) and solar windows, also known as PVGUs (PV glass units). With this ever-expanding offer, it is getting essential for users and manufacturers to know which PV modules offer the higher energy yield over a long period.

Current methodology

PV modules power performance is currently rated in peak Watts measured under STC (Standard Test Conditions): solar irradiance of 1 kW/m², air mass 1.5 and a PV cell temperature of 25°C.

Accurate ratings are important as the maximum power value also is used as the price reference for PV modules, a particularly significant factor to assess ROI when feeding power from PV systems into grids, as investors are paid for the actual power delivered.

However, the current measurement methodology based on STC does not take into account the impact of different climatic, seasonal or environmental conditions on the performance of PV modules, which varies in any case with the technology used.

IEC methodology

To achieve more comprehensive and accurate measurements, IEC TC 82 has been working on the 61853 series of International Standards for evaluating PV module performance over a range of irradiances, temperatures and time periods spread over the year. It released the first of these International Standards, IEC 61853-1, *Photovoltaic (PV) module performance testing and energy rating – Part 1: Irradiance and temperature performance measurements and power rating*, in January 2011.

This series will give users and manufacturers much needed and more precise ratings of the performance of PV modules under different conditions than those available using the current method.

The accuracy achieved with the 61853 standards will prove essential to guide module selection for given locations and conditions.

Safety

TC 82 published IEC 62109-1, *Safety of power converters for use in photovoltaic power systems – Part 1: General requirements*, in April 2010.

The purpose of this standard is to define the minimum requirements for the design and manufacture of PCE (power conversion equipment) used in PV systems for protection against electric shock, energy, fire, mechanical and other hazards. It provides general requirements applicable to all types of PCE.

TC 82 published IEC 62109-2: *Safety of power converters for use in photovoltaic power systems – Part 2: Particular requirements for inverters*, in June 2011. This Standard must be used jointly with IEC 62109-1. It covers the particular safety requirements relevant to d.c. to a.c. inverter products as well as products that have or perform inverter functions in addition to other functions, where the inverter is intended for use in PV power systems. TC 82 may publish additional parts as new products and technologies are commercialized.

Both series of International Standards are examples of the kind of the essential work carried out by TC 82, which has allowed the PV sector to grow at such an impressive rate since its creation and which will enable it to occupy a larger share of the future global energy production.



Enecsys power inverter (Photo: Enecsys)

Making the world a safer place

IECEE is an internationally trusted partner

Claire Marchand

The last 12 months have been extremely successful and fruitful for IECEE, the IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components. Increased collaboration with international organizations, outreach to developing countries and the introduction of new services and product categories have contributed greatly to confirming IECEE as the leading global certification system for electrical and electronic products.

Kazakhstan joined IECEE

In October 2012, IECEE welcomed the Republic of Kazakhstan as its newest member country. The national member body representing Kazakhstan within IECEE is the Committee of Technical Regulation and Metrology of the Kazakh Ministry of Industry and New Technologies.

Kazakhstan's membership of IECEE put it on a par with its partners in the EEC (Eurasian Economic Commission), a three-member Customs Union whose other members are the Republic of Belarus and the Russian Federation.

This crucial move by Kazakhstan was the immediate result of negotiations held between the IEC and the EEC in Moscow, Russian Federation, in late September. IECEE membership provides Kazakhstan and its EEC partners with a strong platform for enhancing competitiveness. IECEE proof of compliance and certification will be highly beneficial to all three economies in facilitating the import of electrical and electronic goods as well as the export of products manufactured in the region.

Cooperation with IAF and ILAC

Cooperation agreements with other standardization and conformity

assessment bodies have been on the IEC agenda for many years. One such agreement, made between the Commission's three CA (Conformity Assessment) Systems, IAF (International Accreditation Forum) and ILAC (International Laboratory Accreditation Cooperation) has proved highly rewarding, with levels of collaboration increasingly constantly.

From day one, cooperation between the three organizations has evolved extremely positively on a number of technical and administrative fronts. These collaborative efforts culminated in the three organizations signing a MoU (Memorandum of Understanding) in October 2010. In 2012, the high level of confidence established between them led the IEC CA Systems and the members of ILAC and IAF to expand the scope of the first tripartite MoU.

To ensure that collaboration is as full as possible, the three organizations have

agreed to coordinate the application of standards and guidance documents for the assessment of the CBs and TLs accredited by IAF and ILAC and operating in the IEC CA Systems. The MoU also stipulates that joint training and workshops should be organized for the pool of technical assessors that are entitled to perform unified assessments of CBs and TLs.

The MoU was signed in Rio de Janeiro, on 25 October 2012, by ILAC Chairman Peter Unger, IAF Chairman Randy Dougherty and IECEE Executive Secretary and COO Pierre de Ruvo, on behalf of IEC General Secretary and CEO Frans Vreeswijk.

Focus on industrial automation

The complexity and sophistication of today's systems and equipment in industrial plants require a specific approach to safety, including functional safety, and security. To provide improved response to industry and market needs,



The introduction of IT enabled engineers to create increasingly complex control systems fully integrated with the factory floor

IECEE and its WG (Working Group) 2: Business Development, have produced a new service entirely dedicated to industrial automation. One of the first tasks undertaken by WG 2 was to gather into one product category – INDAT – all the existing IEC International Standards that have a direct bearing on products used in this area.

The introduction of the INDAT product category has benefits for industry as well as for IECEE CBs (Certification Bodies) and TLs (Test Laboratories):

- it provides a platform offering progressive support of global recognition and acceptance of industrial automation products
- it allows for the sharing of expertise, knowledge and tools that enable third-party CBs to deliver compliance services pertaining to the functional safety of industrial automation products
- it provides easier and faster market access for industry, eliminates the need for multiple testing and ultimately drastically reduces the costs associated with the global roll-out of products

IECEE-AFSEC Seminar in Kenya

The first international seminar jointly organized by IECEE and AFSEC (African Electrotechnical Standardization Commission) took place in Nairobi, Kenya 26-27 August 2013.

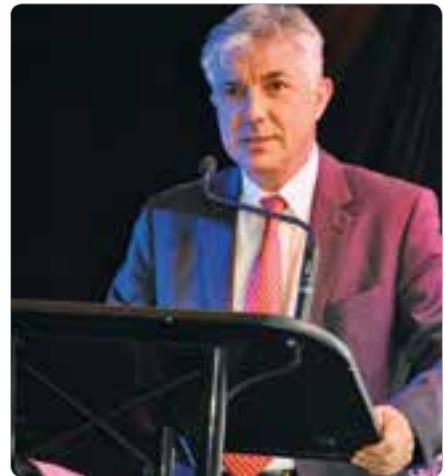
The two day event included a general presentation of conformity assessment at the IEC, as well as three specific sessions on electrical safety for refrigerators, luminaires as well as audio and video electronic equipment.

International experts helped African delegates understand the mechanisms to check the conformity of specific products against IEC International Standards and how to access online certificates. Participation in the event was a great opportunity for gaining new insight into the importance of conformity assessment systems, the IECEE system in particular, and the need for African countries to build their capacity in this regard.

The event was organized in collaboration with several African organizations: AU (African Union), AFREC (African Energy Commission of the African Union), and

KEBS (Kenya Bureau of Standards) in partnership with two Kenyan laboratories.

Pierre de Ruvo to step down at the end of the year



IECEE Executive Secretary and COO Pierre de Ruvo during his speech in Vancouver, Canada

As in previous years, IECEE held its annual series of meetings at the beginning of the summer, this time in Vancouver, Canada, from 17 to 21 June 2013. What distinguished this year's gathering was the announcement that IECEE Executive Secretary and COO Pierre de Ruvo would step down at the end of the year.

In a very personal and heartfelt speech inspired by Frank Sinatra's song *My Way*, de Ruvo took the opportunity to reminisce about the 14 years he has spent at the helm of the IECEE, "a system where there are no premium Members, but Members adhering to a common objective...[to] facilitate trade through mutual recognition".

The following lines, taken from de Ruvo's speech, highlight the spirit in which he is leaving the IECEE: "I am confident that the work we've done thus far will put the IECEE in good stead for many years ahead. [...] Whatever major challenges may lie ahead, I hope that the future IECEE will remain the reference, the unique global recognition system, yet one that truly facilitates trade and be invaluable across industrialized countries to developing nations".



Circuit-breaker testing

Reining in explosive atmospheres

IECEx promotes safety and awareness

Aliyah Esmail

IECEx, the IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres, looks at equipment in areas where flammable gases, liquids and combustible dusts may be present. This System provides the assurance that equipment is manufactured to meet international safety standards, that services such as installation, repair and overhaul also comply with IEC International Standards on safety and that persons working in Ex areas are competent to do so. The UNECE (United Nations Economic Commission for Europe) recommends IECEx as the world's best practice model for the verification of conformity in International Standards.

IECEx certificates go mobile

IECEx launched the first mobile application to show international certificates for equipment used in explosive atmospheres. Now the person in the field can look at a piece of installed equipment and the app provides them with the ability to confirm that there is a valid certificate for the apparatus on the IECEx online Certificate System.

This free application of the IECEx online Certificate System, for iOS, Android tablets and smart phones, can be found at the Apple App Store and Google Play. It installs a simplified version of the main IECEx online Certificate System covering Certified Ex Equipment and allows the user to synchronize the Ex Mobile App with the IECEx online Certificate System, as required. The offline mode provides advanced search capability and CoC (Certificates of Conformity) abstracts (simplified details), while the online version gives the full details of CoC.

Encouraging the Ex sector to be safe

IECEx and UNECE presented a joint paper at the PCIC (Petroleum and Chemical Industry Committee) Middle East Conference in Abu Dhabi, United Arab Emirates. Co-authored by Chris Agius, IECEx Executive Secretary, and Lorenza Jachia, Head of Unit, Regulatory Cooperation, UNECE, the paper, entitled *IECEx System – Evolution and role of the United Nations, UNECE*, provides an in-depth analysis of the IECEx System and the rationale behind its endorsement by UNECE as the internationally recognized certification system for promoting the safety of equipment, services and personnel associated with devices, systems and installations used in explosive areas.

IECEx and UNECE have worked closely for several years to develop a model for legislation in the Ex (explosive) sector. Any Member State that has no regulatory framework in the explosive equipment sector can use the model as a blueprint for legislation. If countries already have such a framework, they can consider gradually centralizing the approach with this international model. Once the model has been adopted as national legislation, it will enable the sector to operate under a single common regulatory framework in all participating countries.

Conference on safety in the Ex field

Safety is paramount in Ex areas. If equipment is not manufactured, installed, maintained, inspected or repaired by competent persons and according to strict Ex standards, the results can be devastating.

As part of the 2013 series of annual IECEx meetings in Fortaleza, Brazil, IECEx hosted a special one day workshop/conference, a joint venture between IECEx, UNECE and the Brazil National Committee. The event provided



Mine workers used to send canaries to see if there was going to be an explosion. Today IECEx can help keep people in mines safe

a unique opportunity for industries throughout South America to get better acquainted with IEC International Standards and Conformity Assessment Systems in general and find out how they can derive the most benefit from the IECEx services. These cover Ex equipment and systems, repair and overhaul facilities, and certification of personnel competence.

IECEx at the Australasian Oil and Gas Exhibition and Conference

Mark Amos and Wal Robson represented IECEx at the Conference in Perth, Australia. As Australia's largest annual oil and gas event, it covers all aspects of their exploration and production, including subsea and offshore technology, pipelines, engineering, procurement, personnel, design and construction. The Conference programme included



Oil rigs and other Ex sectors need to provide the required levels of safety in equipment and personnel

sessions that discussed health, safety, the environment, education, training and skills.

Exhibitors were interested to hear about the IECEx Service Facilities and IECEx Certification of Personnel Competence



Explosive atmospheres can be caused by flammable gases, mists, vapours or by combustible dusts

Schemes. Many of them confirmed that they felt it provided credible recognition of their experience. They said it was an invaluable credential that assisted their business operations.

Amos and Robson were delighted to discover that the level of awareness of IECEx's work was high. They were also pleased to see the prominence given to its logo on many exhibitor stands.

IECEx-AFSEC seminar raises awareness in the Ex sector

The first international seminar for the Ex sector, jointly organized by IECEx and AFSEC, took place in Abidjan, Côte d'Ivoire. The seminar brought together 40 delegates from nine African countries who represented the oil, gas

and electricity industry sectors, hospitals, NSBs (National Standardization Bodies), telecommunications organizations, ministries and industry.

Participants were able to familiarize themselves with the structure and content of the IEC International Standards prepared by IEC TC 31: Equipment for explosive atmospheres. These publications are essential for anyone using equipment and installations in a potentially hazardous environment. They also had onsite sessions where participants had to use and apply the knowledge acquired previously to do a series of practical exercises prepared by the course instructors. This gave the delegates the opportunity to go through the steps involved in Ex site inspections.

Failures avoided

IECQ certification makes components reliable

Aliyah Esmail

IECQ, the IEC Quality Assessment System for Electronic Components, ensures the safety and reliability of electronic components used in the IT, avionics, and a number of other industries. It also monitors and tests the use of hazardous substances in electrical and electronic equipment and provides assessment and certification for facilities that handle unprotected ESD (electrostatic discharge) sensitive devices.



Counterfeit parts in the aerospace sector are a hazard

Faster and more accurate information on the new IECQ webpage

The new and totally revamped website provides quick access to frequent visitors and first time users to IECQ services, publications and documents, online certificates, working groups, events and meetings or an overview of what the System offers. The website is a powerful tool that allows all levels of users to find the information they are looking for.

Avionics industry aims to limit the use of lead in its components

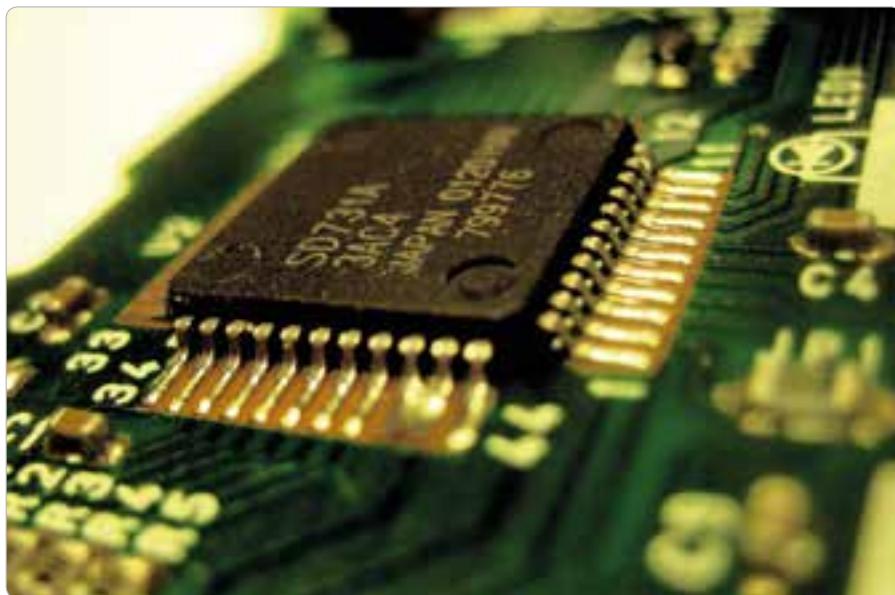
The avionics and increasingly other industries depend on the IECQ Electronic Component Management Plan to assess suppliers and safely manage their components' supply chain. IECQ also allows manufacturers to more easily comply with increasingly strict hazardous substances regulations.

To enhance this, the IEC published the 2nd edition of IEC/TS 62239-1,

Process management for avionics – Management plan – Part 1: Preparation and maintenance of an electronic components management plan, which now includes the management of lead-free termination finish and soldering of avionic components.

IEC/TS 62239-1 documents processes that assure customers and regulatory agencies that ADHP(aerospace, defense, and high performance) electronic systems containing solder (either traditional tin/lead or lead-free solder), lead-free or tin/lead finished piece parts, and printed wiring boards will meet the performance, reliability, airworthiness, and safety requirements throughout the component's lifecycle.

ADHP is one of the few industrial sectors where lead-free materials and processes are relatively new. An aerospace-wide approach has been developed. The industry can now create a plan that



The smallest components make the biggest difference

allows manufacturers to ensure the reliability of the components it uses and make sure that these components are secure for the long-term.

Hazardous substance-free components

IECQ published the 3rd edition of IECQ QC 080000, *Hazardous Substance Process Management System Requirements*. The specification and its requirements are based on the strong belief that the provision of hazardous substance-free products and production processes can only be achieved by integrating management disciplines fully.

The 3rd edition clarifies how organizations can use IECQ QC 080000 to manage

their hazardous substances other than through the outright removal of restricted substances and avoiding their use in products.

IECQ HSPM (Hazardous Substance Process Management) is a technically-based management systems approach to implementing and maintaining hazardous substance-free products and production processes. IECQ HSPM was developed in response to component manufacturers' need to give suppliers the means of demonstrating, through third-party assessment, that their electrical and electronic components and assemblies meet specific hazardous substance-free local, national and international requirements.



With IECQ certification, companies can reduce cost and spend less time testing their components

Countering counterfeiting in aerospace, defense and other industries

Counterfeiting has proven to be a viable and lucrative industry in many areas of the world, specifically the counterfeiting of microcircuits used in electronic devices. IECQ has launched a programme designed to address the international counterfeit crisis faced by the ADHP sectors.

The new IECQ CAP (Counterfeit Avoidance Programme) is designed for and by manufacturers and distributors, to tackle the management processes required to avoid and mitigate contamination in the supply chain by counterfeit or fraudulent electronic components. The objective is to stem the increase in the proliferation of counterfeit electronic parts, which pose significant performance, reliability, and safety risks worldwide.

IECQ CAP certification is internationally recognized because it provides independent monitoring and verification of components and systems, including the auditing of systems.

Increased electronic component dependability in cars

The automotive industry now has a standardized way of testing components to ensure their reliability. IECQ AQP (Automotive Qualification Programme) helps automotive manufacturers avoid multiple tests and related costs. It can also be used by independent, third-party certification bodies to make sure that components meet automotive industry standards. Now all parts can be certified where they are manufactured.

IECQ also has approved laboratories in direct support of IECQ product testing. This approach helps automotive manufacturers to reduce time and cost of seeking qualified laboratories, training, management, monitoring and verification.

Honouring IEC Award winners

Janice Blondeau

Each year the IEC pays tribute to the commitment and work of some of members of the IEC family who, through their outstanding leadership and expertise, have contributed to making products and electrical systems safer, more energy efficient and more compatible.

2013 Thomas A. Edison laureates

Created in 2010, the annual Thomas A. Edison Award recognizes exceptional achievements of TC/SC officers (Chairmen, Secretaries or Assistant Secretaries of Technical Committees or Subcommittees) and other officers of the IEC Conformity Assessment Systems and their subsidiary bodies.

To be nominated, TC and SC officers need to be active in IEC work. They must also have made an outstanding contribution to IEC systems and international standardization work, helping their committees to work more effectively on behalf of key stakeholders. The Award is given to up to nine recipients each year by the SMB (Standardization Management Board) and CAB (Conformity Assessment Board). Seven of these are reserved for



The IEC 1906 award recognizes technical experts who have made an exceptional contribution to IEC work

TC/SC officers, and a maximum of two are reserved for officers in the conformity assessment bodies.

In 2013 the SMB chose five TC/SC officers to receive the Thomas A. Edison Award:

- Sonya Bird, Secretary of TC 61: Safety of household and similar electrical appliances.
- C. (Tony) Capel, Chair SC 65C: Industrial networks
- Bernd Göttert, Secretary of TC 112: Evaluation and qualification of electrical insulating materials systems
- Toshihiro Kojima, Secretary of TC 49: piezoelectric, dielectric and electrostatic devices for frequency control
- Wolfgang Nieuwkamp, Secretary SC 61J: Electrical motor-operated cleaning appliances for commercial use.

Three of the 2013 laureates of the IEC Thomas A. Edison Award will receive their honours from IEC Vice-President Jim Matthews, SMB Chairman, during the SMB session at the 2013 IEC General Meeting.

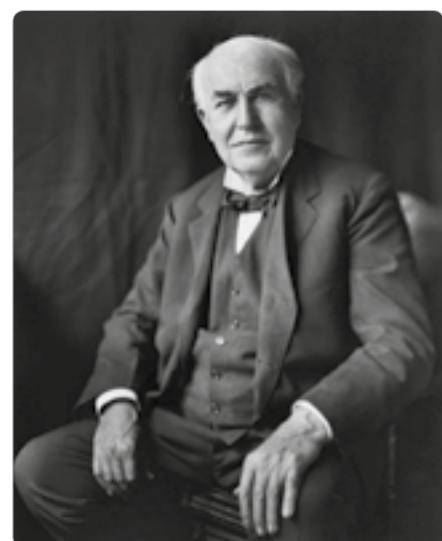
foundation in that year. It honours technical experts around the world whose contribution is deemed to have made an exceptional contribution to the advancement of the IEC's work.

Every year a maximum of five awards may be granted per TC (Technical Committee), including its various subcommittees.

In 2013, 165 experts from 58 Technical Committees (ISO/IEC JTC 1 included) and 25 National Committees have been nominated to receive the 1906 Award.



The Thomas A. Edison Award honours exceptional achievement in their IEC committee work by currently active TC/SC officers and CA systems officers



Thomas A. Edison is credited with many inventions including the first commercially practical incandescent light and electricity distribution systems

1906 Award

The IEC 1906 Award was established in commemoration of the Commission's

New hands on the IEC tiller

Changes in IEC top management

Janice Blondeau

Since the 2012 IEC General Meeting, the Commission has seen a change of leadership, in the form of a new General Secretary & CEO and a new 3rd Vice-President.

Frans Vreeswijk, IEC's new General Secretary & CEO

Frans Vreeswijk took over the role of IEC General Secretary and CEO from 1 October 2012. He succeeded Ronnie Amit, who served as IEC General Secretary from 1999 until 30 September 2012.

Vreeswijk, an electrical engineer by training, spent almost 30 years in research, development and general management with Philips. He has a strong personal interest in and commitment to electrotechnology standardization, as well as an understanding of the benefits that participation in IEC work brings to industry.

"Companies who sit at the table where the technical rules for global trade are written, avoid that the competition writes those rules for them," said Vreeswijk.

Vreeswijk became the IEC Deputy Secretary General on 1 March 2012 to facilitate a smooth leadership transition.



Frans Vreeswijk, IEC General Secretary & CEO



Frans Vreeswijk and Ronnie Amit

Familiar with the IEC, he had been the President of the IEC Dutch National Committee and had served on the IEC CB (Council Board) and the IEC SMB (Standardization Management Board).

See related articles in *e-tech* issues 09/2012 and 01/2013.

Dr Shu Yinbiao, 3rd Vice-President of IEC

Dr Shu Yinbiao, who began his three-year term as IEC Vice-President in 2013, has the responsibility for leading both Market Strategy Board membership renewal and the technology-watch effort.

Dr Shu is the President of SGCC (State Grid Corporation of China), a member of Energy Experts Consultative Committee of the Chinese State Council, and Acting chairman of CSEE (Chinese Society for Electrical Engineering). By training he is a senior engineer in power systems and automation and at IEC he has the responsibility of fostering efforts to remain close to the market.

Since 2008, Shu has already served as the secretary of IEC TC 115: High Voltage

Direct Current (HVDC) transmission for DC voltages above 100 kV; he has been a member of the SMB SG (Strategic Group) 2 on UHV (Ultra High Voltage) Technologies; and also a member of MSB. In February 2012, following the formal end of Enno Liess's MSB convenorship, the IEC President appointed Shu as Convenor of the Market Strategy Board. He has served in this role since then.

Please see profile of Dr Shu in issue 04/2013 of *e-tech*.



Dr Shu Yinbiao, IEC Vice-President

Mentoring and training

IEC programmes to help broaden participation

Claire Marchand

In a world in constant evolution, where new technologies are developed every day and new markets are emerging, the role played by IEC standardization and CA (Conformity Assessment) activities is bound to be more important than ever. For this to happen however, the IEC needs to increase awareness of, and enhance participation in its work. To this end, the IEC has set up specific programmes aimed at its members and Affiliate countries.

Mentoring helps move forward

Recognizing that mentoring can help countries move forward in their work with the IEC, the Commission has established a Mentoring Programme for its Members and Affiliate countries. The purpose of the programme is to broaden participation at all levels by encouraging long-established NCs to mentor and share their experience with other NCs (National Committees) and Affiliates' NECs (National Electrotechnical Committees).



The IEC Mentoring Programme will help experts share knowledge, experience and expertise between peers

The IEC has been a pioneer in bringing the benefits and advantages of involvement in the IEC to many countries throughout the world, not only through membership and the Affiliate Country Programme, but also for example by opening up membership of its CA Systems to countries that are not yet part of the IEC family.

Through its mentoring programme, the IEC will further increase support to countries that want to build their capacity for greater participation in the Commission's technical work. NCs and Affiliate NECs participate in the programme on a voluntary basis for a maximum duration of two years.

Benefits for NCs and Affiliate NECs

The mentoring programme will help NCs and Affiliate NECs at the management and technical levels. Mentoring at the management level will focus on the reinforcement of the NC or NEC structure and its mirror committees, as well as on the adoption of IEC International Standards as national ones. Technical mentoring will enhance the participation of experts, focusing on the procedures for commenting on IEC International Standards during the development and providing guidance in understanding the requirements laid out in these Standards.

Both mentor and mentee, not to forget the IEC, are bound to gain from the partnership they engage in. Stronger ties may provide mentoring countries with new business opportunities in developing or emerging markets. The fast-track approach will help mentees enhance their participation in IEC standardization work and have their voice heard sooner rather than later, thus reinforcing the truly global and leading role played by the IEC in the electrotechnical field.



Some of the mentoring will be done via video conferencing

Off to a good start

Two mentoring agreements have already been signed, one between Austria and Rwanda, the other between Germany and the Czech Republic.

Mentoring may take place via phone, email, Skype, participation in meetings via webinars, one-to-one meetings for example during the IEC General Meeting, and at workshops organized either by the mentor or the mentee.

More information

For more information about the Mentoring Programme or to register please contact: NCs interested in participating either as a mentor or as a mentee: Reena Teuber. Interested Affiliates: Thomas Robertson.

Regional training workshops

The IEC has brought training sessions and workshops to several regions of the world.

The first set of trainings and workshops, organized by IEC TISS (Technical Information and Support Services) and the Asia-Pacific Regional Centre, took place in Asia in May 2012. Four

Faucibus

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Several NCs and many technical experts have benefited from the workshops organized in their region

countries were selected: China, Singapore, Japan and Korea.

In 2013, the training focused first on Latin America. Workshops were organized

in Brazil, Chile, Argentina together with the IEC Latin America Regional Centre. Then it was back to Asia, where four countries were on the agenda: Indonesia, Singapore, the Philippines and Thailand.

In September, a training workshop took place in Nairobi for the Kenyan NC.

Because all these countries have different needs, demands and expectations in terms of infrastructure and development, the format and content of the workshops were adapted to each specific audience. While providing training for participants, helping them get better acquainted with, and encouraging them to participate more actively in with IEC technical and CA activities, the IEC also learned much from the experience.

There is a definite need for more regular training workshops to bring a larger audience from industry onboard.

Go Ahead, Get Ahead

IEC Young Professionals – 2013 Workshop



The IEC Young Professionals workshop, Oslo, October 2012

Janice Blondeau

IEC NCs (National Committees) have selected their 2013 IEC YPs (Young Professionals) who will represent their country at the third YP workshop to be held during the 77th IEC General Meeting in New Delhi, India, on 21-23 October 2013.

Who are the IEC Young Professionals?

They are technical, managerial and/or engineering professionals in their 20s and 30s. They are already familiar with the world of standardization and CA (Conformity Assessment), either because they develop standards or

because they use them in their work. They have all been through a selection process handled by their National Committee, in order to have a place at the IEC Young Professionals – 2013 Workshop. To them we say Welcome!

Wide NC support

Almost 30 NCs have registered participants for the IEC Young Professionals – 2013 workshop. For many this workshop will be their first exposure to an IEC General Meeting and to standardization and conformity assessment at such a high level.

The IEC Young Professionals programme was launched in 2010 as a means of getting Generation Y more involved in IEC activities at the start of their careers. Since then 38 National Committees have been represented in the YP programme, with participants coming from all geographical regions.

Faucibus

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The IEC YP programme sees Generation Y more involved in IEC activities

2013 workshop

The 2013 workshop takes into account feedback received from participants of previous year's activities. It starts with a welcome gathering on the first evening and then follows a programme that gives both an overview and insights into the workings of the IEC. On the 2nd day of the workshop the IEC Young Professionals will attend a technical meeting of their choice, followed by lunch with the IEC community. The day winds up with a dinner for the IEC Young Professionals.

The 3rd day of the workshop starts with a working breakfast where the YPs meet and network with their country's NC Officers. Interactive sessions on four different subjects follow, including how

YPs can become more involved with the IEC after the workshop. There is also an Open Space session, facilitated by previous years Young Professional Leaders and the day wraps up with an industry visit.

The Young Professional Leaders from 2012 will present their individual projects designed to help participants maximize their IEC activities. The 2013 group will also select Young Professional Leaders for 2013.

Deeper understanding of standardization

YPs from the previous workshops have given positive feedback. They have come away from the three-day gathering with a

deeper understanding of standardization, a broadened network and the satisfaction of feeling part of a bigger world in which they have a personal role to play.

Their employers have also seen the benefits of the IEC Young Professionals programme. By enabling their employees to take part in the IEC Young Professionals' programme, companies have provided their staff with fast-track access to the world of standardization and boosted their personal motivation. At the same time the company profile has improved in the eyes of the customers.

The IEC Young Professionals – 2013 workshop will be held in New Delhi, India, on 21 to 23 October, in parallel with the IEC 2013 General Meeting.



The YP programme participants are upcoming technical, managerial or engineering experts

Committed to IEC Standards for all

IEC Affiliate Country Programme promotes the IEC throughout the world

Aliyah Esmai

Launched in 2001, the IEC Affiliate Country Programme offers a form of participation in the IEC without the financial burden of actual membership and enhances the participation of developing countries in International Standardization. It provides these countries with a greater awareness of standardization and conformity assessment. It helps

them understand how existing International Standards can be adopted at a national level, then applied and used for greater safety and efficiency in the context of economical and industrial expansion. To meet this objective the free IEC Programme for developing countries also aims at enhancing their participation in the development of IEC International Standards.



Saint Kitts and Nevis and South Sudan joined the Affiliate Country Programme with the hope that trade will be facilitated



ACAS provides developing countries with a better understanding of the specific requirements linked to conformity assessment activities

From Oslo to Delhi

Since the 2012 IEC General Meeting, the number of Affiliate Countries has increased to 83, with South Sudan and Saint Kitts and Nevis the latest countries to join the IEC family. Five countries, Bhutan, Burundi, Cambodia, Ethiopia and Gabon, established NECs (National Electrotechnical Committee) that provide them with a basis from which to expand their future national electrotechnical standardization activities.

After having set up a NEC and adopted at least 50 IEC International Standards as national standards, two more countries have been granted Affiliate Plus status, Ethiopia and Ecuador. This enables them to adopt a greater number of IEC International Standards for free and provides access to a mentoring programme designed to facilitate their participation in IEC work.

Since Oslo, 5 countries have declared additional adoptions of national standards – Afghanistan with 89, Bangladesh with 149, Ecuador with 50, Ghana with 270, and Zambia with 107. Three new countries have declared adoptions and they are Azerbaijan with 2, Bhutan with 13, and the Dominican Republic with 2.

South Sudan and Saint Kitts and Nevis join the IEC

South Sudan became one of the newest Affiliate Country in the IEC family even though it does not yet have a National Standards Body, but is affiliated through its Ministry of Electricity and Dams. The next step for South Sudan will be to bring together its stakeholders to establish a NEC and start benefiting from what the IEC can offer to support electrification programmes and ensure electrical safety for the population.

Saint Kitts and Nevis joined the IEC in September 2013. The Affiliate Country Programme will give Saint Kitts and Nevis a form of participation in the IEC and the ability to adopt those IEC International Standards that are relevant for the local economy, free of charge. This will help Saint Kitts and Nevis increase the awareness, use and adoption of IEC International Standards and, together with conformity assessment, support economic development and trade.

African affiliates enhance IEC involvement

Paul Johnson, Executive Secretary of AFSEC (African Electrotechnical Standardization Commission) and

Secretary of the IEC NC (National Committee) of South Africa, represented IEC at the SADCSTAN (Southern African Development Community Cooperation in Standardization) meeting in Angola. At the event in Luanda, Johnson presented a message of support from the IEC to SADCSTAN members. He informed delegates that there were now eight National Committees in Africa, including South Africa (currently the only Full Member of the IEC in the SADC region). He told them that since the last SADCSTAN meeting in April 2012, IEC Affiliate Countries in the SADC region had received 115 copies of IEC International Standards to consider for national adoption.

Evah Oduor, Affiliate coordinator for Africa, represented the IEC at the ARSO (African Organisation for Standardisation) General Assembly in Yaounde, Cameroon. The meeting was attended by 22 countries. Five of the countries are Members of the IEC and 17 are Affiliate Countries. Odour presented the IEC Affiliate Country Programme highlighting the benefits of the programme.

Participation in AFSEC General Assembly

The IEC participated in AFSEC's third General Assembly held in Nairobi, Kenya. The meeting was attended by 62 delegates representing 14 African Countries. At this meeting AFSEC members approved the recommendation from the IEC mirror committees to adopt as pan African electrotechnical standards IEC International Standards from TC 13: Electrical energy measurement and control, TC 64: Electrical installations and protection against electric shock, and TC 57: Power systems management and associated information exchange. AFSEC Members also decided to add TC 82: Solar photovoltaic energy systems to their list of IEC mirror committees and to establish a conformity assessment committee whose members will be appointed at the next General Assembly to be held in DRC in September 2014.



The IEC Mentoring Programme is designed to facilitate participation of a greater number of countries in IEC work

IEC visits the DRC

The DRC (Democratic Republic of the Congo) has been an Affiliate Country since 2001 through OCC (Office de Contrôle Congolais) which carries out both standardization and conformity assessment activities. Since the meeting with the DRC delegation in Ouagadougou in March 2012, for the joint IEC/ISO course on adoption held in Burkina Faso, the DRC has made tremendous progress and established its NEC with the support of the Affiliate Secretariat. The first general assembly of the NEC took place in Kinshasa in April 2013. The DRC was granted the Affiliate Plus Status in 2012.

Françoise Rauser, the Affiliate Executive Secretary and IEC International Liaison Officer, visited the DRC with the aim of encouraging NEC members to participate actively in IEC technical work. She also raised the awareness of the ministerial authorities on the importance of using

IEC International Standards for OCC Conformity Assessment activities, in particular in the southern mining province of Katanga.

Facilitating participation in international standardization

A workshop was organized by the Standards Council of Canada under the CATRTA (Canada-Americas Trade-related Trade Assistance) programme. The aim of this programme is to reduce barriers and challenges to the adoption of International Standards and stimulate participation in international standardization work in Latin America and the Caribbean.

The workshop, which took place in Saint Lucia, showed participating countries how they could become more involved with the work of organizations such as the IEC. Amaury Santos, the IEC LARC Regional Centre Manager delivered a training programme to help workshop

attendees and their countries increase participation in the IEC. Santos outlined IEC Affiliate Country Programme benefits and explained how IEC International Standards together with conformity assessment promote the safety of electrical and electronic devices, help protect the environment, and allow them to successfully combat the influx of counterfeit products.

IEC launches Affiliate Conformity Assessment Status

Recognizing the need to raise awareness and provide a better understanding of the specific requirements linked to conformity assessment activities, the IEC Affiliate Country Programme Secretariat, in collaboration with CAB, has launched the new ACAS (Affiliate Conformity Assessment Status).

ACAS will offer Affiliate participants new benefits in all IEC Conformity Assessment Systems, IECEE, IECQ and IECEx, including any future CA (Conformity Assessment) Systems established by the IEC. The objective is to train Affiliate Countries to use IEC International Standards and benefit from its CA Systems through the recognition of IEC CA Certificates, whenever possible at the national level. These benefits include:

- Regional awareness events;
- Documentation and guides on CA at the IEC;
- Webinars (upon request);
- Learning modules on IEC website and CD-ROMs (under development);
- A resource database (under development); and
- Active participation in each system, based on prerequisite training.

Any Affiliate Country that has met the following criteria is entitled to ACAS: officially declared the adoption of IEC International Standards as national standards; signed the ACAS Pledge; and made the commitment to use the ACAS Learning Modules. Existing IECEE Affiliates have automatically been granted ACAS and have a year to sign the pledge document.

IEC is part of the energy conversation

Janice Blondeau

Access to energy is one of the most important challenges facing the world today. In 2011, the UN Secretary General, Ban Ki-moon, made sustainable energy one of his five priorities by launching the SE4ALL (Sustainable Energy for All) initiative. By 2030, the UN has set a goal of universal energy access for all countries, with a clear emphasis on efficiency, energy safety and sustainability. At both international and regional levels the IEC is part of the energy conversation, participating in the SE4ALL platform and attending key meetings of energy leaders.

IEC active in SE4ALL

Energy workshops map out sustainable future

Towards Universal Energy Access: An Asian Perspective, a workshop held under the SE4ALL initiative, took place in Phnom Penh, Cambodia in March 2013. At the two-day workshop which brought together more than 100 participants the IEC was represented by Dennis Chew, Regional Director IEC-APRC (Asia-Pacific Regional Centre).

Practitioners, investors and experts met to discuss the market developments,

innovations and financing opportunities relating to improving energy access in rural areas. Chew's contribution to emphasized the importance of using innovative technologies. He told attendees that to improve access to energy in rural areas innovative solutions such as micro/minи-grids are required.

During some of panel sessions, the work of the IEC and the IEC technical specification IEC TS 62257 on rural electrification drew interest from participants. Questions were also raised on the availability of IEC standards on mini-grids as entrepreneurs were interested in providing electricity at a larger scale by bundling several towns under one mini-grid.

Suzanne Yap, a Technical Officer with IEC-APRC, attended a related event called Advancing Energy Access in South Asia. The conference, which took place in Patna, India, included Yap as one of the panelists at the session titled "Setting the Right Policy Framework". The event provided an opportunity to share best practices and ongoing work of entrepreneurs delivering decentralized energy services in India and in other south Asian countries where mini-grid and off-grid clean energy solutions are relevant to achieving universal energy access.

UN Foundation Energy Access Practitioner Network

The IEC is also active in the UN Foundation Energy Access Practitioner Network that addresses market barriers to the achievement of universal energy access. It works closely with other international organizations such as the World Bank, the United Nations Industrial Development Organization, the International Renewable Energy Agency, the International Finance Corporation, and many other organizations.

On 14 May 2013, a webinar with 160 participants from all over the world, jointly hosted by the UN Foundation's Energy Access Practitioner Network and the Clean Energy Solutions Center explored the importance of global quality standards as a means of protecting consumers and reducing the barriers that practitioners traditionally face. The IEC presented three packages of rural electrification standards.

4th Clean Energy Ministerial looks for answers

IEC General Secretary and CEO Frans Vreeswijk participated in CEM4 (the 4th Clean Energy Ministerial) in New Delhi, India, on 17 April 2013. Vreeswijk was a panellist in one of a series of high-level public-private roundtable discussions. The roundtable, on mini-grid development, allowed practitioners and policymakers to identify the obstacles to further scaling up of mini-grids and potential solutions to achieve universal energy access. Vreeswijk outlined how the IEC can facilitate the broad roll-out of energy technologies, providing truly global reach and state-of-the art expertise.

It was the opportunity for the IEC also to announce the new IEC TS (Technical Specification) 62257-9-5 to expand access to modern off-grid lighting among low-income households in developing countries. The new specification for solar-powered LED (light-emitting diode) lighting devices such as solar lanterns, represents an important step to aid governments to harmonize their national standards and paves the way for market expansion for quality-assured devices.

CEM is one of the few regular meetings that brings together energy ministers, industry, academics and non-governmental organizations to discuss clean energy. The Clean Energy Ministerial (CEM) was launched in 2010 as a high-level intergovernmental forum to promote policies and programmes



IEC brings its expertise to the global energy conversation (Photo: Norsk Hydro)



IEC President Klaus Wucherer has represented the IEC at key energy events during the past year

greenhouse gas emissions and 90% of global clean energy investment.

Wucherer and Vreeswijk join energy leaders in Washington

IEC President Klaus Wucherer and General Secretary and CEO Frans Vreeswijk represented the IEC at the GSEP (Global Sustainable Electricity Partnership) annual summit in Washington D.C. from 5 to 7 June 2013. The summit brought together the heads of the largest electricity companies in the world.

Wucherer and Vreeswijk shared insights into the benefits that IEC work brings to the energy solutions of the future. During the summit, Wucherer participated in a panel discussion on the impact of emerging technologies and innovations on the utilities' current business models. In addition the IEC hosted a session on energy microgrids for disaster resilience and recovery.

The Global Sustainable Electricity Partnership is an organization of the world's leading electricity companies that promotes sustainable energy development through electricity sector projects and human capacity building activities in developing and emerging nations worldwide.

Smart Grid World Forum

The IEC, the State Grid Corporation of China (SGCC) and VDE, the Association for Electrical, Electronic & Information Technologies in Germany organized the World Smart Grid Forum 2013 in Berlin from 23 to 25 September 2013. One aim of the Forum was to help shape the path towards strong Smart Grids, Smart Communities and Smart Cities. The Forum was designed as a business, regulatory and technical executive perspective because it was important to the organizing institutions to capture not only the technical challenges and the decision-making aspects of roll-out of Smart Grids. More than 600 participants from 40 countries and all regions gave input into the Results & Recommendations document.



Recommendations from the World Smart Grid Forum 2013 call for greater international and regional cooperation and exchange

that advance clean energy technology, to share lessons learned and best practices, and to encourage and

facilitate the transition to a global clean energy economy. The 23 participating governments account for 80% of global

The year in events

A roundup of the key events attended by the IEC



The IEC facilitates trade by complying with the Six WTO TBT Principles for the Development of International Standards

Zoé Smart

Every year the IEC organizes and participates in a number of events, promoting IEC activities, engaging stakeholders and staying on top of the latest developments in electrotechnology and beyond. Below is a selection of events attended by Central and Regional Office management in the past 12 months.

WTO TBT (Technical Barriers to Trade) Committee

In March, General Secretary and CEO Frans Vreeswijk and Françoise Rauser, Secretary of the IEC Affiliate Country Programme attended the WTO TBT Committee. Vreeswijk and Rauser spoke to the Committee about the ways in which the IEC facilitates trade as well as the important role the IEC plays in helping developing and developed countries build safe and efficient energy and communication infrastructures.

CANENA

The Council for Harmonization of Electrotechnical Standards of the Nations of the Americas held its annual meeting from the 27-28 February in Montreal, Canada.

IEC Vice-President and SMB (Standardization Management Board)

Chairman James E. Matthews III spoke at the event, whose theme this year was Putting Regional Standardization in a Global Context. Matthews III gave an account of the latest IEC activities, highlighting the role of the MSB in identifying and setting strategies for IEC involvement in future technologies.

Asia-Pacific regional events

ACCSQ (ASEAN Consultative Committee on Standards and Quality)

The ACCSQ's main objective is to develop and implement measures for an ASEAN (Association of Southeast Asian Nations) Economic Community in the area of standards, conformity assessment and technical regulations. The 2013 meeting, held in April in Kuala Lumpur was attended by IEC-APRC Regional Director Dennis Chew, IEC President-elect Junji Nomura and IEC President Klaus Wucherer. Chew said of the event: 'The ACCSQ meeting provides IEC Officers with an opportunity to network with key and high-level standards officials in ASEAN, and to

raise the IEC profile in the region'. Wucherer was also interviewed on a morning radio show as part of the event and spoke at an Industry Breakfast Forum about how standards and conformity assessment impact every aspect of the supply chain, level the playing field in particular for SMEs and allow markets to grow.

APEC JRAC (Joint Regulatory Advisory Committee on Electrical and Electronic Equipment)

Attended by a host of representatives from regional countries, this year's JRAC meeting was held in Surabaya, Indonesia, in April. The meeting's key agenda was the sharing of the latest regulatory developments in the representatives' respective economies. Chew was present at the meeting and gave an introduction and update on the IEC's activities.

7th lites.asia meeting

lites stands for Lighting Information and Technical Exchange for Standards and lites.asia is a network that seeks to facilitate policy maker cooperation within



IEC Vice-President and SMB Chairman Jim Matthews represented the IEC at CANENA

the Asia region to improve knowledge of published and draft standards as well as to increase the participation of regional economies in the IEC standards development process. The *lites.asia* meeting held in April in Jakarta, Indonesia, focused on IEC activities related to CFLs and LEDs and general updates from members on national standards, labelling and enforcement activities related to lighting. Close to 50 participants from 9 countries took part, with the IEC-APRC office represented by Damien Lee.

Experts from Australia, the Philippines and Indonesia, who had attended the recent IEC TC (Technical Committee) 34: Working Group meetings presented some of the new projects within TC 34 and its Subcommittees which are of interest to *lites.asia*. They also took the opportunity to provide an update of the current status of other lighting projects and urged participants to provide comments through their NCs. The Australian expert gave a presentation on the benefits to be gained through participating in IEC meetings and encouraged more countries to take part.

15th ACCSQ Joint Sectoral Committee for Electrical and Electronic Equipment Meeting

Participation of the APRC at the JSC EEE meetings has cemented the IEC's relationship with regulators in the region and greatly promoted the use of IEC standards. Chew has used the meetings as opportunities to help clarify the use of IEC standards with participants. At the last meeting in May, he met with the Laos Affiliate (Director of Standards) and her staff, discussing with her the adoption of standards and selection of Technical Committees as well as explaining the benefits of the mentoring programme.

7th APEC Conference on Good Regulatory Practice

Held in Indonesia in June, the conference brought together more than 100 experts from government, business and international organizations to discuss

the critical regulatory issues facing the APEC community. Ann Weeks, UL Vice President for Global Affairs and Chew participated in session 8, moderated by Frank Kitzantides, to discuss ways to move forward with conformity assessment and GRP (Good Regulatory Practice).

Chew said of the event: 'The IEC's continued engagement in the activities of the APEC SCSC (Subcommittee on Standards and Conformity) is of increasing importance as the grouping focuses on approaches to facilitate trade'.

JISC / IEC / APSG HRD (Human Resource Development) Seminar

Held at the beginning of December 2012, the seminar was a milestone event as it has been held annually since the establishment of the IEC-APRC which celebrated its 10th anniversary in 2012. To this effect, a dinner reception was hosted by the APRC to commemorate its 10th anniversary as well as the joint collaboration with JISC (Japanese Industrial Standards Committee) over the past 10 years.

The theme of the seminar was Standards for a Green Society and it focused on IEC work relating to electrical energy efficiency of white goods, brown goods, IT equipment and surge arrestors. Previous collaborations with JISC have

seen NCs in the region becoming more active and taking part as P members in IEC TCs and SCs.

Other events

Dennis Chew was present at the 2012 International Symposium held in November in Seoul, where he spoke on the importance for regulators to be involved in standards development as well as the benefits of leveraging on the conformity assessment systems operated by the IEC. In particular, he shared the future electricity grid and electrical energy efficiency as new areas where it is important for regulators to be involved in the development of international standards and the use of IEC conformity assessment systems. The symposium attracted 150 participants who were largely engineers and managers of the local utilities and related organizations.

In May, Chew and Treasurer Ake Danemar attended the 36th PASC (Pacific Area Standards Congress) meeting. Danemar gave an update on the latest developments in the IEC while Chew shared on the IEC Young Professionals Programme and the IEC Affiliate Country Programme. PASC (Pacific Area Standards Congress) is an important forum comprising the CEOs and senior representatives of National Standards Bodies from 25 country members in the Asia-Pacific region.



From left: IEC President-Elect Junji Nomura, IEC President Klaus Wucherer and IEC-APRC Regional Director Dennis Chew at the ACCSQ meeting in Kuala Lumpur, Malaysia

And in July, close to 40 people attended the Seminar on International Standardization for Semiconductor Devices which was organized by the APRC and the Singapore NC to promote the work of TC 47 and its Subcommittees. The meeting was supported by SSIA (Singapore Semiconductor Industry Association), JISC and PCSS (Promotion Committee of Semiconductor Standardization, Japan). Apart from promoting awareness to the industry in Singapore, the event was an opportunity to gather interested industry participants to consider participation in this area.

Latin America regional events

COPANT (Pan American Standards Association) General Assembly

The 2013 COPANT General Assembly was held in April in Saint Lucia. This year's event was the biggest in term of attendees with over 100 participants present. The IEC's Jim Matthews and Amaury Santos, IEC-LARC Regional Manager, were in attendance with Matthews giving an update and presentation of IEC activities.

The event provided a great opportunity for Matthews and Santos to meet with

representatives of Caricom (Caribbean Community) and CROSQ (CARICOM Regional Organisation for Standards and Quality). A meeting was organized to discuss more active participation in the IEC through the Affiliate Country Programme as well as the use of IEC Conformity Assessment Systems.

CONCAMIN and COMENOR National Standardization Annual Forum

The IEC's Jacques Régis and Amaury Santos were present at the CONCAMIN (La Confederación de Cámaras Industriales de los Estados Unidos Mexicanos) and COMENOR (Consejo Mexicano de Normalización y Evaluación de la Conformidad) event in June this year, with Régis giving a presentation on the IEC.

The annual forum hosts a large number of high-level individuals from government authorities and standardization entities as well as regulators, allowing IEC Officers to network and promote the work of the IEC.

FINCA (Forum of IEC National Committees of the Americas) 2013 Meeting

Held in Miami in September, the FINCA 2013 Meeting, saw its 7 country

members (Argentina, Brazil, Canada, Chile, Colombia, Mexico and USA) take an important decision in inviting the region's Affiliate Countries and Associate Members to participate as observers in future events. For the first time this year, COPANT's Executive Secretary Kory Eguino was in attendance, and the USA invited Costa Rica's Sandra Gomez of INTECO as observer. Also present were three of the IEC's Young Professionals, Manayphay Souvannarath, Stephanie McLarty and Jonathan Colby.

The event allows the NCs to exchange information about the IEC General Meeting agenda and come together to defend the region's common interests at the meeting. Santos also reports on latest IEC-LARC activities.

Other events

Amaury Santos and Peter J. Lanctot, Secretary of the MSB (Market Strategy Board) have been invited to speak at the 2013 Latin America Smart Grid Forum which will take place in Brazil in November 2013. Lanctot will be presenting the Smart Grid Standards Mapping Tool at the event.

Paving the way for e-mobility

Two workshops look into enabling a safe future for EVs

Zoé Smart

The IEC has embraced EV (Electric Vehicle) development from early on, with a large number of IEC TCs (Technical Committees) and experts working on different aspects of the vehicles themselves as well as connection to the grid. The safe use of the cars is, of course, of prime importance and two workshops were organized this year that took EV safety as their central theme.

ACOS workshop

In February, ACOS (the Advisory Committee on Safety) organized a workshop entitled Reviewing Safety aspects in the area of e-mobility. Participants were there to discuss the best ways in which to achieve a level of safety protection for EV users comparable to that regulating household equipment or machine operators. IEC President Klaus Wucherer addressed participants and pointed out that because electricity is at the very heart of

EVs, standards for them need to draw on the knowledge of electrotechnical experts, especially in regard to the safety of humans, animals and the environment.

The workshop looked in particular at practical applications of IEC standards in relation to EVs. For example, a number of IEC basic safety and group safety standards deal with aspects of protection against electric shock, insulation coordination or



The workshop organized by ACOS focused on safety aspects of e-mobility

insulation materials and are therefore also applicable to electric vehicles. ACOS's role is particularly important in coordinating these horizontal safety and group safety standards within the IEC.

FNC workshop

The 8th FNC (Fully Networked Car) Workshop was held in Geneva, Switzerland in March. Organized by the WSC (World Standards Cooperation),

this year's theme was How can international standards provide greater support to the global automotive industry for developing FNCs integrated with ITS (Intelligent Transport Systems)?

With a particular focus on vehicle safety, communications, the electrification of vehicles, and performance measure, the automotive experts and specialists in attendance explored new approaches

to establishing international standards for electric vehicles. The IEC's Gabriel Barta addressed participants, advising them to initiate the standards they think are the most urgent, in areas such as active vehicle safety. The ensuing discussion covered the development of new safety standards as well as improved traffic information and vehicle-to-vehicle emergency communications.



Representing the IEC, Gabriel Barta addressed participants at the 2013 FNC workshop



A new brochure lays out IEC work supporting the automotive and EV industries

Investing in the future

CEOs share their views on the benefits of IEC standardization

Claire Marchand

Some of the world's leading CEOs and CTOs have recently been interviewed by IEC Global Visions. From different perspectives, these captains of industry explained why, notwithstanding today's economically challenging conditions, they were keener than ever to spend more time and invest more resources in IEC activities.

IEC International Standards are key to access global market

They spelt out how IEC participation had helped them reduce their existing operational costs, how IEC standardization had helped them pioneer innovation more effectively by enabling them to improve their design and production processes when launching new products.

They said that involvement in developing IEC International Standards allows industries, companies and countries to learn from each other. They added that when their standardization experts sat at the table where global trade rules are written, their varied technologies and business needs were properly considered.

They stressed in different ways that because of the IEC, every country and company is able to compete on a level playing field. This makes the IEC more important today than ever because it provides industry with what amounts to the gold-standard guidelines and certification to operate internationally in economically troubled times.

In the past 12 months, Eaton, Goldwind and NIST (National Institute for Standards and Technology) were featured in the Global Visions series of videos.

Eaton – Ensuring compatibility

In the interview, Thomas S. Gross, COO of Eaton and responsible for the company's nearly USD 7 billion electrical business, underlined that most of the major global challenges, and the markets that emerge around them, depend directly on the ability to connect solutions from different suppliers. The transition from products to total solutions requires interoperability and more international standards. (read the full article in e-tech November 2012).



Thomas S. Gross, Chief Operating Officer, Eaton Corporation

Goldwind – Sharing knowledge

Gang Wu is Chairman and CEO of Goldwind, the largest manufacturer of wind turbines in China, and among the largest globally. In the interview, he explains how active participation in IEC work allowed his company to jump development hurdles and learn from the mistake of others. How this shared knowledge helped improve wind turbine design, performance and reliability and ultimately built the trust needed to sell globally. In 2006 Gang Wu received the World Wind Energy Award. (read the full article in e-tech issue 06/2013)



Gang Wu, Chairman and CEO, Goldwind

NIST – Global strategy, superior income

IEC Global Visions also interviewed George Arnold, Director of the Standards Coordination Office at NIST. In this interview, he explains how IEC International Standards contribute to reducing the cost of infrastructure development and modernization in the US. With them utilities have a bigger choice and are able to purchase products that are competitively priced because they have been developed for the world market. Ultimately this positively impacts electricity rates for consumers.

(read the full article in e-tech issue 07/2013)



George Arnold, Director of the Standards Coordination Office, NIST

Share your work

We want your stories

Claire Marchand

With 165 countries in the IEC family, more than 13 000 technical experts who work in standards development, hundreds of CBs (Certification Bodies) and TLs (Test Laboratories) in the three IEC CA (Conformity Assessment) Systems, there is no shortage of stories to be told within the IEC community. In 2014, as in previous years, the e-tech editorial team will be reaching out to you to get your story.

Today, e-tech reaches about 20 000 readers around the world. Each month the IEC publication covers a different topic that describes the work of a variety of TC/SCs and the CA Systems in that specific field. Reports on international and regional conferences, workshops and seminars, organized by the IEC or attended by IEC representatives, are also featured.

In 2014, as in previous years, we plan to continue and increase this sharing, get your input and include articles that are of direct relevance to your area of expertise.

This is our editorial plan for the coming months of e-tech. We look forward to receiving your comments, news and suggestions.

e-tech focus for 2014

January/February

Multimedia and appliances

Home, office / New developments in multimedia equipment: Smart equipment, flexible screens, OLEDs, Ultra HD / Smart appliances, interconnectivity / New trends

March

Transportation

EVs / Rail transport including Maglev high-speed trains (Australia/Japan/China)



Transportation in March - Maglev (magnetic levitation) high-speed train in Shanghai, China



Energy harvesting/storage in June - Footwear-embedded microfluidic energy harvester
(Photo: InStep NanoPower)

/ New and unusual electric modes of transport: e.g. pods at Heathrow Airport & Dubai) / Urban cable cars / Safety on roads and tunnels (signage, alarm and monitoring systems)

treatment (cancer, plastic surgery) / Nanotechnologies in medical environment / Superconductivity (imaging & diagnosis)

April

Medical equipment

Ultrasonics: from diagnosis to

May

Energy

Renewables – Revisiting marine energy & CSP (Concentrated solar



Equipment in public areas in December - Light show at a rock concert

power), geothermal / Combined Heat and Power / Grid integration of large-capacity renewable energy generation / UNSE4ALL (United Nations Sustainable Energy for All) initiative – Overview, projects and achievements so far, IEC involvement / Environmental considerations applied to specific conditions

June

Energy harvesting/storage

Grid integration of large-capacity renewable energy generation / Batteries / Piezoelectric / MEMS / Supercapacitors

July

Safety in general

Home, office, commercial and industrial environment / Tools and appliances / Transportation / Functional safety / Airport security, access controls, biometric data / Conformity assessment

August/September

Printed electronics/Nanotechnologies

3D printing / Printed electronics / Nanotechnologies

October

Interoperability

Sourcing / Standardized methods of

production, design, etc. / Off-the-shelf components / Maintenance and repair / Waste management / Cooperation / Global value chains – Made in the world concept

November

Year in review

December

GM Special + Equipment in public areas

Lighting, signage, sensors / Sports arenas / Theater and concert halls, movie theaters / Elevators, escalators / Air-conditioning / Cybersafety – Document storage over the long term CCTV

Enhancing our digital presence

IEC website improvements



The IEC website has a new look and better user experience

Janice Blondeau

The IEC is constantly striving to improve the efficiency and effectiveness of its online presence and working platforms. Here some of the bigger changes that have come into effect over the past months...

IEC's website homepage makeover

From the beginning of April, the IEC website homepage has enjoyed a new design and look, which aims to provide an improved user experience.

Navigation has been simplified with tabs for Home, Work, Learn, News and Buy, to bring users directly to the content they are most interested in. Feedback from the IEC community has been positive and the homepage will continue to evolve.

tools and applications on a single web page. Users are now able to customize their personal work page so it responds to their specific needs.

The new homepage and upgraded myIEC tool are in line with the IEC 2011 Masterplan objectives. Our aim is to provide the most efficient working platform to the IEC community and other interested parties, for all their standards and Conformity Assessment needs.

IECQ launches new website

Faster and more accurate information is just a click away with the launch of the new IECQ website. IECQ services, publications and documents, online certificates, working groups, events and meetings are now more easily accessible.

Also the IECQ homepage has been updated to provide quick access to the most popular features, including latest news items, frequently used tools, such as the On-line Certificate System database, list of CBs (Certification Bodies), operational documents and coming events. Visit the new IECQ website at: www.iecq.org.



The IEC web presence gets better everyday. Go have a look!



The IEC community can now customize its personal work page to make their experience easier

IEC support and feedback

Telling us what you think has become easier too. We added a new functionality: a feedback button to

the IEC's website. It is located on the top right hand side corner of the screen, making it simpler for users to ask questions, make comments and suggestions or obtain support.

A ticketing system will allow for better/faster processing and treatment of all requests coming to IEC CO (Central Office). Its public launch coincided with that of the feedback button.

Voting made easier

Another area that benefits from improved efficiency is the IEC voting system. Simultaneously, a customized voting system was built for CENELEC

(European Committee for Electrotechnical Standardization).

Under the Dresden Agreement (on common planning of new work and parallel voting), many IEC International Standards are adopted by CENELEC, and implemented nationally by their Members. Many experts participate in CENELEC and the IEC and the standards that are voted on by the two organizations are often the same. The updated system helps eliminate duplication as users can now send votes directly to the CENELEC and IEC sites without having to login and shift between two different voting platforms.

Rural electrification support for developing countries

IEC, World Bank and UN Foundation IEC TS 62257 offer



Electricity is something many of us take for granted, but 1,3 billion people can't

Janice Blondeau

Electrification is one of the key drivers facilitating economic and socio-cultural development. However rural areas in developing countries can sometimes be too remote to connect to the main grid – in these circumstances renewable energy off-grid applications provide the most suitable energy solution.

Rural electrification specifications offer to developing countries

The IEC, World Bank Group and United Nations Foundation have announced an initiative to provide developing countries with access to important technical specifications, the IEC TS 62257 series, that support rural electrification, at a specially discounted price, to help bring electrical energy to some of the 1,3 billion people without access or only limited energy access.



When developing countries use internationally recognized standards it ensures the long-term sustainability of their investments

The IEC TS 62257 series

Recommendations for small renewable energy and hybrid systems for rural electrification outlines international best practice solutions to support energy access in developing countries across a range of technologies. The three organizations are cooperating to offer

discounts to qualified stakeholders purchasing documents in this series.

Sound investment, increased security and interoperability

When developing countries use internationally recognized technical specifications it allows them to secure

long-term sustainability of their investments, as well as interoperability and safety of the products they are installing. It also helps to ensure that their investments will be worthwhile and that components will work together as they should, when they should.

In offering this package the IEC has responded positively to a request from the UN Foundation to have the IEC TS 62257 technical specifications more easily available to key stakeholders in developing countries. This request was reinforced by the conclusions of a 2012 workshop on rural electrification held by AFSEC (African Electrotechnical Standardization Commission) with experts from IEC TC (Technical Committee) 82: Solar photovoltaic energy systems. As result of that workshop, AFSEC is developing a technical guide for sustainable off-grid electrification, with reference to IEC TS 62257 series.

About the IEC/TS 62257 series

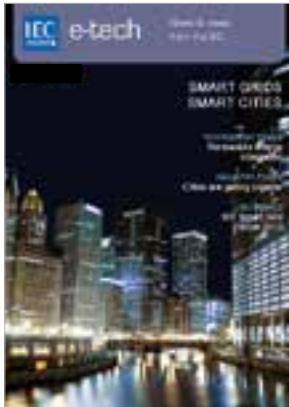
The IEC TS 62257 series contains numerous technical specifications which address three main topics – introduction to rural electrification; project management and implementation guidelines; and technical specifications for components and systems. It also provides assistance to the project implementer, with information on how to select the right product based on what is available in their local market, product tests to be performed under the local future field conditions, and technical and economic aspects of equipment, skills required etc.

The details of the available discounts are:

- 75% discount on IEC TS 62257-9-5 (with or without all normative references)
- 58% discount on entire IEC TS 62257 series + all normative references
- 50% discount on any other individual documents in the IEC TS 62257 series (with or without normative references)

More information is available on the IEC Webstore: <http://webstore.iec.ch/>.

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Smart Grids, Smart Cities

Issue 09/2013 of *e-tech* will focus on various issues and technical aspects in relation to Smart Grids and Smart Cities.

In many countries huge investments are needed to replace, upgrade or install power distribution networks, or grids. The issue is becoming ever more pressing with the necessary integration of various renewable sources. Innovative storage solutions will be essential to level out the intermittent nature of power generation from renewables. Optimal distribution, storage, use and monitoring of electrical power resources, via so-called smart grids, smart buildings, electric vehicles and smart meters will be central to ensuring the best possible allocation of future energy supplies.

Many of these issues were addressed at the IEC World Smart Grid Forum 2013.

In addition, a great number of IEC TCs (Technical Committees) prepare International Standards that are relevant to the Smart Grid issue





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