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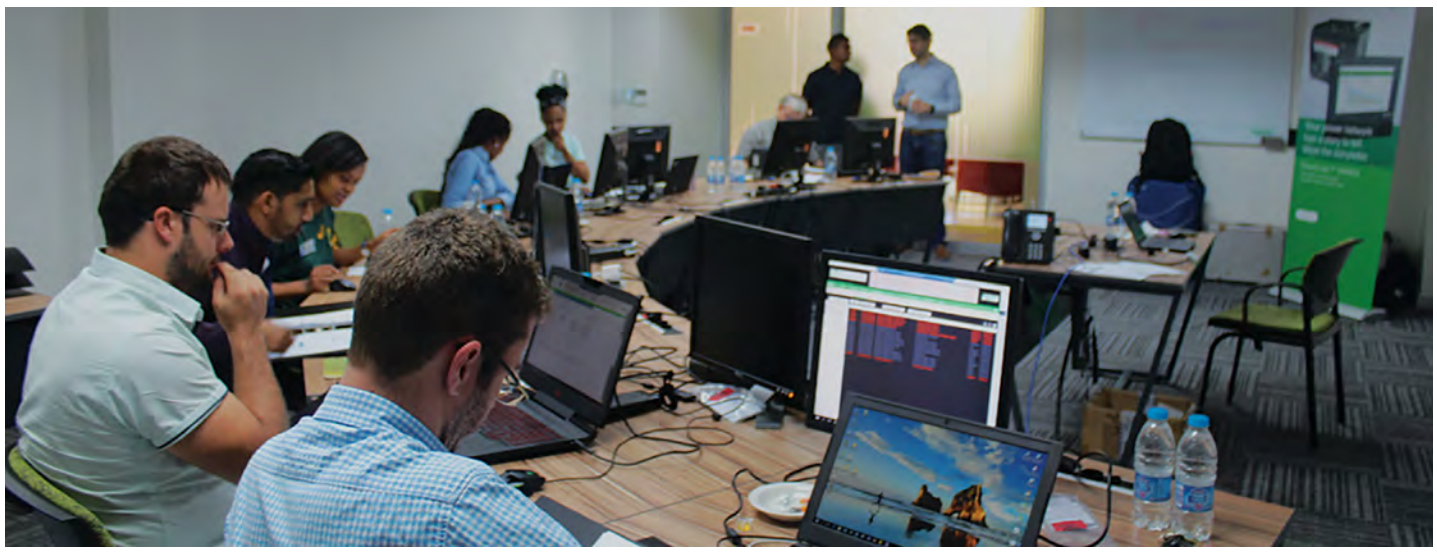
INCREASE YOUR KNOWLEDGE IN THE FIELD OF ENERGY



In any industry, knowledge is power, and none more so than in the electrical field where electrical contractors deal, on a daily basis, with something that could be fatal if the relevant knowledge is not applied. With this in mind, Schneider Electric South Africa (SESA) encourages anyone in the field of energy to register for upcoming in-class trainings or on-demand online courses at its Training Services Portal, www.se.com/za/en/work/services/training/.

"Schneider Electric Academy offers a comprehensive range of training courses in the field of energy management and automation," explains Dilaine Subban – Schneider Academy coordinator at SESA. The following categories of classroom training are offered:

- Automation and Drives.
- Building Management.
- Critical Power and Cooling Services.
- Electrical Distribution and Energy Automation.
- Energy Efficiency.
- Home Automation.
- Medium Voltage.
- MES and SCADA.
- Protection and Control.
- Power Solutions Hardware and Software.
- Remote Terminal Unit.
- Substation Automation.
- Technology Day Workshops.
- Telemetry.

In addition to classroom training, the Schneider Electric Academy offers a wide range of online courses. "Being available 24/7 enables our students to learn anywhere, anytime and at their own pace and convenience," explains Subban. Of particular interest to the South African market are the newly launched technical and non-technical courses on electrical safety related topics, which include:

- Arc Flash Prevention designed to increase electrical risk fundamentals knowledge, learn arc flash prevention and regulation knowledge and improve decision-making mechanism. This course is aimed at those who work in an environment with electrical risk and/or their managers, for example, health and safety managers.
- Electrical Risk Prevention e-Learning program designed to learn international electrical risk prevention rules and increase electrical risk fundamentals knowledge. This course is aimed at those who work in an environment with electrical risk and/or their managers.
- Electrical Safety in the workplace for non-electrical staff e-Learning program, which will increase electrical risk fundamentals knowledge and enable right behaviour in the vicinity of electrical work. This course is aimed at non-electrical persons working in an environment with electrical risks, such as factory workers and health and safety managers.
- Electrical Crisis Management e-Learning program designed to learn crisis management basics (pressure, soft skills, and communications) and how to deal with an unexpected event. This course is aimed at operation and maintenance teams working in electrical substations and facilities.
- Electrical distribution fundamentals e-Learning program designed to increase electrical distribution network knowledge, learn basics of electrical engineering and learn knowledge of the grid and main electrical distribution devices. This course is applicable to all types of audiences in the electrical distribution and energy automation field.

"The Schneider Electric Academy provides a holistic training offer to ensure that Life Is On everywhere, for everyone and at every moment," concludes Subban.

Enquiries: za-training@Schneider-electric.com

The leader in all things electric

As the leader in electrical solutions, Voltex supplies the widest range of related products through its strategically placed locations around Southern Africa. Its established network of branches along with many years of industry experience translates into the highest level of service.

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- 20 specialised divisions.
- Over 2 500 personnel.
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Enquiries: www.voltex.co.za

ECA(SA) elects first woman president

ECA(SA) National Director, Mark Mfikoe, welcomes Lumie Naidoo as the first woman President of the ECA.

At the ECA(SA)'s AGM at the end of 2019, Lumendrie Naidoo, Chairperson of the ECA(SA) Regional Executive Committee in KwaZulu-Natal, was elected as the ECA's new President – the first time a woman has worn the chain of office at the Association. Danie Esterhuizen was elected as First Vice-President, and Frans Swanepoel is now the Second Vice-President.

Lumie, as she's known in Durban business and social circles, won the Woman-Owned Business of the Year title at the 2017 ECA(SA) Presidential Excellence Awards and, this year, she was a runner-up in the same category.

Naidoo's election as President made ECA history in the traditionally male-dominated industry and it highlights her achievements as Director of Durban-based Namasthethu Electrical. "I hope that my election will inspire women in South Africa to enter the electrical contracting industry," says Naidoo. "Playing in this male-dominated industry has its challenges," she admits. "I've survived by believing in my abilities and by always striving to be an exemplary leader and to serve others first.

Leadership skills

"Over the years in this industry, I've worked hard to develop my business and leadership skills and I believe this will help me in my role as President, especially when I'm interacting with other ECA members who are also running businesses." Born and bred in KwaZulu-Natal, Naidoo is respected by electrical and construction industry leaders and by aspiring female mechanical engineering entrepreneurs.

"I'm honoured to be the first woman President of a 70-year old organisation and hope I can be an example to other women and prove that nothing is impossible if you apply your mind to it," she says. "I think the ECA is ready for its first woman President and, together with the National Management, I'm ready to take on this pivotal role and work with them to take the ECA(SA) to even greater heights," says Naidoo.

Enquiries: www.ecasa.co.za

INDUSTRI awarded 2020 CTC contract

The Colliery Training College (CTC) in Emalahleni (Witbank), has awarded INDUSTRI Tools & Equipment the 2020 contract to supply tool kits, which are used during mining and engineering related skills training.

"The CTC, which was established in 1964 specifically for the mining sector, has since diversified and artisan skills training is now available for many different trades. Students are offered training for various sectors, including electrical, auto electrical and instrumentation, or as riggers, diesel mechanics, plater welders, millwrights and fitters," says Kriban Govender, Managing Director, INDUSTRI Tools & Equipment. "The INDUSTRI team is proud to be part of this skills upliftment initiative, which plays an increasingly critical role in South Africa. The 2020 CTC tool kit contract encompasses the supply of quality-branded hand tools, that are used by hundreds of students every day in the CTC engineering workshops and during practical skills training.

"The CTC, which is accredited by the Mining Qualifications Authority (MQA) and the Quality Council for Trades and Occupations (QCTO) also has certification from relevant SETAs. In line with the CTC's commitment to meeting the highest standards in every aspect of the training programme, all tools are carefully selected by INDUSTRI Tools & Equipment specialists, in terms of quality, suitability for the task, safe use and long service-life."

Enquiries: www.industri.co.za

JS Spies, Witbank Branch Manager, INDUSTRI Tools & Equipment and Johan Venter, Managing Director, Colliery Training College.

Returning to the electrical industry

Carl Kleynhans

When Carl Kleynhans was appointed as General Manager at Phoenix Contact in November last year, it gave Sparks Electrical News the ideal opportunity to catch up with him and find out what he has been doing since he was Personality of the Month in 2011.

SPARKS: What have you been up to since we spoke to you in 2011 as country president for Schneider Electric South Africa?

CK: I left Schneider in around 2013 and took time off for a 'sabbatical', for lack of a better word, after 15 years of corporate life. I went on a couple of motorcycle tours around Southern Africa on my BMW GS 1200 and up the Californian coastline on a Harley Davidson, and then I started consulting. I looked at a couple of businesses with the idea of possibly getting involved; assisted a number of friends in small to medium enterprises; and I ended up in Mozambique where I worked for close on a year, commuting Monday to Friday, heading up the development of an industrial business park.

I returned to South Africa and back into the corporate environment. I was introduced, via my neighbour, to Pinnacle IT and accepted a position there heading up three divisions. I was there for almost two years and was really happy and enjoyed the work. I was then approached by a head-hunter on behalf of Phoenix Contact and it ticked all my boxes – Phoenix Contact has been represented in South Africa for 50 years, and is now a wholly owned German subsidiary however we are a Global player with numerous manufacturing facilities and sales companies throughout the world.

SPARKS: What is your current position?

CK: I am General Manager for the South African entity and custodian of the local legal entity, which also looks after Sub-Saharan Africa. One of the things I like about working at Phoenix Contact is that we are independent; the Phoenix Contact philosophy is that it likes local people to run local teams. I'm looking forward to the challenge. Once again, it means a new environment, new people, new ideas, and learning a niche space within the automation and electrical arena. I've always been a collaborative leader; I'm engaged and I like to roll up my sleeves, be involved and be in front of customers. I also like to develop people and see young people grow.

SPARKS: What changes have you noticed in the industry since you've returned?

CK: One of the luxuries of working for multinational companies similar to Phoenix Contact is that they are often ahead in their thinking. Since I've come back, I heard a lot of companies talking about Industry 4.0 and IOT. So, funnily enough, while a number of things have changed, a lot have stayed the same. We are in the age of digitization and it's great to be working for a company that is driving this technology. We are still talking about renewable energy, we are still talking about global warming, and we are still talking about Moore's Law.

SPARKS: What would your advice be to electrical contractors and electrical engineers coming into this new world?

CK: Nobody knows a vendor's offer better than the vendor, so I would say, utilise the vendors, especially those that have been around and have a vested interest in the country. Phoenix Contact is a specialist in its field, so make sure you use us to keep yourself up to date with the latest trends, technology and solutions available, and work closely with the reputable companies, because they really are at the forefront of research and development. It is more important now than ever to stay up-to-date with changing trends.

Convergence has become a big factor. Look at structured cabling, for example, with LED lighting we don't have to use electrical cables, we can use CAT XI A cables to wire LEDs. All of a sudden the electrical and IT fields are converging. If you study electrical engineering, you don't have to become pigeonholed, you could become a part of a big ecosystem, such as smart cities.

SPARKS: Does Phoenix Contact have plans to engage closely with electrical contractors and electrical engineers?

CK: Absolutely. We're a channel dependent company, so we don't deal directly with end users. Since many of our customers are panel and motor control centre builders, we will continue to work with them and offer training seminars, online portals, white papers and the like.

SPARKS: What is your personal outlook for South Africa?

CK: I may be beating a drum that's been beaten to death, but obviously energy and water are going to be the biggest concerns in the foreseeable future. However, these challenges create opportunities for companies like Phoenix Contact because we have a lot of solutions in the solar and wastewater spaces. Also, finding talent is difficult; it takes months to find the right skills. Although I have not seen enough statistical data, anecdotally, the 'brain drain' and the large numbers of people leaving the country really concern me.

SPARKS: What is your favourite saying?

CK: I guess in any given year it would be different, but coming into a new environment, this one comes to mind. "It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so." Whenever I start a new position, especially if it is at a new company, I take 90 days before I make any fundamental changes. In those 90 days you observe, and you speak to staff, customers and consultants to build a picture of where the company is. After the first three months you can build a roadmap for the company going forward.

SPARKS: When we asked you for your 'bucket list' in 2011, you said you wanted to ride Route 66 on a motorcycle and gain work and life experience abroad. How did that pan out?

CK: I came very close! I mentioned earlier that I did the Californian coastline on a bike; I had to decide between the two, and after researching and talking to people, I learned that Route 66 is mostly highway and desert. I would still like to do it, but would prefer to go with a friend rather than on my own for three weeks, which is how I travelled California.

As for working abroad, does Mozambique count? I had opportunities at Schneider to work internationally, but my kids were still very young and my family wasn't ready to relocate. Over the years, however, I've been fortunate to travel to over 55 countries, and probably three times the number of cities.

Looking ahead, something I've wanted to do for a long time with my wife and kids is an RV road trip in the US. I've also never been to South America, so that's definitely up there.

Enquiries: +27 (0)11 801 8200

EnI delivers at high-pressure end of African contracts

Usually the last contractor on site, electrical instrumentation and control (EC&I) specialist EnI Electrical puts extra effort into helping clients around Africa meet their scheduled start-ups.

With decades of experience in mining and industrial projects on the continent, the Zest WEG group company understands the challenges that developers face, Russell Drake, general manager operations at EnI Electrical, says. Among its mining projects, it is currently involved in a large copper mine expansion in Zambia.

"Large project implementation is complex, and is often made more challenging by the logistical constraints that many African projects face," Drake says. "There are invariably delays at various stages, which places more pressure on the EC&I contractor, who must in many ways 'complete' the roll-out."

EnI Electrical works extensively with project houses and directly for mining companies, and is a preferred supplier to many of them. A key reason, he says, is the proactive attitude that underlies its depth of technical expertise.

Calvin Fisher, EnI Electrical overhead lines manager, emphasises the importance of on-time completion, combined with reliable electricity supply.

"With the various issues that may delay stages of a project, there is usually growing urgency as the deadline date approaches," Fisher says. "This is normally when EnI Electrical enters the project, so we are accustomed to working under some extra pressure. Our dynamic team actively looks for ways to advance the work, especially when the previous phases may not be quite ready for us to begin."

He notes that the team often does not have all the site access they need, so it requires some innovation to push the job along.

"We may even collaborate with other contractors if we have spare resources, for example, to help them complete their work so that we can start ours," he says. "Our focus is on being part of the solution, and this is an approach that really helps clients meet their deadlines."

The linking up of electrical infrastructure, connections and equipment is one of the final stages to allow any project to start operating. In this role, EnI Electrical installs a wide range of electrical infrastructure including medium and low voltage cable reticulation, motor control centres, lighting, earthing protection and energy management systems.

Its control and instrumentation work ranges from process instrumentation and plant automation, to custom control stations and fibre or copper networks. The company also designs and installs overhead power lines up to 161 kV and substations.

"Our permanent bases in countries like Zambia and Ghana – with significant in-country investment in technical assets – underpins the efficiency of our work," Drake says. "We understand our working environment very well, so we can quote accurately and fairly. This is vital to reduce variations during projects, as this can be disruptive to the project and the client."

He emphasises that EnI Electrical's experience and technical capability give it the confidence to present the most cost effective solutions to clients. This provides certainty and reduces overall project risk.

"We also take pride in developing local capacity in the countries where we are based," he says. Operating from locally registered entities also ensures legal compliance and maintains a social licence to operate.

EnI Electrical's local operation in Zambia – established in 2002 – employs 188 local staff including highly skilled technical teams. In Ghana, ongoing investment in assets and skills gives that office the capability to run up to R300 million in contracts at any given time, he notes.

"Our success in Africa is built on our specialised expertise and experience, but what clients really appreciate is our willingness and ability to 'take up the slack' towards the end of their project when time is not on their side," Fisher says. "Our close contractor interface and solution-driven approach allow us to do this."

Enquiries: www.zestweg.com

Cable installation with the WEG generators in the background.

EM Bloemfontein offers accredited training courses

The Bloemfontein branch of ElectroMechanica (EM) plans to make significant inroads in the Free State region thanks to its fully-equipped training facility, focusing mainly on automation products such as PLCs, HMIs, and servos.

With its inaugural training session already completed successfully, branch manager Anton Nortje explains that it aims to conduct one major training session each month, with ad hoc training provided as and when required. "The major advantage of this is to expose our customers to our broader offering and also to make them aware of capabilities and synergies that they might not have previously known about. Now customers know they can approach us for customised solutions to specific requirements." The branch also serves to bring EM closer to its customers in the region. Nortje concludes that training is a critical focus for EM: "Training is knowledge, and we pride ourselves on our capability in this regard."

Enquiries: +27 (0)11 249 5000

Iconic switches and sockets for the modern home.

The Iconic™ range is a modern electrical accessories line designed to be slim, sleek and tasteful. With interchangeable skins, innovative features and enhanced connectivity, the range is able to blend in with your décor, while standing out for its stylish aesthetics.

www.se.com/za

Life Is On | Schneider Electric

And the winners are...

Representatives from Citiq Prepaid, Comtest, Crabtree Electrical, Empire Electrical Wholesalers, Garry Lumpe Imports, HellermannTyton, Schneider Electric, Three-D Agencies and Waco joined the Sparks Electrical News *team at the lucky draw for the African Summer promotion held at the Royal Johannesburg and Kensington Golf Club.*

At the beginning of 2020, the *Sparks Electrical News* team invited the companies who had participated in our African Summer promotion for lunch and to do the draw of the prize-winners at the picturesque Royal Johannesburg and Kensington Golf Club in Linksfield. While there were familiar faces aplenty, three companies, Citiq Prepaid, Empire Electrical, and Citiq Prepaid took part in the competition for the first time.

After much needed welcome drinks on a sweltering Johannesburg summer afternoon, Karen Grant, Publisher at Crown Publications welcomed and thanked the industry representatives for their participation in another successful competition. The lucky winners were then drawn by each sponsor before a delicious lunch was enjoyed and some relaxed networking time was taken advantage of.

Congratulations from *Sparks Electrical News* to each of the prize winners, and thank you to the sponsors for once again supporting this popular initiative and offering up a host of fantastic prizes..

Karen Grant (publisher, Crown Publications) alongside Richard Huyerman from Citiq Prepaid.

Gregg Cocking (editor, *Sparks Electrical News*) with Ingrid Nicolaus and Claude Middleton from HellermannTyton.

Karen Grant (publisher, Crown Publications) with Gillian Taylor and Pieter Knoetze from Crabtree.

Carin Hannay (advertising manager, *Sparks Electrical News)* and Jaco Coetzee from Waco Industries.

Gregg Cocking (editor, *Sparks Electrical News*) is flanked by Denver Mahabeer and Ashveer Lalla from Empire Electrical.

Garry Lumpe of Garry Lumpe Imports and Carin Hannay (advertising manager, *Sparks Electrical News*).

Leanne Cole and Fezeka Bani from Comtest with Gregg Cocking (editor, *Sparks Electrical News*)

Ian Downard and Mark Jenkins from Three-D Agencies flank Karen Grant (publisher, Crown Publications).

Nadine Combrinck and Kesh Rocker from Schneider Electric with Gregg Cocking (editor, *Sparks Electrical News*).

The lucky winners

Prize sponsor: Citiq Prepaid
- Breakfast set

Winner: Manuel De Paiva

Prize sponsor: Comtest
- 2 x Fluke 114 multimeters

Winners: Raymond van Heerden and Neil Spiers

Prize sponsor: Crabtree
- A 47 cm Weber braai

Winner: Coert Slabbert

Prize sponsor: Empire Electrical Wholesalers
- Complete drill machine kit –

Winner: Wilco Lubbe

- 2600 W angle grinder –

Winner: Wener (All Area Electricians)

- R500 Empire gift voucher –

Winner: Shanti Ramdas

Prize sponsor: Garry Lumpe Imports
- 2 x Knipex folding knives –

Winners: Hardus Boshoff and JP van Niekerk

- 2 x Wiha bit holders –

Winners: Louis Pelser and Nigel Spriggs

Prize sponsor: HellermannTyton
- 2 x HellermannTyton hampers –

Winners: Derick van Rensburg and Mike Smith

Prize sponsor: MCE Electric
- A 100 W Floodlight

Winner: Ronel Bouwer

Prize sponsor: Radiant Lighting
- Hummer H3 Power Bank

Winner: Robin Hudson

Prize sponsor: Schneider Electric
- 3 x Schneider Electric lights

Winners: Niresh Nundlall, Jacques Du Plessis Kruger and Chantal Scholtz

Prize sponsor: Three-D Agencies
- 4 x MaxTorque toolkits

Winners: Rendani Mphephu, Riaan Basson, Solomzi Mbolo and Vincent Govender

Prize sponsor: Vermont Sales
- 6 x Quick Draw tape measures –

Winners: Savannah Lubbers, Schalk van der Merwe, Sean Michael Millard, Sekate Mphahlele, Sello Calvin Makwela and Selwyn Mannsbach

- 2 x Pica Master sets –

Winners: Sergio Da Cruz and Shafieqa Ismail

- 1 x Drill Doctor 500XI –

Winner: Rishichand Budram

Prize sponsor: Waco
- Waco Amprobe photovoltaic solar power meter

Winner: Trevor Hendrikz

The future calls for efficiency

The demand for raw materials is rising, which means reserves should be dwindling. Producers around the world are thus working towards the goal of generating more with less. The result, which seems contradictory at first glance, is that reserves are increasing thanks to technological innovations.

While our planet boasts a wealth of natural resources, industrialised nations and the large emerging ones, especially China and India, are developing an ever-increasing appetite for raw materials. Furthermore, the reserves – those resources that can be extracted economically and with today's technology – are often distributed unequally. Most of the large deposits have already been developed, while cannot be economically used since they are too finely dispersed to be easily extracted or lie in inaccessible regions.

The resource crisis in perspective

Under pressure from all sides, the phrase 'resource crisis' is used on a regular basis, sometimes with a focus on scarce or uncertain supplies, other times with concerns about the price structure. Geopolitical issues play a role as well, given that access to the deposits is often confined to narrow geographical areas, and on the markets national trade policies consequently meet global industry structures. On the other hand, the way in which metals and minerals are wrested from the earth often concerns environmentalists. The objective is to make the extraction of raw materials more sustainable by reducing both energy consumption and the impact on nature. As a result, raw materials producers are feeling pressure from all sides. Although demand for their products is high, geopolitical frameworks, price sensibility and political demands are making the business anything but simple. Approval processes are becoming more complicated, the necessary investments are increasing and yields are sinking, such as with gold, which can be found in nearly all electronic products in tiny amounts.

The technical trends are already becoming visible. In mining, for instance, complex chemical processes or bioleaching with bacteria aims to make it easier to release the minerals from the rock. The underground mining sector is also seriously considering highly automated extraction methods. Real-time mining, an EU-sponsored research and innovation project, has named two major objectives: decrease environmental impact; and increase resource efficiency. Achieving these goals will require continuous process monitoring and highly selective mining operations, thus resulting in less energy consumption and less excavated material. If the industry is successful in making this transformation, reserves will continue to grow. This is a trend that has long been observed as a consequence of new exploration and technological advances, such as with copper. In 1970, usable copper reserves were estimated at roughly 280 million tonnes. That number has since risen to between 600 and 800 million tonnes, despite the fact that the industry mined around 520 million tonnes over the past five decades.

Recycling raw materials

Reserves also increase when the recycling loops are effectively closed. In contrast to other raw materials, metals can be recycled over and over because they are used, not consumed. A third of copper production is already covered through recycling today. At around 800 million tonnes a year, steel is the world's most recycled material. However, the much-discussed concept of urban mining – the process of recovering raw materials from used products, buildings and waste – has so far turned out to be more of a concept than a reality.

Electronic scrap stored at old and new waste disposals is viewed as a major source of secondary raw materials for the future. However, it is still unclear how these resources can be systematically developed, not to mention the fact that the mixture of substances requires exceptionally complex separation processes. Recycling is a topic of discussion in cement manufacturing as well, where enormous quantities are needed to produce concrete for growing cities around the world.

The fields of application for recycled materials are limited, but there is much that can be accomplished in other areas. At 65 to 75 percent of the variable manufacturing costs, energy is a critical factor in the burning of the cement clinker. Alternative raw materials, secondary fuels such as sewage treatment sludge, and more efficient kilns, can help to drastically reduce the consumption of rock and fossil fuels, and thus carbon emissions.

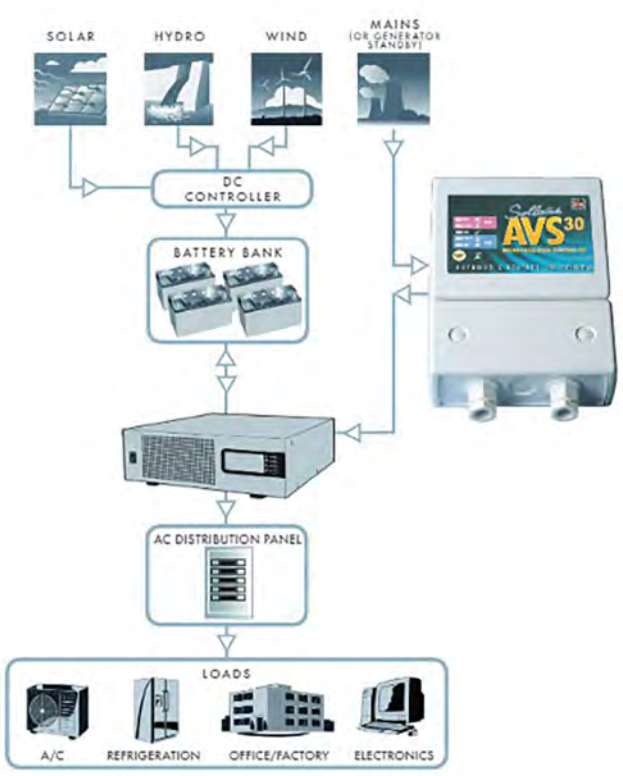
Steel is no different. Up to 40 percent of the production costs are tied to energy utilisation. Both industries are under pressure to develop new solutions to satisfy more stringent environmental regulations around the world. This applies to the mining industry as well, with emerging future technologies changing the needs of the market. Because of the electromobility boom, for instance, the demand for lithium, cobalt and nickel is growing.

Data is the key

Although the primaries industry operates in a markedly physical world, the various segments have one thing in common: to implement the necessary innovations, precise and continuous data is required – and it has to be linked so that all of the individual processes can be flexibly controlled in minute detail. "There are a number of things that we could use this data for, such as faster mine planning, more efficient system operation, automation of the extraction process and improving the processing technologies," concludes Michelle Ash, chair of the Global Mining Guidelines Group, which is driving the transformation of the global mining industry. "Generally speaking, developments suggest that the real catalyst for fundamental change in the way materials are produced could be cyber-physical systems. Maybe resource scarcity won't result in bad times for the industry after all. Perhaps it's just the opposite, a brighter future through better technology."

Enquiries: info@za.endress.com

Finding an effective power solution for blackouts and load-shedding



In South Africa, the flicker of a light bulb or the sound of a buzzing electrical appliance has become a cause for celebration. The realisation of power returning brings on a sigh of relief. Africa's second largest economy has threatened to regress as rolling blackouts keep the country in the dark. The blackouts are scheduled and limited, affecting different areas at different times, in a process meant to convey stability, even as the national grid struggles. These organised power cuts are known as 'load shedding' (blackouts).

Load-shedding, or load reduction, is undertaken countrywide as a controlled option to respond to unplanned events to protect the electricity power system from a total blackout. A country-wide blackout has serious consequences, which can occur when there is too much demand and too little supply, bringing the power system into an imbalance – shutting the power system in its entirety.

With the increase in load-shedding, we are reminded about the inconvenience of no power.

Whether planned or an accidental 'blackout', the power returns with a power-back surge causing damage or even destroying electrical appliances. During planned load shedding, cable thieves may steal copper cables resulting in loss of neutral. This results in equipment receiving 3-phase (+400 V) and not the 220-230 V, again damaging electrical appliances.

5 main power problems:

The following problems can negatively impact the solar inverter if the right protection isn't correctly installed to prevent the below events from occurring whilst in function;

1. High voltage – As power fluctuates due to unreliable mains or poor distribution network, the mains voltage can either drop or rise. A sustained over voltage event can be catastrophic and cause instant irreparable damage. (Consider installing a SVS, voltage stabiliser, where utility is supplying high/over voltage for long durations. This will facilitate faster charging of the batter pack).

2. Low voltage – Similarly, low voltage can occur often during fluctuations, over stretched distribution network, excessive demand to the size of the utility or being at the end of a long distribution line. Low voltage is particularly damaging to equipment. (Consider installing a SVS, voltage stabiliser, where utility is supplying low/brown out voltage for long durations. This will facilitate faster charging of the battery pack).

3. Power back surges – Commonly occur after power cuts. As the mains supply resumes, it usually returns with a surge which could be quite high and damaging in some instances. Ensuring the power has settled before resumption is important.

4. Spikes and surges – Power spikes are short pulses of energy on a power line and contain high voltage. These spikes only last a few milliseconds, but they have the potential to cause great damage to sensitive equipment. Often equipment does not fail right away; however, in many instances when it does, this seriously affects the shelf life of any electrical equipment.

5. Loss of neutral – When the instance of LoN occurs, the line voltage will rise from a normal 220/230 to 400/415 V causing instant catastrophic damage and even risk of fire.

The AVS30 inverter accepts the input power source from the ac mains, battery, solar modules and switches between various operation modes depending on the operational conditions. This will expose the inverter to high or low voltage, which will damage its circuitry. The AVS is installed to protect the inverter from unreliable damaging mains power by disconnecting the input main power when it's outside the limit of acceptable voltages.

Enquiries: sales@sollatek.co.za

Harnessing solar energy

South Africa is regarded as one of the best solar resources in the world. On average, most areas in the country get close to 3 000 hours of sunshine a year; with a 24-hour global solar radiation average of about 220 W/m². That is about 4.5 to 6.5 kWh/ m² of solar radiation levels a day that could be converted into electricity.

For businesses, harnessing this resource does not only boost their bottom line by reducing electricity costs (where tariffs are set to rise by 80% soon), it also frees them from relying on the grid and from harmful and expensive diesel power generation alternatives. This ultimately reduces their carbon footprint, and helps them meet their corporate sustainability goals.

When it comes to energy supply, corporates that harness solar energy are never in danger of struggling to operate or losing time and money during blackouts. "For most domestic installations, there is no cost of opportunity – it doesn't matter if a person brushes his or her teeth by candlelight. But if a factory works with machinery, a lot of money is lost when there is no electricity. So, the cost of opportunity often outweighs the cost of having a solar PV system," says Resolution Circle's Electrical Consultant – Dennis du Plooy.

He explains that in the industrial market, "businesses need to harness the maximum power supply during their productive hours - that is when everyone is at work. Other systems apply during weekends and holidays, but the most important thing is to have demand during the week". The main advantage of having a solar system is self-consumption – where the self-generated solar electricity isn't fed into the grid, but directly into the building – especially during peak hours. Industries have come to realise just how economically viable solar is when it is distributed directly into their distribution boards. That, and the fact that people are at work during peak hours.

"I think the agile workforce of today also allows for this system where, outside of the sun's peak, people work remotely, and only get to the office when the sun is at its peak," says du Plooy. Corporates investing in solar can get intelligent energy managers which either store excess energy for use during off-peak hours or feed it back into the grid. If a business generates more electricity than it consumes, it can be fed back into the grid, and the business gets credits from the city or municipality for the electricity.

Businesses might experience power outages, hefty electrical bills, tariff increases, and expensive diesel power generation costs while struggling to reduce their carbon footprints and meeting their sustainability goals – but one thing is certain, South Africa will never be short of sunshine.

As a technical training hub that also offers a Solar PV installation short learning programme, Resolution Circle is passionate about energy efficiency management – to the point where electrical engineering students who were part of its P2 Work Integrated Learning Programme implemented a project they dubbed #Sunny18. Here they developed a grid-tied system that works with micro-inverters instead of string inverters, which are normally used in grid-tied systems. The system can be used as a power backup for an office space that is not connected to an uninterruptible power supply.

Resolution Circle is a technical ecosystem that acts as a bridge between industry and communities by offering short learning programmes, workshop based learning, and experiential training programmes that are applicable to the ever-changing world of engineering, engineering technology and artisanship.

The company is a University of Johannesburg (UJ) initiative, founded in 2012; and is funded by both the National Skills Fund (NSF) and UJ. Resolution Circle has a Super Solar School, which offers exciting workshop-based training programmes.

Enquiries: www.resolutioncircle.co.za

Top industry awards for South African industrial energy efficiency project

The South Africa Industrial Energy Efficiency (IEE) project team received the highest recognition from the energy efficiency fraternity when it walked away with two awards when the Southern African Energy Efficiency Confederation (SAEEC) held its 14th conference. The IEE project won the prestigious 2019 Project of the Year award, while National Project Manager, Alfred Hartzenburg, received the 2019 Hall of Fame for Energy Efficiency Lifetime Award, which is the highest honour bestowed on an individual by the SAEEC.

Enquiries: www.energy.gov.za

How to maximise solar savings with inverter clipping

As a solar installer, it is vital to know how to ensure a PV system is operating optimally and obtaining maximum value for the home or business owner. One of the lesser known ways to maximise value is with inverter clipping.

What is inverter clipping?

Inverter clipping, or 'inverter saturation,' occurs when the dc power from a PV system exceeds an inverter's maximum input rating. The inverter may adjust the ac voltage to reduce input power, increasing voltage and reducing the dc. Alternatively, the inverter may restrict or throttle the inverter's ac output.

Contractors – more specifically, system designers – across the solar industry will evaluate the impact of inverter clipping on a system's generation capacity and performance. Changing the dc/ac ratio is a powerful tool for optimising the system's levelised cost of energy (LCOE) for long-term owners or increasing internal rates of return (IRR) for investors or developers. In addition, it can make the power generation curve smoother to reduce the peak shaving pressure of the grid and increase the share of PV power.

Not all inverters can accept higher ratios

If the inverter clips output power on the ac side, the internal ac components will wear out faster. Installers must be wary of overloading the dc side of the inverter as this may void the warranty, so it is crucial to check for a maximum dc/ac ratio on the manufacturer's datasheet.

At present, some inverters reduce the dc input power and, therefore, the ac output power, without stressing internal components. Advanced string and central inverters will self-limit to protect the internal components, but any designer must keep the panels' input voltage below the inverter's maximum limit. In addition, the maximum short circuit current of the system must not exceed the inverter's rating or the maximum power rating of its dc components such as terminals, busbars and maximum power point trackers (MPPTs).

When is a PV system designed to clip?

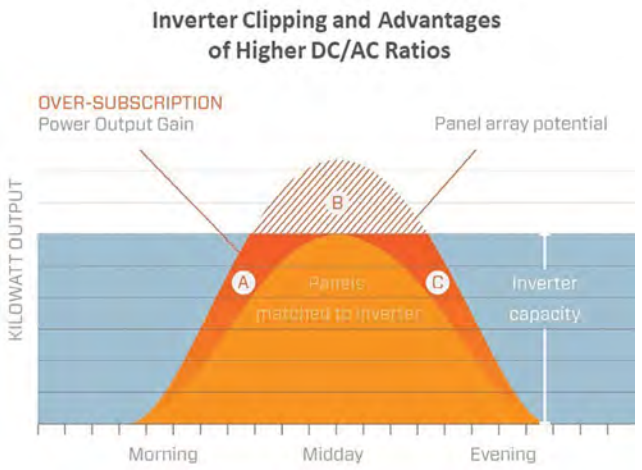
An installer can determine what project size a new site can accommodate, but residential systems may be limited to a 40 amp breaker by the home's main service panel. A larger, more expensive breaker panel would be needed to accommodate more solar. While a designer may be able to fit a more extensive PV system on site, a homeowner may decide to limit the inverter size to reduce costs or to match the site's loads better.

Commercial building owners may find themselves in a similar situation if, for instance, their warehouse roof could accommodate 2 MW of PV. However, if the local utility only accepts 1 MW of power injection in the grid, commercial property owners should consider matching the panel output to this figure.

So, why would a homeowner or a commercial building owner encourage their solar designer to create a system that would clip the PV array power from 3% to more than 10%? In short, it is usually because the system owner wants to generate a higher IRR and increase the net present value (NPV) of cash flows.

Maximising profits

Investors burdened by fixed costs – including permits, insurance, wire, racking and set O&M costs – want to get money back as quickly as possible. A high dc/ac ratio to maximise ac kilowatt-hour output helps to meet that goal.



Commercial asset owners will also design their systems to optimise IRR and NPV of cash flows accordingly. Large industrial-scale systems manage clipping loss to maximise profits during the first five years when both the Investment Tax Credit and the five-year depreciation revenues are realised. Installers should take advantage of inverter clipping to accomplish the different goals of solar installations from residential rooftops to utility-scale solar farms.

Fine-tuning cash flows

Midday sunshine on days of high irradiance will 'max out' the inverter's ac output rating. What's more, a PV system with a higher dc/ac ratio will produce more power in the early mornings and late evenings than a system with a standard ratio. The graph above demonstrates this: dc/ac ratio limits are meant to ensure the ac components remain within their tolerances if the designer overloads the inverter on the dc side. Luckily, many new inverters (such as those in the Solis Residential Single-Phase portfolio) automatically reduce the ac output by adjusting the dc voltage and current.

Solis' products have inbuilt protection features to guarantee the long-term safety and performance of the internal components.

Enquiries: www.sengensolar.co.za

Going off-grid is not the solution to escape load shedding for commercial and industrial businesses

ESKOM once again implemented load shedding at the end of year, as the utility experienced severe generation capacity challenges. While the announcement prompted some businesses to consider taking their operations entirely off-grid, there are solutions that are much more viable at this time.

This is according to Manie de Waal, CEO of Energy Partners Solar, who says that 100% off-grid energy solutions are not a feasible alternative for commercial and industrial operations yet, but that it is still crucial to explore ways to ensure security of supply regardless of the state of load shedding in the country.

"Load shedding is a massive business risk that will unfortunately only get worse in South Africa. Nelisiwe Magubane, an Eskom director, was quoted as saying that even a 0.1% rise in economic growth could result in outages – which is a very unsettling statement, given how dependent the majority of businesses are on grid-based power for growth. If the country enters into another prolonged period of load shedding, we can be assured that scores of companies will be forced to close their doors."

De Waal notes that the only sustainable solution in the current economy is a diversified energy portfolio. "An integrated system that combines grid-based electricity, alternative generation sources such as solar power, and generators and/or batteries (referred to as an energy centre), is the only way for businesses to stay competitive in the years to come."

He explains that complete off-grid solutions are only viable for businesses in very unique cases. "Commercial and industrial businesses often do not have the available space to generate enough energy to power 100% of their operation's electrical needs. Added to that, the business would require either a battery system or generator in order to store energy for night-time usage. Both of these options come at quite a high cost when compared to grid-based tariffs at the moment."

Currently, an integrated system is the best option for continuous operation. "A grid-tied solar photovoltaic (PV) system provides the cheapest cost of energy, however it is not a standalone solution during a grid outage. Integrating a generator or battery to support the business during load shedding, ensures security of supply."

De Waal adds that a PV system should ideally supply the bulk of the power during load shedding in peak daylight hours, while a generator either idles on standby or runs at reduced capacity to provide additional power. "The alternative is to implement a battery storage system in conjunction with the PV system. However, the capital outlay for the latter is still high, so the capacity of such a system would be limited."

De Waal says that having a long-term partner when embarking on a diversified energy portfolio is crucial. "The integration of these energy centres is a highly technical operation and they require dedicated service providers who can design, install and monitor its performance. Outsourcing this to an experienced service provider is therefore a prerequisite."

He explains that the advantage of engaging with a service provider such as Energy Partners Solar, is that the company can provide entirely outsourced solutions that require no capital investment from the client. "Businesses have the option of paying for renewable energy as a utility by partnering with service providers on the basis of a Power Purchase Agreement (PPA). It offers the cost-saving benefits of renewables without the asset risks associated with actually owning the system."

Depending on site details (such as usage profile, location, and current infrastructure), the cost electricity for reliable power from the energy centre could be between R1.50 and R2.50 per kilowatt-hour. This price would include the maintenance of the system.

De Waal states that businesses need to view load shedding as an ongoing threat to their continued operation. "It is vital to the long-term survival of every company to engage with capable service providers and ensure they have affordable, uninterrupted power in the coming years," he concludes.

Enquiries: www.energypartners.co.za

The first sun2rope solar energy project finalised in a Kenyan Safari camp

Swiss-based clean energy provider, The Meeco Group, has completed the structural installation of its first photovoltaic project with the newly launched, innovative solar power mounting structure, the sun2rope. This eco-friendly system consists of photovoltaic modules mounted on tailor-made rope structures, specifically designed for the project. The sun2rope PV energy installation, a first of its kind, is purposed to provide clean energy to the renowned Kenyan eco retreat, Cottar's 1920 Camp, which is closely located to Kenya's famous national park, the Masai Mara. The multi-award-winning Cottar's 1920 Camp spreads over an area of 1500 hectares, with a large concentration of watchable wildlife, and provides ten tents to host nature-loving safari tourist.

To supply the eco resort with renewable energy, seven rows of 168 highly efficient polycrystalline photovoltaic modules, with a total capacity of 54 kWp are installed at this stage. Once the site is completely finalised and commissioned, the generated energy is intended to charge the batteries of the energy management and storage system sun2safe and inter alia for hot water treatment and for charging the sun2move e-bikes of the safari camp.

The modules are mounted on special long-life, exceptionally resistant technical ropes supported by robust wooden poles. These ropes are distinguished by their extremely high breaking strength and a very low weight Thus, the sun2rope solar PV structure is designed to resist wind speeds of up to 36 m/s. The core of the rope consists of a special UHMWPE (Ultra-High-Molecular-Weight Polyethylene) braid with a coat made of black UV resistant polyester braid. The technical ropes have been developed and engineered in conjunction with Gruschwitz Textilwerke AG, an enterprise from Germany (Baden-Württemberg), that has been engaged in this industry for more than 200 years.

With sun2rope the impact to the natural environment is minimised by the fact that heavy steel structures are replaced with rope and sturdy wood. It additionally contributes in achieving other targets, such as reducing the logistic costs by making use of the locally available wood from the controlled planting areas against steal structures with long shipping delays. This way the CO_2 footprint of the installation is scaled back dramatically.

Being one of the eleven Global Ecosphere Retreats worldwide, the Cottar's 1920 Camp is committed to the protection of nature and wildlife, as well as the preservation of the original culture and the lifestyle of the neighbouring Maasai tribe, by combining cultural responsibility with animal welfare, sustainable management and soft tourism.

"We are proud to support the Cottar's 1920 Camp in its endeavour of protecting wildlife and nature by delivering clean, sustainable and innovative renewable energy solutions as a sustainable power source, giving way to a reduced use and new deployment of diesel-based generators," states Michael Georg , Senior Project Manager of The Meeco Group.

Enquiries: www.meeco.net

20 ways to supercharge your business in 2020 with prepaid metering

Want to know why prepaid metering has become such a powerful business tool over the past few years? Want to know how you can grow as an electrical contractor and company? Here are 20 ways to supercharge your business in 2020 with prepaid metering.

1 Take your business to new customers
- Develop an offering that can help transform utility management for tenants and property owners.

2 Expand your skills and potential
- Work with companies like Citiq Prepaid that offer support and services to electrical contractors.

3 Build a brand
- Expand your services and put another notch on your proverbial business belt as you engage with new customers and markets.

4 Become a trusted electrical contractor
- Establish a reputation that allows you to expand your network and get invited to manage large prepaid meter installations on new property developments.

5 Offer retail, commercial, and residential property owners a transparent and accessible solution
- Utility management is an ongoing challenge for many property owners and developers, so be the solution that they need to reshape their tenant relationships in 2020.

6 Build relationships and partnerships
- Citiq Prepaid can help you grow your business thanks to networking and inclusion into a vibrant sub-metering community.

7 Find new markets and opportunities
- Already some of Citiq Prepaid's partners have found a foothold in markets that previously they'd never considered and have used the networking opportunities provided by this relationship to engage in large scale projects.

8 Join a loyalty club
- These offer you returns for your hard work and commitment. Try out the Citiq Installation Club for a loyalty programme designed to give something back to the electrical contractor, www.citiqprepaid.co.za/cic

9 Join a growing market
- Prepaid metering has become the *de facto* solution for many estates and commercial properties due to its transparency and accessibility. Working in this space allows for the contractor to become part of a growing market and shore up income in tough economic times.

10 Strengthen your business
- Value-added services have become commodities. Use this trend to strengthen your business and your customer service.

11 Undergo relevant and consistent professional development
- The prepaid metering industry is constantly changing and innovating, allowing for you to consistently undergo professional skills development.

12 Consistently manage customer expectations
- Citiq Prepaid offers ongoing support and expertise that allows you to improve customer service delivery and consistently manage customer expectations.

13 Promote your company
- Work with Citiq Prepaid to get branding and marketing materials that you can use to promote your company. Citiq Prepaid recently worked with a startup electrical contractor company to provide them with print and vehicle branding that saw a measurable growth in business.

14 Provide customers with tangible cost benefits
- Prepaid metering solutions allow customers to accurately manage their expenditure. The Citiq Prepaid system charges a set fee for collating funds and delivering them to the property owner on time.

15 Provide people with insight and guidance
- Your understanding of the prepaid market can help people minimise bill disputes and issues and help shift their relationships with estate and property managers.

16 Get ongoing professional support
- Citiq Prepaid has two call centres that are committed to providing you with the support and guidance you and your customers need, on demand. The Pocketbook for Installers provides you with all the technical information you require.

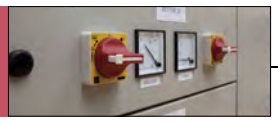
17 Join a professional ecosystem
- Citiq Prepaid has paid attention to processes and systems over the past ten years to ensure that contractors are provided with the relevant products and quality service.

18 Just step in the direction of convenience
- Sub-metering is the most reliable, easy, convenient and relevant way of providing and accessing electricity.

19 Give customers more than just power
- Your customer is the landlord, the owner, the developer and the body corporate and they want to know more about the systems they are installing. With Citiq Prepaid you can direct customers to a support centre and an active, report-driven portal so they can see the benefits.

20 Make a difference to the planet
- Sub-metering may not be the first thing you think about when you consider climate change, but it's a proven way of reducing power consumption and managing carbon footprints.

Enquiries: www.citiqprepaid.co.za



DISTRIBUTION BOARDS, SWITCHES, SOCKETS AND PROTECTION BUYER'S GUIDE

MANUFACTURERS

ABB South Africa
Allbro
Brady South Africa
Brother International SA
C3 Technologies
CBI-electric: low voltage
Crabtree South Africa
DEHN + SHöNE GmbH
Denver Technical Products
Eurolux
George Switchboards
HellermannTyton
JB Switchgear Solutions
Legrand
McWade Productions
O-Line
Phoenix Contact
Power Panels and Electrical
Radiant Group
Sabelco Electrical Industries
Shuttle Lighting
SIBA Fuses
Siemens
Superlume
Surge Technology
Switchboard Manufacturers
Telbit
WEG
World Power Products

DISTRIBUTORS

ACDC Dynamics
ACTOM Electrical Products
ARB Electrical Wholesalers
C3 Technologies
Comtest
Consolidated Electrical Distributors
DEHN Africa
Denver Technical Products
Edison Lebone
Electrahertz
ElectroMechanica
Electro-Test
Elen Electrical Enclosures
Eurolux
Fusecomp
HellermannTyton
Hoi P'loy
Khanyisa Electrical Supplies
Livecopper
Magnet Electrical Suppliers
Major Tech
MCE Electric
Nordland Lighting
Phambili
R&C Instrumentation
Sabelco Electrical Industries
SIBA Fuses
Stone Stamcor
Surge Technology
Swan Electrical
Switchboard Manufacturers
Three-D Agencies
Voltex
Voltex LSis
Voltex MVLV
Waco
Zest WEG Group

CONTACTS

ABB South Africa
Customer contact centre
ACDC Dynamics
Elmari Erasmus/Dirk Klynsmith
ACTOM Electrical Products
Russel Ramsden
Allbro
Elani van Rensburg
ARB Electrical Wholesalers
Sales
Brady South Africa
Anica Moyo
Brother International SA
Munna Desai
C3 Technologies
Charles du Plessis
CBI-electric: low voltage
Aletta Olivier
Comtest
Sales
Consolidated Electrical Distributors
Danie Esterhuizen
Crabtree South Africa
Gillian Taylor
DEHN Africa
Kirk Risch
Denver Technical Products
Mervyn Stocks
Edison Lebone
Justin Human
Electrahertz
Frank Proude (Pta) Peet Lourens (Jhb)
ElectroMechanica
Sales
Electro-Test
Winston Browning
Elen Electrical
Andy Kapral
Eurolux
Sales
Fusecomp
Charmaine
HellermannTyton
Ingrid Nicolaus
Hoi P'loy
Lisa van Heerden
JB Switchgear Solutions
Johan Basson
Khanyisa Electrical Supplies
Dominic Kalil
Legrand
Johan Bosch
Livecopper
JP Gouws
McWade Productions
Steven Naidoo
Nordland Lighting
Johann Lamprecht
O-line
Sales
Phambili
Steve Lea
Phoenix Contact
Carl Coetzer
Power Panels and Electrical
Freddie van der Merwe
R&C Instrumentation
Steve Edwards
Radiant Group
Alfred Weldon
Sabelco Electrical Industries
Marc Moreau
Shuttle Lighting
Tracey Steyn
SIBA Fuses
H.I. Hassen
Siemens
Yullen Govender
Stone Stamcor
Mark Talbot
Superlume
Willie Garbers
Surge Technology
Paul van As
Swan Electrical
Albert Pienaar
Switchboard Manufacturers
Josh Berman
Telbit
Martin Hogan
Three-D Agencies
Mark Jenkins
Voltex
Hugh Ward
Voltex
Hugh Ward
Voltex LSis
Rose Schulz
Waco
Jaco Coetzee
World Power Products
Chris du Preez/Jan Gortzen
Zest WEG Group
Switchgear call centre

CIRCUIT BREAKERS / EARTH LEAKAGE BREAKERS

ABB South Africa
Full range of circuit breakers, earth leakage breakers
ACDC Dynamics
Full range of switchgear from 13 mm MCBs to MCCBs and ACBs; MCCBs rated from 20 A to 1 600 A; complementary isolator and earth leakage ranges also available
ACTOM Electrical Products
Full range of circuit breakers/earth leakage breakers
ARB Electrical Wholesalers
Full range of circuit breakers/earth leakage breakers
CBI-electric: low voltage
Full range of commercial/industrial, miniature circuit breakers; moulded case circuit breakers; earth leakage protection devices
Consolidated Electrical Distributors
Full range of circuit breakers/earth leakage breakers
Edison Lebone
Full range of circuit breakers and earth leakage breakers
Electrahertz
Range of circuit breakers and earth leakage breakers
ElectroMechanica
Wide range of circuit breakers and earth leakage breakers
Eurolux
Extensive range of circuit breakers and earth leakage devices, single and three phase
Fusecomp
Range of circuit breakers and earth leakage breakers
Khanyisa Electrical Supplies
Full range of circuit breakers/earth leakage breakers
Legrand SA
Complete range of circuit breakers up to 6 300 A, MCB, MCCB, ACB
Livecopper
CBI-Electric; Schneider; Chint; Hager; Veti
Magnet Electrical Supplies
Schneider and Eaton circuit breakers and earth leakage breakers
Major Tech
Full range of miniature circuit breakers, isolator switches, earth leakage breakers and populated pre-wired distribution boards according to SANS10142
MCE Electric
Onesto DIN rail circuit breakers and earth leakage devices; Schenker mini rail circuit breakers and earth leakage devices; Schenker 13 mm mini rail circuit breakers and earth leakage devices; Onesto dc circuit breakers
McWade Productions
Full range of circuit breakers, earth leakage breakers
O-Line
Full range of circuit breakers and earth leakage breakers
Phoenix Contact
Full range of circuit breakers
Siemens
Full range of circuit breakers/earth leakage breakers
Swan Electrical
Full range of circuit breakers/earth leakage breakers
Switchboard Manufacturers
Full range of circuit breakers
Voltex
Full range of circuit breakers and earth leakage breakers
Voltex LSis
Full range of circuit breakers and earth leakage breakers
Waco
Full range of circuit breakers and earth leakage breakers
Zest WEG Group
Comprehensive range of miniature circuit breakers, moulded case circuit breakers, air circuit breakers and earth leakage devices

PROTECTION

ABB South Africa
Full range of protection devices
ACDC Dynamics
Full range of motor protection circuit breakers (MPCBs) from 32 A to 110 A frame high break capacity; all accessories and auxiliary contacts available including the Gewiss IEC309 HP range of connectors
ACTOM Electrical Products
Wide range of protection devices
ARB Electrical Wholesalers
Full range of protection devices
Comtest
IS meters; Atex equipment
Consolidated Electrical Distributors
Full range of protection devices
Edison Lebone
Range of protection devices
Electrahertz
Range of protection devices
ElectroMechanica
Range of protection devices
Eurolux
Extensive range of protection devices available
Fusecomp
Range of protection devices
Khanyisa Electrical Supplies
Range of protection devices
Legrand SA
Complete range of protection devices
Livecopper
CBI-Electric; Schneider; Chint; Hager; DEHN; Cirprotec
Magnet Electrical Suppliers
Schneider and Eaton protection devices
McWade Productions
Full range of protection devices
O-Line
Full range of protection devices
Phoenix Contact
Range of surge protection devices
R&C Instrumentation
Infrared inspection windows 24-7 differential temperature monitors inside v outside boards
Sabelco Electrical Industries
Full range of protection devices
Siemens
Full range of protection devices
Voltex
Complete range of protection devices
Voltex LSis
Wide range of protection devices
Zest WEG Group
Full range of thermal and thermal/magnetic overload devices; electronic overload protection

DISTRIBUTION BOARDS

ABB South Africa
Full range of distribution boards
ACDC Dynamics
Wide range of DBs in various materials; economy plastic to steel; pre-wired and open boxes; surface and flush mount boxes available in most ranges; watertight enclosures
ACTOM Electrical Products
Full range of DBs
Allbro
Full range of DBs
ARB Electrical Wholesalers
Full range of DBs
C3 Technologies
Manufacturers of LV DBs and all assorted products
CBI-electric: low voltage
12- and 20-way distribution boards
Consolidated Electrical Distributors
Full range of DBs
Edison Lebone
Range of DBs
Electrahertz
Full range of DBs
ElectroMechanica
Range of distribution boards
Elen Electrical Enclosures
Surface-mount distribution boards
Eurolux
Surface- and flush-mounted distribution boards; a variety of electrical enclosures, steel and stainless steel options
George Switchboards
Specialised manufacturer of low and medium voltage enclosures; various distribution products for the electrical distribution network across the African continent
JB Switchgear Solutions
Full range of distribution boards and distribution board enclosures
Khanyisa Electrical Supplies
Full range of DBs
Legrand SA
Full range of flush- and surface-mount, waterproof DIN rail boards
Livecopper
Custom sizes made to order; Gewiss; Hager; Veti; CBI-Electric
Magnet Electrical Suppliers
Schneider DBs
Major Tech
Full range of DBs including flush-mount Econo Boards (plastic and galvanised steel tray options), surface-mount Econo boards and surface-mount IP65 boards, populated DBs; ready boards
MCE Electric
Onesto ready boards with or without bulkhead; Schenker ready boards with or without bulkhead; Onesto swimming pool distribution board; Onesto caravan distribution board; MCE multi-purpose distribution board
McWade Productions
Full range of DBs
Phambili
All sizes available or manufactured to client specifications
Phoenix Contact
Range of terminals
Power Panels and Electrical
Full range of distribution boards
R&C Instrumentation
Infrared inspection windows 24-7 differential temperature monitors inside v outside boards
Sabelco Electrical Industries
Complete range of distribution boards
Siemens
Full range of distribution boards
Swan Electrical
Full range of distribution boards
Switchboard Manufacturers
Full range of LV distribution boards
Voltex
Full range of distribution boards
Voltex LSis
Complete range of distribution boards
Waco
Broad range of distribution boards

DISTRIBUTION BOARDS

World Power Products
Wide range of distribution boards, enclosures and floor standing cabinets (TTA/MCC)
Zest WEG Group
Full range of indoor and outdoor distribution boards, custom made to client specification

LABELLING

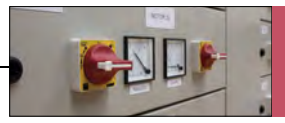
ARB Electrical Wholesalers
Full range of labelling products
Brady South Africa
Full range of identification solution – labels, printers, software
Brother International SA
Full range of labelling machines and consumables
Consolidated Electrical Distributors
Full range of labelling products
Edison Lebone
Full range of labelling products
Electrahertz
Range of labelling products
ElectroMechanica
Full range of labelling products
HellermannTyton
HTZ compatible table black, black/white, black/yellow; Panel plate labels - thermal transfer -(Helatag 1221 – silver; Helatag 1220 – white)
Khanyisa Electrical Supplies
Range of labelling products
Legrand SA
CAB 3 and Memocab cable markers
Livecopper
Brother portable hand-held label printers and replacement tapes
Magnet Electrical Suppliers
Brady labelling products
Phambili
Full range of labelling products
Phoenix Contact
Marking materials and printers
R&C Instrumentation
APP-driven equipment tagging
Voltex
Complete range of labelling products

FUSES

ABB South Africa
Range of fuses
ACDC Dynamics
BS and Din type fuses for fused isolators
ACTOM Electrical Products
Full range of fuses
Allbro
Full range of fuses
ARB Electrical Wholesalers
Full range of fuses
Consolidated Electrical Distributors
Full range of fuses
Edison Lebone
Range of fuses
Electrahertz
Range of fuses
ElectroMechanica
Range of fuses
Fusecomp
Full range of fuses and fuse holders
Khanyisa Electrical Supplies
Full range of fuses and fuse holders
Legrand SA
HRC, domestic and industrial fuses
Magnet Electrical Suppliers
Full range of fuses
MCE Electric
MCE fuses and fuse holders; Onesto fuses and fuse holders; Onesto dc fuses and fuse holders
McWade Productions
Full range of fuses
Phoenix Contact
Din rail mounted
SIBA Fuses
Complete range of LV and HV fuses for all applications
Siemens
Full range of fuses
Swan Electrical
Full range of fuses
Voltex
Wide range of fuses
Waco
Full range of fuses
Zest WEG Group
High speed fuses ranging from 20-1 000 A; fuse holders

SWITCHES/ISOLATORS

ABB South Africa
Full range of switches and isolators
ACDC Dynamics
Wide variety of switches and isolators
ACTOM Electrical Products
Full range of switches/isolators
ARB Electrical Wholesalers
Full range of PVC and metal; CEE plugs and connectors
CBI-electric: low voltage
Full range of commercial and industrial switch disconnectors
Consolidated Electrical Distributors
Full range of switches/isolators
Crabtree South Africa
Complete range of switches and isolators
Edison Lebone
Range of switches/isolators
Electrahertz
Range of switches/isolators
ElectroMechanica
Range of switches/isolators
Eurolux
Dimmer switches; plastic plate and switch packs; metal plate and switch packs; industrial switches; variety of isolators
Fusecomp
Range of switches and isolators
Hoi P'loy
Black & White in line switches
Khanyisa Electrical Supplies
Complete range of switches and isolators
Legrand SA
Domestic and industrial switches and isolators
Livecopper
CBI-Electric; Schneider Electric; Legrand; Veti 1; Veti 2; Crabtree; Lesco
Magnet Electrical Suppliers
Full range of Schneider and Eaton switches and isolators



SWITCHES/ISOLATORS

Major Tech
VETI complete switches in modular and assembled; VETI complete isolator range; VETI IS isolator series (one-pole to four-pole)
MCE Electric
Onesto din rail isolators; Schenker mini rail isolators; Onesto dc isolators; MCE surface mount (IP66 and IP65) and base mount isolators
McWade Productions
Full range of switches/isolators
Phoenix Contact
Switches and isolators
Shuttle Lighting
LED dimmers
Siemens
Full range of switches and isolators
Stone Stamcor
Chilly toggle switches, Triton float switches
Swan Electrical
Range of switches and isolators
Switchboard Manufacturers
Full range of isolators
Voltex
Full range of switches and isolators
Voltex LSis
Complete range of switches/isolators
Waco
Full range of switches and isolators
Zest WEG Group
Comprehensive range of miniature and moulded case isolators ranging from 40-1600 A

CONTACTORS

ABB South Africa
Full range of contactors
ACDC Dynamics
Wide variety of contactors
ACTOM Electrical Products
Full range of contactors
ARB Electrical Wholesalers
Full range of contactors
CBI-electric: low voltage
Full range of magnetic contactors and thermal overload relays
Consolidated Electrical Distributors
Full range of contactors
Denver Technical Products
GIGAVAC dc contactors up to 1 000 A 1 000 V
Edison Lebone
Range of contactors
Electrahertz
Range of contractors
ElectroMechanica
Range of contactors
Eurolux
Extensive range of contactors
Fusecomp
Full range of contactors
Khanyisa Electrical Supplies
Full range of contactors
Legrand SA
Contactors up to 800 A
Livecopper
Schneider Electric; Chint
Magnet Electrical Suppliers
Schneider and Eaton contactors
MCE Electric
MCE ac magnetic contactors in 3- and 4-pole; MCE contactor accessories; S&C ac magnetic contactors in 3- and 4-pole; S&C contactor accessories
Phoenix Contact
Range of contactors
Siemens
Full range of contactors
Swan Electrical
Range of contactors
Voltex
Complete range of contactors
Voltex LSis
Complete range of contactors
Waco
Full range of contactors
Zest WEG Group
Complete range of contactors from 7-800 A, suitable for AC1 or AC3 use

SURGE PROTECTION DEVICES

ABB South Africa
Full range of surge protection devices
ACDC Dynamics
Wide range of surge protection devices
ACTOM Electrical Products
Full range of surge protection devices
ARB Electrical Wholesalers
Full range of surge protection devices
CBI-electric: low voltage
Clip-in dual mount surge protection devices
Consolidated Electrical Distributors
Full range of surge protection devices
DEHN Africa
DEHNguard 952 310; DEHNguard 952 110; DEHNguard 952 070; DEHNguard 952 030; DEHNventil 951 310; DEHNventil 951 110; DEHNshield 941 310; DENHshield 941 310; DEHNguard CI 952 322; DEHNguard CI 952 327; DEHNven CI 961 200; DEHNgap Maxi 961 180; DEHNcord 900 430
Edison Lebone
Range of surge protection devices
Electrahertz
Complete range of surge protection devices
ElectroMechanica
Range of surge protection devices
Eurolux
IP66 isolators
Fusecomp
Full range of protection devices
HellermannTyton
Surge plugs: TSPIA and TSPIAF – high surge handling capabilities
Khanyisa Electrical Supplies
Complete range of surge protection devices
Legrand SA
Full range of surge protection devices
Livecopper
CBI-Electric; Schneider; Chint; Hager; DEHN; Cirprotec
Magnet Electrical Suppliers
Schneider and Eaton surge protection devices
Major Tech
MTD6 - appliance surge protector
MCE Electric
Onesto surge arresters; Schenker surge arresters; Onesto dc surge arrestors
McWade Productions
Wide range of surge protection devices
O-Line
Full range of surge protection devices
Phoenix Contact
Range of surge protection devices
Sabelco Electrical Industries
Full range of protection devices
Siemens
Full range of surge protection devices
Surge Technology
DEHN; Saltek; Copa; Tridelta
Swan Electrical
Range of surge protection devices
Telbit
40kA and 8kA DIN-Rail Surge Arresters
Voltex
Full range of surge protection devices
Voltex LSis
Complete range of surge protection devices
Zest WEG Group
Fanox surge arrester Class C Type II

TIMERS

ACDC Dynamics
Wide variety of timers, including the Rhomberg range of timers
ACTOM Electrical Products
Full range of timers
ARB Electrical Wholesalers
Full range of timers
CBI-electric: low voltage
Standard electronic time switch with 24-hour reserve
Consolidated Electrical Distributors
Range of timers
Edison Lebone
Range of timers
Electrahertz
Wide range of timers
ElectroMechanica
Wide range of timers
Eurolux
Plug-in (24 hour) and time-switch timers
HellermannTyton
TDDT7 seven day digital timer; TMT2 24 hour mechanical 3-pin socket; TDT7 digital 3-pin socket
Khanyisa Electrical Supplies
Range of timers
Legrand SA
Complete range of analogue and digital timers
Livecopper
CBI-Electric; HellermannTyton; Major Tech
Magnet Electrical Suppliers
Schneider and Eaton timers
Major Tech
Complete range of analogue and digital timers
MCE Electric
MCE analogue and digital time switches; MCE seven day digital geyser time switch; Schenker mini rail seven day digital time switch
O-Line
Wide range of timers
Phoenix Contact
Din rail mounted timers
Radiant Group
Broad range of timers
Siemens
Full range of timers
Stone-Stamcor
SAIA-Burgess timers
Swan Electrical
Range of timers
Voltex
Full range of timers
Waco
Broad range of timers
Zest WEG Group
Electronic relays; RTW range timing; RPW range monitoring; RNW range level control

METERS

ACDC Dynamics
Digital panel meters ad digital process meters
ARB Electrical Wholesalers
Full range of meters
CBI-electric: low voltage
Rail mount meters
Comtest
Digital meters; clamp meters; laser distance meters
Consolidated Electrical Distributors
Full range of meters
Edison Lebone
Range of meters
Electrahertz
Range of meters
ElectroMechanica
Range of meters
Electro-Test
Complete range of meters
Eurolux
Digital multimeters; IR thermometer; Lux meter; laser distance meter; clamp meter
HellermannTyton
TBM series of multimeters and clamp meters to suit every application
Khanyisa Electrical Supplies
Full range of meters
Legrand SA
Electrical energy and multifunction metering
Livecopper
CBI-Electric
Magnet Electrical Suppliers
Schneider and Power Star meters
Major Tech
Full range of professional test instruments and DIY meters
MCE Electric
MCE ammeters and voltmeters
McWade Productions
Range of meters
Phoenix Contact
Energy power meters and CTs
Siemens
Full range of meters
Swan Electrical
Range of meters
Switchboard Manufacturers
Range of KHW meters
Telbit
Prepaid water meters
Three-D Agencies
Full range of multimeters and test equipment
Voltex
Voltex range of LSis panel meters

METERS

Waco
Complete range of meters
Zest WEG Group
Electronic range of power factor meters and power meters

ABB South Africa
Complete range of DB enclosures
ACDC Dynamics
Wide range of DB enclosures in all colours, materials and sizes
ACTOM Electrical Products
Full range of DB enclosures
Allbro
Wide range of DB enclosures
ARB Electrical Wholesalers
Full range of DB enclosures
C3 Technologies
Manufacturers of LV distribution boards and all associated products
CBI-electric: low voltage
Flush mounted distribution boards
Consolidated Electrical Distributors
Full range of DB enclosures
Edison Lebone
Range of DB enclosures
Electrahertz
Range of DB enclosures
ElectroMechanica
Broad range of DB enclosures
Elen Electrical Enclosures
Surface-mount distribution boards
Eurolux
Variety of steel and stainless steel electrical enclosures; surface- and flush-mounted distribution boards
George Switchboards
Specialised manufacturer of low and medium voltage enclosures; various distribution products for the electrical distribution network across the African continent
JB Switchgear Solutions
Wide range of distribution board enclosures
Khanyisa Electrical Supplies
Full range of DB enclosures
Legrand SA
Complete range of flush- and surface-mount, waterproof, DIN rail boards
Livecopper
Custom sizes made to order: Gewiss; MCE; Hager; Veti; CBI-Electric
Magnet Electrical Suppliers
Rittal and Allbro DB enclosures
Major Tech
Full range of IP 65 and IP 55 enclosures
MCE Electric
MCE distribution boards available in surface and flush mount from two-way to 36-way; Onesto distribution boards available in surface and flush mount from four-way to 36-way; Schenker distribution boards available in surface and flush mount from four-way to 20-way; adjustable flush mount distribution boards available in 20-way and 24-way
Phambili
Range of standard sizes available; manufacture to client specifications
Power Panels and Electrical
Wide range of distribution board enclosures
R&C Instrumentation
Infrared inspection windows
Sabelco Electrical Industries
Full range of distribution board enclosures
Siemens
Full range of distribution board enclosures
Swan Electrical
Range of distribution board enclosures
Switchboard Manufacturers
Range of DB enclosures
Voltex
Full range of DB enclosures
Voltex LSis
Full range of distribution board enclosures and custom panels
Voltex MVLV
Complete range of DB enclosures
Waco
Broad range of distribution board enclosures
World Power Products
MCC: floor standing, 19" racks, kiosks
Zest WEG Group
Full range of indoor and outdoor distribution boards and DB enclosures, custom built to client specification

HAZARDOUS AREAS

ACDC Dynamics
Full range of products for hazardous areas
ARB Electrical Wholesalers
Broad range of products for hazardous areas
Comtest
Digital multimeters; process calibrators; pressure calibrators; infrared thermometers; pressure models
Edison Lebone
Wide range of products for hazardous areas
Elen Electrical Enclosures
Junction boxes Eex'e zone 1, 2, 21, 22
Eurolux
Hazardous luminaires
HellermannTyton
Multimeter – TBM812XEX and TBM811XEX, intrinsically safe; TSF14 – Ex and suitable for mining and petrochemical
Khanyisa Electrical Supplies
Wide range of products for hazardous areas
Magnet Electrical Suppliers
ATX products for hazardous areas
Nordland Lighting
Lighting for hazardous areas
Phoenix Contact
Safety relays and Ex barriers
R&C Instrumentation
IS-certified Infrared thermometers
Siemens
Full range of products for hazardous areas
Superlume
A range of lighting products for hazardous areas
Three-D Agencies
Full range of multimeters and test equipment
Voltex
Full range of products for hazardous areas
Waco
Full range of products for hazardous areas
Voltex LSis
Broad range of products for hazardous areas

Replacing switch gear and motor control panels

In some organisations the plant engineer (or at least the person carrying that title, engineer or not) is not really experienced in electrical matters. The electrical foreman and electricians are all pretty hot shot (they have to be or sooner or later the plant will stop working). But the plant engineer is often merely an agent whose job it is to convey and implement the wishes of management to the engineering staff. When sales reps come visiting, it is the engineer they see. And, sales reps being sales reps, they entertain the engineer and give diaries and planners and bottles of scotch and, being salespeople, they push their product. If a plant is established, there is little that they can sell since all the switchgear and motor control centres are installed and running. Sooner or later the salesperson will whisper in the engineer's ear that, perhaps, the motor control centres and medium voltage switchgear are getting old… and… should be replaced.

Sometimes the engineer latches onto this and, at the next management meeting, includes it in the minutes. At the meeting the engineer presents a 'report'. Actually, it's not the engineer's report, really: it's been written by the salesperson and the engineer has signed it. It contains some terrifying information: (1) Fault levels are rising and the switchgear is inadequately rated and may blow up if it has to interrupt a fault. (2) The switchgear does not conform to the standard IEC 62271-200-2003 [1]: ac metal-enclosed switchgear and control gear for rated voltages above 1 kV and up to and including 52 kV. (3) Spares are mostly unavailable.

The report goes on to mention that staff may be injured when operating the switchgear. However, new switchgear is available…and it costs a lot but should be budgeted for. Reluctantly, management agrees. In due time the budget is submitted. It includes equipment, labour, installation and… consulting engineer fees. All of the pricing has been supplied by the salesperson who wrote the report. In due time the consulting engineer is appointed. In discussing fees, the consulting engineer first tries the old, "It's very hard to estimate fees in a switchgear upgrade; we'll charge on a basis of time and attendance". When the plant accountant kicks this into touch the consultant then says the charge will be 12% of the contract value up to R500 000 and 8% of the value above that up to a contract value of R10 million.

The consultant gives the accountant a copy of a government gazette setting out consulting fees. After studying it for a few hours the accountant is none the wiser but doesn't want to seem unintelligent. So, the accountant appoints the consulting engineer via a Procsa form (which is equally unintelligible) and the contract starts. The consultant, getting a percentage of the construction cost, has no incentive to keep equipment and construction costs down. So, the design is for switchgear that could be used in a steel mill with a blast furnace and smelter and the replacement switchgear is large and elaborate. Unfortunately, it won't fit into the footprint of the existing switchgear and building alterations are required. Expensive and inconvenient. However, it does cost about R12 million so the consultant's fee is about R1 million. Very tasty. A further score is that the supplier does all the drawings.

What mistakes have been made? These are (a) The consultant should have been appointed at a fixed fee to determine if replacement of the switchgear is required. Often it is not. If it has been regularly serviced, probably not. There are many things that can be done to reduce fault levels and the consultant should investigate this. (b) There is no requirement for switchgear installed in 1993 and before to conform to any standard as long as it is reasonably safe. In Cape Town switchgear has been installed which is over 50 years old. (c) Clients should not fall into the trap of basing consulting fees on a percentage of contract costs… insist on a fixed fee.

UPS systems ensure continuity of service during power outages

Legrand's advanced uninterruptible power supply (UPS) systems ensure maximum continuity of service of essential electrical equipment by providing reliable performance in terms of power and back up time, particularly during electrical network disturbances such as load-shedding.

Legrand's environmentally responsible approach to constantly changing global markets encompasses ongoing technological developments of its product portfolio, including energy efficiency, quality power supply, optimum safety and enhanced aesthetics.

According to Legrand, innovative design, advanced electronic components and thorough testing of each unit ensure dependability, energy efficiency and safety of the new UPS system. High performance batteries and an efficient charging system extend battery life by up to 50%.

Legrand's UPS systems, which provide superior power efficiency resulting in cost effective solutions, encompass three ranges – Line Interactive, Conventional and Modular.

Line Interactive UPS systems comprise units from 600 VA to 3 kVA single phase. This range is ideal for small office and home use. Conventional UPS systems, for power from 0,8 kVA to 800 kVA, in single and three phase, offer the commercial sector safe, efficient and innovative solutions, including reliable electrical redundancy. The design of this range offers flexibility in semi-modularity, whereby the autonomy and power can be expanded as required. Legrand's compact and lightweight Modular series, from 1,25 kVA to 800 kVA, is a flexible three-phase system, comprising individual single-phase modules that can be added to existing configurations to increase the power supply or backup time.

An advantage of a three-phase power supply system with single-phase loads is that in the event of a failure of one of the modules, there is no loss of power. Power continues to be distributed over other modules that are still operational. The modular functionality of the batteries enables the removal of faulty batteries, or the option to increase the autonomy by adding batteries as required.

A range of communications accessories has been designed for managing and configuring the UPS, as well as for remote control of the system. These devices include network interfaces for real time control of the UPS and for managing numerous events that include no power, over-loads and by-pass problems. These network interfaces, with a 32-bit processor, do not require any external software. Other accessories include sensors for monitoring ambient temperature and humidity, smoke detectors and fire safety controls, as well as air conditioning fault and intrusion detectors.

Communication and supervision software for accessing the operating parameters of the UPS and for carrying out full diagnostics and the configuration of specific functions, is also available. Legrand's online site configurator www.ups.legrand.com assists with the selection of the correct UPS by providing easy power selection and calculation of the necessary back-up time required.

Legrand South Africa offers a service centre providing full technical support, service level agreements as well as critical spares backup.

Enquiries: +27 (0)11 444 7971

Current transformers and the impact on distribution boards

A current transformer (CT) is a type of 'instrument transformer' that is designed to produce alternating current in ots secondary winding which is proportional to the current being measured in its primary.

A CT is used to safely monitor actual electric current and use of current flowing in an AC transmission line using amp or kWH/kVA metering. CT's reduce high current levels from thousands of amperes to a standard 1Amp or 5Amp for normal operation.

Standard uses of CT's are for Wattmeters, Power Factor Meters, watt-hour meters, protective relays or as a trip coil in magnetic circuit breakers or MCB's. The selection of CT varies on the input, required output, and application.

The bigger the input current the bigger the physical size of the CT which has a direct impact on the space required in a DB board for the mounting (on the busbar system or incoming cable system) thereof. For metering purposes, a CT is placed on the incoming side of a main circuit breaker to ensure that tampering/removal of the CT is not possible without the knowledge of the regulating authority.

If there is no load connected to a CT the points need to be bridged out for protection purposes as it will result in damaging the product, some CT's will make a humming sound indicating that there is no load connected.

The onus in selection of the correct CT for the required application generally lies with the board manufacturer subject to information received from consulting engineer and product supplier.

Enquiries: +27 (0)44 873 4137

Enclosures for severe corrosive environments

LEGRAND'S range of fibreglass reinforced polyester Marina cabinets is designed for use in any environment, but these durable units are particularly suited for severe corrosive environments in the chemical and petrochemical, mining, general engineering and marine industries. Marina enclosures offer maximum safety and the ordered arrangement and optimum protection of electrical components like terminal blocks, switches and sockets, fuse carriers, safety transformers and circuit breakers. These fibreglass-reinforced polyester cabinets are self-extinguishing at 960°C, and can withstand temperature ratings of between -40 and 80°C. These cabinets have an IP66 protection index rating against the dust and liquid ingress and are adapted to withstand corrosive environments, with excellent resistance to UV, saline mist, bases chemicals, oils and greases. These enclosures have a Class II classification, which meets the requirements to create suitable assemblies for photovoltaic installations.

Enquiries: +27 (0)11 444 7971

Basic electrical installation testing

Concern for public safety and the increasing complexity of fixed electrical installations place extra responsibility on electrical test engineers. It is therefore important to have suitable test tools for carrying out the stringent tests imposed by the International Electrotechnical Commission (IEC) and the European Committee for Electrotechnical Standardisation (CENELEC).

IEC 60364 and its various associated national equivalent standards, specify the requirements for fixed electrical installations in buildings. Section 6.61 of this standard describes the requirements for the verification of the compliance of the installation with IEC 60364.

Basic requirements of IEC 60364.6.61

Electrical contractors are already familiar with IEC 60364.6.61 or its national equivalents. It states that verification of the installation shall be carried out by visual inspection, followed by testing of:

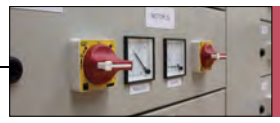
- Continuity of protective conductors.
- Insulation resistance.
- Protection by separation of circuits.
- Floor and wall resistance.
- Automatic disconnection of supply.
- Polarity.
- Functional performance.

In addition, electric strength test and the voltage drop test are under consideration. IEC 60364.6.61 refers to IEC/EN 61557 to test these protective measures.

The basic requirements of IEC/EN 61557

EN 61557 addresses the requirements for test equipment used in installation testing. It consists of general requirements for test equipment (Part 1) and specific requirements for combined measuring equipment (Part 10), and covers the specific requirements for measuring or testing of:

- Insulation resistance (Part 2).
- Loop impedance (Part 3).
- Resistance of the earth connection (Part 4).



SAFEhouse discusses distribution boards, isolators and earth leakage units

The distribution board in any building contains vital safety equipment for the purpose of protecting people and their assets. The devices installed for this purpose are, like so many other electrical products, subject to design and material shortcuts in order to reduce cost and attract those who are enticed by low prices. It is therefore important for installers and users to be aware of the intended functions of the equipment concerned so that, hopefully, safety compromises are discouraged.

Distribution board (DB)

Within a building, the electrical supply is distributed from the distribution board (DB). The main supply cable comes into the DB and is then distributed to the breakers and, from there, to all the circuits such as the geyser, lights and plugs.

The DB usually houses all the contact breakers, earth leakage unit and may also house items such as a doorbell transformer and timers. In a house, the main distribution board is usually where the main electrical cable enters, however there may be smaller boards with contact breakers and possibly earth leakage units at other points, including swimming pool pumps, gate motors and outbuildings. Various types of distribution boards are available, such as surface-mounted, flush-mounted or floor-standing; with closing doors or clear plastic covers or doors. These are available in different sizes, which are determined by the number of circuits rewired within the board, referred to by some manufacturers as 'modules' and others as 'ways', for example eight-way, 12-way, 18-way, 24-way, 36-way, etc, or module.

The interior of the distribution board is pre-fitted with a clip tray or DIN rail for mounting the miniature circuit breakers (MCBs) and other devices. The two different types of MCBs, referred to as 'mini rail' or 'DIN', are only interchangeable if special adaptor brackets are used. While mini rail MCBs can be slightly narrower than DIN MCBs (thus giving an advantage of fitting more into the same space available), the number of accessories on the market for this type of distribution board is limited as many manufacturers are now using the DIN format for their equipment. With the DIN format, the normal ranges of earth leakage units, disconnecting switches as well as MCBs are available.

In addition to this, various types of meters, time switches, pilot lights, surge arresters, etc, are manufactured and this now makes the DIN type distribution board very versatile. Distribution boards can be purchased as an empty enclosure to enable the contractor to equip it, as a ready-wired standard unit, or as a specially manufactured item to a client's requirements. Also available are distribution boards for specific applications such as swimming pools, ready boards for low-cost housing, irrigation systems, etc. Each distribution board must be controlled by a switch disconnector (mains or main switch).

The switch disconnector should:

- Be mounted in or next to the distribution board.
- In the case of the main or first distribution board of an installation, be labelled as 'main switch'.
- In the case of a sub-distribution board, be labelled as 'sub-main switch' or 'main switch' if the board is labelled 'sub-board'.
- In the case where an alternative supply is installed, such as emergency supply, uninterruptible power system (UPS), etc, be labelled as required.
- Have a danger notice on or near it. The danger notice should give instructions that the switch disconnector must be switched off in the event of inadvertent contact or leakage.

A distribution board must comply with the requirements of SANS 10142, and each item of electrical equipment used in a distribution board should comply with the requirements of this standard:

- The distribution board must be suitable for the environmental conditions in which it operates.
- Distribution boards shall be protected against corrosion.

Any point of a distribution board that has to be reached during normal operation, must not exceed a height of 2 200 mm above floor (or walking) level. However, the board may be mounted higher if it can be disconnected from the supply by a switch disconnector that is less than 2 200 mm above floor level. Unless a residential distribution board is housed in an enclosure and direct access cannot be obtained by an infant, no part of an indoor distribution board can be less than 1 200 mm above the floor level, and no part of an outdoor distribution board can be less than 0.200 mm above the ground level.

A distribution board must not be mounted in a bathroom, or above a fixed cooking appliance, or in a position where a stationary cooking appliance could be put below it, unless the enclosure provides a degree of protection, or within a radius of 1 m from a water tap or valve (in the same room), unless the enclosure provides a degree of protection.

If an installation is likely to be extended, a distribution board with spare capacity should be fitted.

Each unoccupied opening of a distribution board must be fitted with a blanking plate. Unless obvious, permanent labelling must identify all incoming and outgoing circuits of the distribution board.

Circuit breakers

A circuit breaker performs the same function as a fuse, but it needs only to be reset, not replaced. Circuit breakers have now replaced fuses and are chosen and connected into a circuit in the same way – they are also chosen with a rating that is always slightly less than the maximum current rating of a circuit. When the current flow in a circuit exceeds the rating of the breaker, it will simply trip, cutting off the electricity supply to that circuit, protecting it from damage. Once the fault has been cleared, the circuit breaker is reset, thus restoring the supply. Circuit breakers are located in the distribution board of the building and also in the utility supply meter box. Every breaker should be clearly labelled so that faulty circuits can be easily identified and isolated (e.g. lights, plugs, geyser, stove). A circuit breaker is also a switch.

Switches and isolators

Switches and isolators are devices used to break the flow of current. Switches come in various shapes and sizes, but all operate on the same principle. An important factor when choosing a switch is its rating. Reputable manufacturers will always indicate the operating voltage and current rating. For instance, a light switch must not be used as a stove isolation switch because the rating of the light switch will be too low for the stove current drain and this would cause it to overheat and fail. Switches in a residential building would include switches in the distribution board, and the common switches indicated in the following illustration.

Earth leakage unit

An earth leakage unit is a device that can detect small imbalances between the earth conductors and the supply, indicating leakage of electricity down to earth. When this happens, the earth leakage switch automatically turns off or 'trips'. A small test button is provided and it should be used to test the unit periodically. It is a vital safety feature for any installation and should always be installed.

Enquiries: +27 (0)11 396 8140

- Resistance to earth (Part 5).
- RCD performance in TT and TN systems (Part 6).
- Phase sequence (Part 7).
- Insulation monitoring devices for IT systems (Part 8).

Testing an electrical installation

The visual inspection is performed first to confirm that permanently wired electrical equipment complies with the safety requirements and is not visibly damaged, and that fire barriers, protective, monitoring, isolating and switching devices, as well as all relevant documentation are present. Electrical testing may commence after this inspection. Note that the test methods described are given as reference methods in IEC 60364.6.61. Other methods are not precluded provided they give equally valid results. Only with the appropriate experience and training, safe clothing and the right test tools is a person considered competent to test installations to IEC 60364.6.61.

Continuity

Testing the continuity of protective conductors is normally done with an instrument able to generate a no-load voltage in the range 4 – 24 V dc/az with a minimum current of 0,2 A. The most common continuity test is measuring the resistance of protective conductors, which involves first confirming the continuity of all protective conductors in the installation, and then testing the main and supplementary equipotential bonding conductors. All circuit conductors in the final circuit are also tested. As continuity testing measures very low resistances, the resistance of the test leads must be compensated for. The Fluke 1650 Series multifunction installation tester has an auto-null feature which measures and stores the test lead resistance even after the instrument has been switched off.

Insulation resistance of electrical installation

Insulation integrity is critical to prevent electric shock. It is generally measured between live conductors and between each live conductor and earth. The complete installation must be switched off, all lamps removed and all equipment disconnected before measuring the insulation resistance between live conductors and earth. All fuses must be left in and circuit breakers and final circuit switches closed.

Measurements are done with direct current using an instrument capable of supplying a test voltage of 1000, 500 or 250 V, depending on the nominal circuit voltage. On single phase supply systems, insulation testing is normally undertaken using a test voltage of 500 V. Before testing, disconnect equipment and take measures to prevent the test voltage damaging voltage-sensitive devices such as dimmer switches, delay timers and electronic starters for fluorescent lighting. According to IEC 60364.6.61, the resistance values should be greater than 1 MΩ for 1000 V test voltage, 0,5 MΩ for 500 V, and 0,25 MΩ for 250 V.

Protection by separation of circuits

The separation of the live parts from those of other circuits and from earth should be verified by a measurement of the insulation resistance. The values obtained should be identical to the values mentioned previously, with all appliances connected.

Floor and wall resistance

If applicable, at least three floor and wall resistance measurements should be made per location, one being approximately 1 m from any accessible extraneous-conductive part in the location, with the remaining two measurements taken at greater distances. The series of measurements is repeated for each relevant surface of the location.

Verifying protection by automatic supply disconnection

Verification of the effectiveness of the measures for protection against indirect contact by automatic disconnection of supply depends on the type of system. In summary, it is as follows:

- For TN systems: Measurement of the fault loop impedance and verification of the characteristics of the associated protective device.
- For TT systems: Measurement of the earth electrode resistance for exposed conductive parts of the installation and verification of the characteristics of the associated protective device.
- For IT systems: Calculation or measurement of the fault current.

Measurement of the earth electrode resistance

Before testing, the earthing rod must be disconnected from the installation's main earthing terminal. In doing this, the installation will consequently have no earth protection and must therefore be completely de-energised prior to testing. Earth resistance testing must not be done on a live system.

One auxiliary electrode is placed at a set distance from the earth electrode, and the other at 62% of the distance between the two in a straight line. The test measures the earth resistance and detects the voltage between the auxiliary electrodes, and if this exceeds 10 V, the test is inhibited.

Measurement of fault loop impedance

Measurement of the fault loop impedance is done using the same frequency as the nominal frequency of the circuit (50 Hz). The earth-loop impedance test measures the resistance of the path that a fault current would take between line and protective earth. This must be low enough to allow sufficient current to flow to trip a circuit protection device such as an MCB. Determining the prospective fault current (PFC) ensures that the capability of fuses and over-current circuit breakers is not exceeded. The Fluke 1650 Series instruments can also measure the earth resistance component of the total loop resistance, and line impedance (source impedance between line and neutral, or the line-to-line impedance in 3-phase systems) and calculate the prospective short circuit (PSC) current which could flow when there is a short circuit between line and neutral.

Testing RCDs

Residual current operated devices (RCDs) are often fitted for additional protection where they detect currents flowing to earth that are too small to trigger over-current operated protective devices or to blow fuses, but would still be sufficient to cause a dangerous shock or generate enough heat to start a fire. Basic testing of RCDs involves determining the tripping time (in milliseconds) by introducing a fault current in the circuit. The test is done for both 0 and 180° phase settings because some RCDs are more sensitive in one half cycle than the other. The longest time is recorded.

Polarity test

Where local regulations forbid the installation of single-pole switching devices in the neutral conductor, a test of polarity must be done to verify that all such devices are connected in the phase only. Incorrect polarity results in parts of an installation remaining connected to a live phase conductor even when a single-pole switch is off, or an over-current protection device has tripped.

Functional test

All assemblies, such as switchgear and control gear assemblies, drives, controls and interlocks, should be functionally tested to show that they are properly mounted, adjusted and installed in accordance with the relevant requirements of the standard. Protective devices must be functionally tested to check whether they are installed and adjusted properly.

The 1650 Series multifunction testers

The 1650 Series multifunction testers measure up to 500 V ac, and the instruments simultaneously display line voltage level (primary display) and frequency (secondary display). They are easy to set up for making measurements, with a clearly marked rotary control for setting the range, and a straightforward user interface with simple menus for setting test conditions. The display's wide viewing angle also contributes to user convenience. The control panel markings are available in five languages (English, French, German, Italian and Spanish), and with universally recognised graphical symbols.

Enquiries: sales@comtest.co.za

How to prepare for a career in the 4th Industrial Revolution

The world is changing fast - faster than ever before. Jobs that first emerged barely a generation ago are no longer around.

Today changes are monumental job market: by 2022 over 75 million jobs will have disappeared and been replaced by 133 million new types of jobs (WEF, 2018). This is because of the 4th Industrial Revolution, which refers to how high-level technologies are enhancing our world. It's a future that could have driverless cars, drone deliveries and shops run by artificial intelligence. That's why so many jobs will disappear, and new ones will be created.

This can make students today anxious about their tertiary education choices. What guarantee do they have that their pick will be a good one for the future? Here are four tips that will help cover those bases and guide you to the best options:

Get into STEM: In the future, STEM (Science, Technology, Engineering and Mathematics) will be a part of everything, because it is the foundation of the 4th Industrial Revolution. That doesn't mean you need a PhD in science to play a part. STEM can however help you see where you can do the most with your abilities and interests. STEM covers an enormous number of careers that aren't in the 'classic' brackets of their names. For example, a designer of visual elements for an application is still part of the technology world. Visit STEM seminars and speak to people in careers you're considering about STEM to discover more.

Soft skills are the top skills: Machines can do many wonderful things, but they are not much good at creativity, empathy and a host of other human attributes that make each of us unique. This is popularly called EQ or 'soft skills'. EQ will be very important for future jobs. Working with others, managing disagreements, inspiring co-workers and collaborating for better results are benchmarks that matter more every day. There are many books and online resources about soft skills, so start there. An integrated and supportive learning environment can also help to develop these skills.

Discipline: The need to clock in at nine and leave work at five is disappearing fast. It's being replaced by agile workplaces where results, not being seen at your desk, are the measure of productivity. We can now be connected nearly anywhere using phone-sized, powerful computers. These are all ingredients of the 4th industrial revolution. They create new freedom for workers, but you need to know how to self-motivate and apply discipline. This is even more important if you want to work for yourself. Anyone can learn such skills by setting goals and working to meet them.

Making a choice for a future career isn't easy, but once you've decided, Sasol can help. To support the growth of STEM skills in South Africa, Sasol offers bursaries for students pursuing B Eng or BSc Eng in various engineering disciplines, BSc in Chemistry and Accounting (CA route), or Instrumentation, Mining Survey and Mechanical or Electrical Engineering at a University of Technology.

Enquiries: www.sasol.com

Industry 4.0: The challenges and risks

Industry 4.0 is a trending topic. The entire concept represents full industry digitalization and is closely related to the Internet of things (IoT); infiltrating all industrial areas and resulting in the creation of an industrial internet of things, or IIoT for short.

Industry 4.0 and IIoT are exciting concepts that require a company's infrastructure to be fully interconnected. The traditional approach was based on separate operational technology (OT) and company information (IT) systems. Over time and thanks to technological advances, these areas grew closer until they finally fused together.

If configured correctly, the interconnection of that infrastructure brings companies advantages in terms of time and money saved. It is possible to provide monitoring, planning and maintenance in real time because the data is immediately available. This type of easy data accessibility, and mutual dependency and interconnection of systems, however, also has certain risks. One of the main challenges of digitalization is cybersecurity.

Main challenges

Security: The interconnection of systems is a key feature in industrial digitalization, which also, however, represents a security challenge to data protection. This data must be secured against direct, external hacking attacks but also against unintentional data leaks, for example, as a result of employee error or lack of competence. The question of cybersecurity is especially important for managing infrastructures that are critical for a functional state (production and distribution of electricity and gas), as well as infrastructures with a risk of environmental and health hazard accidents (chemical plants, nuclear power plants, etc.).

Testability: Each new system or change in a system must be tested in an industry setting prior to deployment so that its security and reliable response in various situations can be verified. Testing has always been a critical phase of the change implementation process even in the era of separate OT and IT systems. Once a company is fully integrated and digitalized, testing becomes a more complex challenge than ever before.

Using elements of artificial intelligence: A topic that is much discussed in relation to Industry 4.0 is the use of artificial intelligence for autonomous control, as well as for purposes of intelligent and predictive maintenance, control optimisation and decision-making processes and, finally, for increasing security (e.g. face or speech recognition). To function correctly, most artificial intelligence algorithms require a 'learning' or 'training' phase using a representative data sample. Obtaining such data, however, is another important challenge. Not only it is necessary to obtain an adequate amount of relevant data for learning, but it must also be proven that this data adequately covers all critical system states so the entire system can be tested successfully.

Legislation and standardisation: The industrial automation sector faces stricter and stricter legal regulations relating to the protection of human health and the environment. Moreover, it is necessary to realise that Industry 4.0 is not one standard but represents an entire group of standards, which are mostly still evolving. Reacting to current trends and requirements, Rockwell Automation, therefore, continues to evolve its Industry 4.0 concept called The Connected Enterprise.

Industry 4.0 brings many new opportunities, which would not be possible prior to full digitalization and the interconnection of company systems. On the other hand, it also brings new challenges, which need to be addressed.

Enquiries: www.rockwellautomation.com

Setting the benchmark for Industry 4.0 in South African industry

With the advent of Industry 4.0 set to change the face of industry and production, SEW-Eurodrive has a range of solutions for its concept of the Lean Sm@rt Factory. This is based on the paradigm shift introduced by new technologies such as big data, embedded computing, the Internet of Things (IoT), and cloud computing in the production environment.

The Movigear® mechatronic drive system from SEW-Eurodrive (Pty) Ltd. is designed for flexible use across various communication infrastructures. It is ideal for decentralised field applications. Features include a compact design and optimal integration of components with permanent-field synchronous motor, gear unit, and integrated electronics.

Movigear® is especially tailored for efficient use in the general materials-handling sector. It is available in two sizes and three electrical performance classes for a total of four communication variants. Energy savings of up to 50% are possible due to the seamless interplay between the IE4-rated motor, efficient gear unit, and integrated electronics.

"Perfectly-matched components, combined with the energy optimisation of the overall system, facilitate high system efficiency. These features make the Movigear® mechatronic drive solution a cost-effective, power-optimised, total solution," SEW-Eurodrive MD Raymond Obermeyer comments.

Flexible, compact and intelligent Movidrive® B drive inverters save space in the control cabinet. In addition, they are equipped with integrated IPOSplus® positioning and sequence control as standard features. These inverters are ideal for asynchronous ac or synchronous servo drives.

Additional features are a broad power range from 0.55 kW to 250 kW, and a high overload capacity. Based on a modular concept, the Movidrive® B inverter is ideal to improve the flexibility and efficiency of a range of applications.

SEW-Eurodrive (Pty) Ltd. also offers the freely programmable Movi-PLC® motion and logic controller for solving complex tasks in a flexible manner. These scalable controllers are an ideal solution platform due to their universal operation and functionality. Comprehensive interfaces are available for the external periphery, and for visualisation purposes so as to fully automate complete machines.

For fast and simple start-up, users can take advantage of preconfigured program modules for many applications. The standard programming languages FBD, LD, IL, and structured text ensure greater flexibility. MOVI-PLC® provides the drive functionality necessary to match any specific application. It can be used wherever 'smart' drive solutions are required.

"The basic concept behind Industry 4.0 is to leverage information technology in order to integrate business and engineering

Siemens contributes to Coca-Cola Beverages Africa's digitalisation vision

The Nairobi Bottler's Embakasi Plant based in Nairobi, Kenya, a fully owned subsidiary of Coca-Cola Beverages Africa (CCBA), received a Totally Integrated Automation (TIA) training rig from Siemens Digital Industries South Africa to enable skills development in digitalisation technologies.

The training rig, complete with an extensive portfolio under TTIA, will serve a pivotal role in training apprentices and current employees to understand the current and future value of food and beverage manufacturing plant operations. It will prepare engineers and technicians to take complete value from the latest automation solutions, and develop themselves to carry out technical activities related to migration and management of S7-1500 PLC, HMIs, servo drives etc. This rig was configured and supplied in conjunction with International Energy Technik (IET), a local Kenyan company and a Siemens Partner.

As Eric Nyakundi, Electrical Engineer at CCBA's Embakasi plant, explains, "It perfectly fits into our business goals and overall strategy of capability development and asset care strategies. The bulk of our control systems are based on Siemens products, hence the direct transfer of skills and knowledge acquired in training for our manufacturing facilities. This is in line with the new supply chain philosophy of growing and developing engineering capacity and an overall asset care strategy."

Nyakundi continues, "The automation teams, the machine specialists, the electrical artisans and the apprentices at CCBA will be trained on this rig. These teams are responsible for supporting the manufacturing facilities in realising the company's manufacturing business goals."

"The soft drink market is characterised by frequently changing and often short-lived trends," adds Ralf Leinen, senior vice president for Siemens Digital Industries, southern and eastern Africa. "Soft drink manufacturers must always be able to adapt their production to new requirements, always working efficiently to produce optimal quality. Digitalisation gives them the flexibility they need to accomplish this, while also boosting energy efficiency. Siemens and CCBA have a historically successful partnership in Africa, where Digital Industries has contributed towards a fully automated solutions that can assist with engineering skills."

Siemens also created a 3D point cloud scan of the entire plant. This data from the scan can be utilised with Siemens NX platform tool to analyse and plan projects. This is a step closer towards digitalisation, where engineering time will reduce thereby reducing time to market. Automation products, showcased in the rig, help to collect the necessary data from process and packaging lines, which ultimately can add valuable information in the NX tool for further analysis."

"Ongoing education and training have a positive effect for both business and society," concludes Sabine Sabine Dall'Omo, CEO, Siemens southern and eastern Africa. "At Siemens we believe in investing in the long-term and creating value for our customers and the societies we operate in. We will continuously support CCBA's vision in shaping their digital future."

Enquiries: www.siemens.co.za

A new $200 billion industry: smart materials

The new IDTechEx report, "Smart Material Opportunities in Structural Electronics 2020-2030" analyses and forecasts a remarkable $200 billion materials opportunity by making dumb structures smart. Save weight, space and cost, eliminate maintenance, ten times the life. Welcome huge drones with solar airframes aloft for five years, beaming the internet to everyone. Cars will soon have 10% of the parts as so many components become load-bearing multifunctional composites. Solar bodywork for latest cars, later doubling as energy storage too, means they never plug in. In fact, better appliances, wearables and vehicles lasting generations are on the cards. Think one-piece flexible phones with no case, even smart roads. Six countries are pleased with their experimental solar roads and that is just a start.

The report introduces the enablers of all this, such as additive metal and dielectric patterning, some stretchable, and the new organic, inorganic and composite materials merged. Here we have the e-window performing three functions, five later, and the potential for a composite ocean wave blanket acting as a power station, all facilitated by new materials and processing with huge sales potential.

Many infograms pull together market readiness of composites and how improved metal patterning can create electricity and bend light. See separate forecasts for vehicles, building and ground-integrated photovoltaics, for in-mould electronics, flexible AMOLEDs and other structural electronics/ electrics/optronics as multifunctional material. Even elements of this are forecast, including embedded RFID, solar cars, building integrated photovoltaics and smart glass.

The Introduction reveals the evolution of the needs and practices with phones, wearables, vehicles, structures and more. Which of the 12 energy harvesting technologies lend themselves to being incorporated in the new monolithic smart structures? Tesla sunroof with electric tinting and lighting functions in one glass, human body area networks, energy positive solar boats and self-healing plastics are among the host of examples explained.

Another chapter, Vehicle Integrated Photovoltaics (VIPV) introduces such things as energy positive solar cars, autonomous solar flying wings that replace trucks and those upper atmosphere solar drones. Infograms show how many disciplines leverage to deliver many benefits here. Why the importance of single crystal silicon bodywork but potential of GaAs film and thin film, 3 junction InGaP, GaAs, InGaAs. Which companies, why, by when?

Chapter 4 pulls together Smart Roads, Bridges, Buildings, emphasising new materials and potential. Here is the largest sector BIPV including solar tiles and windows. What materials and benefits? Scope for heat and piezoelectric harvesting roads? Why did solar roads and environs fail in Germany and France, but look good in the UK, Netherlands, Japan, China and Hungary? What new materials? What next?

Chapter 5 goes deeper with Materials and Manufacturing: Large Structural Electrics. Including structural battery and supercapacitor technology from graphene and CNT, glass and carbon fibre to vanadium and ruthenium boosting pseudocapacitance.

To download the report, visit: www.IDTechEx.com

Taking efficiency to new heights

The industrial sector has a significant impact on global sustainability: According to the International Energy Agency, it accounted for 41.6% of global electricity consumption and 79.8% of global coal consumption in 2016. As socially responsible actors, manufacturers play an important role in the broader transformation towards sustainable development. The emergence of Industry 4.0 has been attended by expectations that its development would lead to substantial resource savings and greater resource efficiency.

Current research suggests that improvements in energy efficiency hold the greatest potential for resource savings. New software solutions can gather and aggregate data from across the production chain, providing greater transparency around energy consumption and enabling employees to schedule production to take advantage of shifts in electricity pricing. Another promising approach will exploit the flexibility of Industry 4.0 technologies to accelerate the deployment of renewable energy in manufacturing by scheduling production processes so that they track with peaks in the generation of energy from renewable sources. Efforts are also underway to improve the energy efficiency of industrial robots by optimising the speed at which actions are carried out, rather than simply programming systems to work as quickly as possible. This approach could deliver energy savings of up to 30%.

When it comes to material efficiency gains, the evidence is less clear. The use of modern technologies such as additive manufacturing (3D printing) could certainly reduce material wastage. But in the near-term these products are unlikely to capture a significant share of the market and due to this the resulting material savings will not be significant.

The potential material savings are offset by the additional resources required to roll out Industry 4.0 in factories. This entails the retrofitting of manufacturing systems across the production chain with sensors, actuators, processors and communication technologies or indeed their replacement with modern systems capable of collecting and communicating relevant data.

Conclusion

There is a clear potential for digital technologies such as 3D-printing and optimised robotics to deliver energy and material savings. It is important to remember that Industry 4.0 is not a single technology, rather it is a concept in which different manufacturing technologies, information and communication technologies, and organisational aspects interact. Improvements in individual areas do not necessarily translate into net gains and we should be wary of drawing such conclusions. It will take systemic studies covering entire value chains to provide reliable estimates on the net effects in terms of energy and material savings. One possible starting point would be to examine the potential benefits that could be achieved through corporate sustainability management.

There is some evidence to suggest that fully computerised manufacturing systems require more energy and raw materials than their conventional predecessors. This outcome is primarily due to the installation and operation of additional sensors, control units and data processing hardware. Whether and to what extent the digital transition can reduce the ecological footprint of manufacturing is a matter of design. While potentials exist, it will take conscious efforts to deliver and tap into them.

By Dr. Grischa Beier, Silke Niehoff and Prof Ortwin Renn

4 important concepts of Industry 4.0 in energy and Utilities Management

Far beyond buzzwords, understand how concepts of Industry 4.0 like Internet of Things, Big Data and Machine Learning contribute to energy and utilities management.

The term Industry 4.0 has continued to gain strength. What many people don't realise is that the term was coined in a strategic initiative of the German government, called Industrie 4.0, whose principal objective was to "drive digital manufacturing, promoting interconnection between products, value chains and business models."

Indeed, we have come to recognise Industry 4.0 as the "digital transformation of industrial markets, with intelligent manufacturing in the front line. Industry 4.0 also represents the so-called Fourth Industrial Revolution in discrete manufacturing and of continuous processes, in logistics and in supply chains (Logistics 4.0), in the chemical industry, energy, transportation, sectors like oil and gas, mining and metallurgy, in addition to other industries such as natural resources, health, pharmaceuticals and even intelligent cities."

But to go beyond the jargon, we will explore the main concepts and technologies related to Industry 4.0 in the context of energy and utilities management.

Extensive monitoring

The development of technologies for instrumentation and monitoring of industrial processes enables data capture in ever-increasing resolutions, allowing increasingly powerful analyses. In energy and utilities management, sophisticated physical meters (instruments) are capable of interpreting physical quantities that allow the understanding of processes of interest, monitoring variables that range from applied power, for example, to harmonics that describe the quality of the electricity consumed.

In addition to technological advances, the costs of acquisition and installation of modern sensors and instruments have become increasingly accessible, allowing broad and deep understanding of the characteristics of industrial processes of interest, allowing redundancy of measurements and the obtaining of high-quality data – essential for planning, control, and improvement of energy efficiency and operational efficiency.

Industrial Internet of Things (IIoT)

The Internet of Things is another widely-discussed concept, and refers to an entire "network of physical devices that include sensors, actuators, electronics, and connectivity, allowing the integration of the physical world with computer systems." In our context, the Industrial Internet of Things, a term often used as a synonym for Industry 4.0, refers to the application of technologies such as Machine Learning and Big Data to exploit sensor data, communication between machines (M2M) and automation systems to improve industrial and manufacturing processes.

In energy and utilities management, Industry 4.0 is realised in the connectivity between measuring instruments and the entire information and automation architecture of industrial organisations, extending the capacities for collection, communication, and storage of large volumes of data related to the consumption, generation, and transformation of energy inputs.

Analysis of large volumes of data

Typical industrial applications can involve thousands of meters collecting data at high frequencies, generating gigabytes of data each day – in energy quality applications, for example, specialised meters today visualise the network each millisecond.

This abundance of data and the increasing availability of computational resources allows the application of specific techniques of artificial intelligence with the aim of facilitating the prediction of variables and the identification of patterns of interest in a range of industrial processes.

Due to the very nature of the phenomena that produce data collected from industrial operations and the limitations of the instruments that are used to capture them, the development of prediction models based on data collected from industrial operations involves considerable levels of noise and imposes additional pressures on the volume, variety, speed, and veracity requirements of the data, something common to Big Data applications. Efficient algorithms for processing data quality are thus becoming as essential as algorithms for the construction of prediction models.

In energy and utilities management, the data available can give rise to, for example:

- Prediction models for energy consumption (or energy generation) of operations, starting from planned production levels or other contextual variables;
- Models for learning and establishing the ideal modes of operation, which permit effective levels of energy consumption;
- Models for analysing the energy efficiency of processes, starting from the capture of entry and exit variables and knowledge of the transformation phenomena involved.

Efficiency and sustainability

Behind the entire investment in Industry 4.0 lies a common objective: increasing the efficiency and competitiveness of an operation. The benefits are direct and carry the potential to establish a virtuous cycle of investment, result and reinvestment: more competitiveness results in better financial results; with more cash in hand, more investments can be directed to capacity expansion, productivity technologies, operational efficiency and energy efficiency; greater efficiency ensures lower levels of greenhouse gas emissions, reducing environmental impact in addition to improving the quality of work, both of which positively impact the community.

Industry 4.0 and energy and utilities management

Energy management is one of the main pillars of Industry 4.0. The motivation comes from a combination of environmental aspects, cost pressure, and regulation as well as the proactiveness of organisations when it comes to efficient consumption of energy and utilities.

In addition, the integration of different sources of energy generation in an increasingly demanding and distributed market will require management technologies capable of recognising, predicting and acting in a way to guarantee quality, sustainability, and efficiency, including costs, in energy consumption.

Modern energy and utilities management systems should be able to exploit a large volume of data collected by various types of meters on a number of variables of interest for a certain industrial operation, assembling the above concepts – extensive monitoring, the Industrial Internet of Things, analyses of large volumes of data, and efficiency and sustainability – around a common, integrated, and robust objective.

Enquiries: www.viridisenergy.ca

The benefits of LED floodlights

Floodlights have become a common feature around homes and commercial spaces. These broad-beamed high-intensity lights are fairly inexpensive, easy to install and come with a variety of benefits. They serve as a security measure by ensuring the exterior of your home or business is well-lit, leaving no dark spots for intruders to hide in. They provide sufficient illumination for you to safely use your braai area and swimming pool when the sun goes down. They also offer the simple functionality of providing you with enough illumination to find your keys and make your way up to your front door without stumbling in the dark.

Radiant Lighting has a range of LED floodlights to power the exterior of your property. These are just some of the reasons you may want to invest in one:

They have an impressive lifespan: LED floodlights last almost 10 times longer than incandescent lighting and are known for their longevity. They also give you fair warning that they're reaching the end of their lifespan by dimming gradually as opposed to abruptly dying.

They are energy-efficient: LED floodlights will save you money in the long run because they use less electricity. This ultimately leads to a lower electricity bill and also plays a part in reducing your carbon footprint.

They don't emanate heat: In comparison to standard bulbs, LEDs don't waste heat which allows them to conserve a large amount of electricity. This also means they do not contribute to a rise in temperatures where they are placed, making them ideal for cold storage facilities. The absence of heat makes them a safe option because the risk of an electrical fire is reduced.

They're durable: LED floodlights are made of tough materials and can withstand exposure to the elements and drastic changes in temperature.

They're environmentally friendly: No mercury or lead is used in the production of LED floodlights and they do not give out carbon emissions which are harmful to both the environment and your health.

They're available with a motion sensor: Some LED floodlights come equipped with a motion sensor which can detect movement from up to 10 m away. Motion sensor floodlights are a convenient option for those wanting the benefits of a floodlight but only when movement is detected. A floodlight that automatically switches on and off cuts down on electricity consumption. It's also great for security as the sudden flood of light will startle any criminals attempting to enter your property.

Enquiries: www.radiant.co.za

The Who's Who of the sector: top global brands at Light + Building 2020

Some 2,700 exhibitors will be presenting their new products at Light + Building, the world's largest trade fair for lighting and building services technology, in Frankfurt am Main from 8-13 March 2020. They include numerous international leading brands in the fields of lighting, security technology and electrotechnology, as well as home and building automation.

These well-known suppliers will be showcasing ground-breaking technologies and innovative products designed to increase the efficiency of buildings and improve the user experience, as well as satisfying security requirements. With a strapline of 'Connecting. Pioneering. Fascinating.', Light + Building 2020 offers a unique and comprehensive overview of the current market.

To complement the trade exhibition, there are numerous events, special shows, guided tours and specialist forums. The themes covered include, amongst others, Progressive Electric Charging Infrastructure, Building Information Modeling (BIM), innovative service models and Functional Aesthetics.

The world's leading trade fair in its field, Light + Building encompasses all electronically controlled building services and seeks to promote integrated building planning in both domestic dwellings and commercial premises. In this, the show's twentieth anniversary year, there is a special role for digitalisation and networks involving various different trades.

One of the major areas of emphasis at Light + Building 2020 concerns current design trends in the lighting market. A host of exhibitors will be showcasing their innovative ranges of design-orientated and decorative lamps and luminaires, both for domestic dwellings and commercial premises. To complete this section, there is a large selection of technical lighting components and accessories.

The presence of well-known companies such as Artemide, Bega, Erco, Fagerhult Group, Flos, Iguzzini, Martinelli Luce, Nimbus, Nordeon Group, Osram, Samsung, Seoul Semiconductor, Schréder, Signify, Tobias Grau, Trilux, Vibia Lighting and Zero indicates the extensive range of lighting products at Light + Building.

Enquiries: www.light-building.com

Who is IESSA?

Lighting is all around us, both in design and functional lighting, and these are forever changing as the technology and trends do. For example, today, functional lighting includes more comfort and flexibility with an increased focus on customising light to particular situations and needs. We also see smarter more flexible and less expensive solutions on the market. Smart lighting means controlling light in a whole new way and customising it to specific tasks and moods. We are going to see a lot more smart lighting in the coming years.

But what is the role of the Illumination Engineering Society of South Africa (IESSA) and how do they positively contribute to the South African lighting community? IESSA represents South Africa internationally and thereby acts as the National Committee of the Commission International De L'Eclairage (CIE). The CIE provides a national and international forum for the discussion of all matters relating to the science, technology and art in the fields of light and lighting and for the interchange of information in these fields between countries. Therefore, it acts as a liaison between the world and South Africa to bring us to the forefront of these forever changing trends and technologies.

South African experts represent various topics in the lighting technology field that serve on the CIE and are responsible for the development of standards for the different aspects of illumination for that field, for example lighting safety, they measure and ensure the response of human sight and the environment to different methods of lighting.

IESSA also has its own Technology Committee who facilitates professional correspondence, acts on behalf of IESSA members, deals with any disputes; conform to mandatory safety and specifications and the general promotion of good quality luminaires in the industry.

IESSA mission: IESSA supports the practical implementation of internationally recognised lighting practices for the direct and indirect enjoyment and benefit of the general public.

IESSA objective: To provide a forum for business, training, public engagement, national standards and meaningful engagement with stakeholders within the lighting industry both nationally and internationally.

The objectives of IESSA

- To provide a unique forum for the interchange of information and contracts between those concerned with the different aspects of illumination.
- To stimulate and coordinate technical activities in the field of illumination.
- To provide opportunities for members to improve their knowledge in order to practice their profession with knowledge and confidence.
- To maintain and enforce the strict code of conduct of IESSA to ensure members conduct business in a fair and professional manner.
- To represent members on international organisations to ensure that knowledge on the latest trends and developments is transferred to members.
- To apply available resources efficiently to render a meaningful and reliable service to members and to the lighting industry.
- To cooperate with other national organisations, both public and private, to ensure fair governing and to accomplish these goals.

History

The lighting industry of South Africa was previously represented by three organisations, namely:

- SANCI (South African National Committee on Illumination) which represented South Africa internationally and served on international committees on various topics.
- ILESA (Institute for Lighting Engineers of South Africa), which focused on education for the lighting.
- SALA (South African Lighting Association), which represented the lighting manufacturing industry on technical committees of organizations such as SABS and SEIFSA.

During 2002, a committee recommended that a unified lighting body be established. As a result, IESSA (Illumination Engineering Society of South Africa) was established in January 2004.

Membership

Membership of IESSA is open to both individual and organisations active in the lighting industry of South Africa. You don't need to be a Lighting Professional to join IESSA – all applications are welcome. Group membership is open to any educational, scientific, technical, professional, institution, public, commercial or municipal entity that is actively involved in the lighting industry.

The benefits of becoming a member of IESSA:

- Becoming an Individual or Group Member.
- Becoming a Branch Committee Member.
- Submitting industry related articles.
- Presenting or attending Technical Meetings.
- Presenting or attending lighting courses.
- Becoming an Accredited Lighting Practitioner.
- Conduct Lighting Audits on behalf of IESSA.
- Providing a venue to host presentations or courses.

Enquiries: info@iessa.org.za

IESSA
ILLUMINATION ENGINEERING SOCIETY OF SOUTH AFRICA
(Association Not For Gain)

LED floodlighting for prestigious hotel's tennis court

Mont Rochelle is Sir Richard Branson's South African luxury hotel and vineyard and now joins the exclusive Virgin Limited Edition collection. Mont Rochelle is a stunning 26-bedroom hotel and vineyard just under an hour's drive from Cape Town in the town of Franschhoek in South Africa. Franschhoek is a traditional vineyard town in the Western Cape Province famously known as the French Corner of the Cape and is considered to be the food and wine capital of South Africa.

As the hotel's Astroturf tennis court's floodlighting has become outdated, Sir Richard Branson personally requested that the old HID floodlights be replaced with LED floodlights. BEKA Schréder supplied the OMNIstar-midi, a cost-effective and efficient lighting solution to maximise energy and maintenance cost savings. Furthermore, the gooseneck type pole was successfully converted to a conventional floodlight bracket.

The OMNIstar-midi is the smaller sized floodlight in BEKA Schréder's OMNIstar family. The various optical solutions make it a very versatile floodlight, ensuring the correct lighting for the area to be illuminated. Various optical solutions are available to achieve the highest energy savings and the most economical lighting solution. In addition, because it has been designed and manufactured in South Africa, it takes Africa's harsh environments and conditions into account, thereby ensuring a long lifetime.

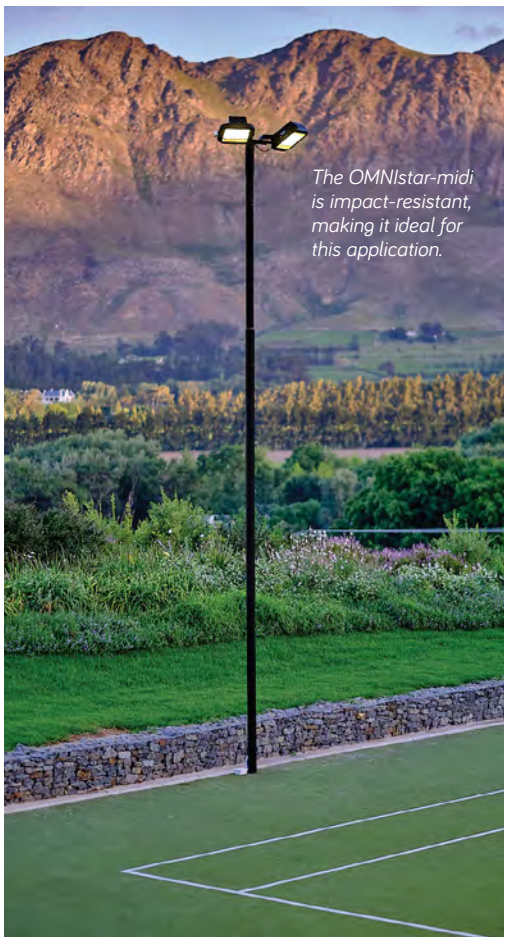
The OMNIstar-midi is impact-resistant, making it ideal for this application. Furthermore, owing to LED technology, the floodlights switch on or off instantly, eliminating the delay that we experienced with traditional lamp technology.

BEKA Schréder locally develops and manufactures energy-efficient LED lighting products, designed and suitable for local conditions. The company is proud to be associated with Mont Rochelle in providing a successful floodlighting solution for this project.

Enquiries: +27 (0)21 510 8900

OMNIstar-midi floodlights illuminate Mont Rochelle's Astroturf tennis court.

OMNIstar-midi, a cost-effective and efficient lighting solution to maximise energy and maintenance cost savings.



The OMNIstar-midi is impact-resistant, making it ideal for this application.

A guide to outdoor lighting

Melissa Davidson from The Lighting Warehouse says: "Whether adding lighting to outdoor spaces for practical, security, landscaping, or aesthetic reasons – it has a tendency to transform the areas in a positive way – making them attractive, useable, welcoming and practical spaces to be in."

When deciding on outdoor lighting, it is imperative that you understand how lights can integrate and complement a building and its grounds, notes Davidson: "If you fully comprehend the play between light and dark, you can use contrast and shadows to create really interesting and attractive outdoor spaces."

So, where do you start? Davidson explains that the most important thing to establish is your primary design goal: "Once you have decided how the space will be used, you will be able to define how lighting can be implemented to achieve that goal. Do you want to make the space more useable, more secure, more attractive, or do you just want to highlight features that are currently hidden in the dark? When you have made a decision, you can start versing yourself on the various types of outdoor lighting, and how they can be used to achieve your goal. Next, you will need to get a grasp on the different types of outdoor fixtures that are available to you".

Types of outdoor lighting

As with any successful lighting design, whether indoors or outdoors, the lighting should be installed in various layers that can be operated independently from one another, and that perform specific functions. Davidson explains that there are four main types of lighting, including:

Task lighting: Task lighting is arguably the most important type of lighting, as it is all about functionality and aiding with specific tasks. With regards to outdoor lighting, task lighting includes the likes of pathway, deck and stair lighting, for example.

Ambient lighting: Also known as general lighting, ambient lighting offers illumination for an overall area. It should radiate at a comfortable level of brightness, without being too bright or too dull. Outdoor ambient lighting could comprise wall, post, pendant lights, and bollards for example.

Accent lighting: This type of lighting is used to heighten drama and add visual appeal to a specific area by creating added interest. It is used to highlight specific feature areas or items, such as walkways, doorways, hardscaping and landscaping elements. It can be used to great effect for illuminating trees, attractive plants, architectural features, sculptures, ponds and pools for example. Accent lighting comprises mainly spotlights.

Security lighting: Adding lighting to your outdoor areas can go a long way to boosting the security of your home by warding off potential intruders or burglars. Security lighting comprises products such as LED motion-sensor lights, LED day/night sensor lights, and ultra-powerful LED floodlights including solar.

Ratings and energy efficiency

By law in South Africa, all outdoor lights need to be designed for installation in a damp location if partially covered, or a wet location if exposed to the elements, says Davidson: "IP (ingress protection) rated fixtures are designed according to the level of potential moisture, damp or wetness. Water and electricity are obviously not a good combination and can be extremely dangerous. A low IP rating of 20 for example, would apply to a fitting such as a bedroom or lounge ceiling light. An IP rating of 44 would apply to a bathroom ceiling light. An IP rating of 65 would apply to a splash proof light fitting such as an outdoor wall light; whereas an IP rating of 67 would apply to a garden spike installed in the soil where there is rain and irrigation. A submersible light fitting, such as a pool or pond light, requires an IP rating of 68. Always check the box or packaging for these ratings and choose accordingly".

Davidson adds that with the high cost of electricity, it is best to opt for the most energy efficient form of outdoor lighting available: "LEDs are the way to go – they offer unparalleled longevity, are available in a variety of wattages, shapes and sizes, and provide great illumination. They also require far less energy than any of their counterparts – making them a great eco-friendly energy-efficient choice that will save money on your utility bills during their lifetime".

Different types of lighting fixtures

Like their indoor counterparts, outdoor lighting fixtures are available in a variety of shapes, forms and styles – ensuring there is something to suit every conceivable decorating and design scheme. Davidson offers an overview on the main types of lighting fixtures on the market:

Ceiling and hanging lights: These are generally used to provide ambient lighting for covered patios. Since they are under cover, they need only be suitable for damp areas and be damp-rated. They are available in a wide range of styles and, most often, their designs will provide an aesthetically attractive focal feature.

Wall lights: Wall lights are a practical and versatile option as they do not take up much space, and can be mounted on virtually any vertical surface. They are also available in a variety of styles and are always waterproof so can be used in covered and exposed outdoor areas alike. They are great providers of ambient and task lighting and are especially useful for smaller patios and for narrow pathways.

Post lights and pedestals: These comprise fixtures mounted on top of a post, which can be freestanding, or placed on top of a wall. They provide far-reaching ambient light, and are commonly used for entrances, gates, fences, in gardens, or around a deck. Since most post lights are placed in open-air settings, they need to have an IP rating of 68 (waterproof) to withstand the elements.

Landscape lights: These comprise low voltage, wet-rated lights that are used to light up various feature elements within a garden landscape. They comprise spotlights, spike spotlights, floodlights and bollards. They are great for highlighting outdoor elements such as trees, buildings, sculptural and architectural details, and feature plants.

Deck and step lights: Deck lights are built into and lie flush with the hardscaping elements within the outdoor landscape, such as pathways and stairs. They are used to highlight these accents, and to provide added safety to dark areas for easy navigation. Step lights can be recessed or surface-mounted, and they are an elegant way of lighting up stairways.

Sensor lights – motion and day/night: A great addition for added security in a home – sensor lights are either activated via motion, switching on when they detect movement, or via the lack of sunlight, switching on as the sun goes down – these are known as day/night sensors.

Enquiries: www.lightingwarehouse.co.za

A light to win your heart

WILLOWLAMP'S new collection has focused intensively on the creation of smaller, accessible pieces that are more readily accommodated in the average living space.

Creative director and founder of willowlamp, Adam Hoets, has taken a playful direction with one of these delightful pendant lamps – the flirtatiously titled Secret Love Clover. The delicate, heart-shaped pendant pays homage to the charm and magic of the four-leaf clover. It was dreamed up – along with other lamps in the series – after Hoets and his fiancée found a number of the cheerful plants on a mountain run one morning.

"Clovers are such dear things – but it took me a long time to decide how to turn the joyful, sweet plants I saw into interesting three-dimensional objects," reveals Hoets, who came up with the concept. "Simply extruding a curtain of chain in the shape of a clover was just not interesting enough. Normally, I like to conceptualise an idea fully in my head, but this time I decided to play around with 3D CAD wireframe drawings, repeating simple lines."

The Secret Love Clover has a secret of its own – seen from below and at an angle, where the straight chain is cut away, a heart pattern is revealed (the heart shape in the individual clover leaf was tipped on its side and extruded slightly). The pendant is elegant and voluptuous, with finishes available in silver, smoke, copper, brass, rust, white, red, black and a mixture of colours.

Enquiries: www.willowlamp.com

Do all lights need an LOA?

A current question that Spazio Lighting receives from professional consultants is, "Do all light fittings require a LOA (Letter of Authority)?" The answer is yes they do; each and every complete light fitting needs to have an LOA.

It does not matter if the products are imported or locally manufactured, if the products are sold by a shop or by a wholesaler, or even if they are custom-made, they all require an LOA. An LOA is proof that the luminaires meets the safety compliance as set out by the National Regulatory Body, also known as the NRCS. Thus, each product shall have a full test report to the prescribed standard (IEC 60598), and such test report shall not be older than three years. This type of test report will record each clause of the standard, the measurement results and describe the product in full.

Why is it so important to have an LOA in place? Many luminaires are imported and manufactured using inferior material or components, which are not only cheap but will also most likely fail prematurely and end up costing the consumer more money. Furthermore, non-compliant fittings might also be dangerous and can be regarded as a health and safety risk. Testing compliance and LOA applications ensure that the correct and approved components that have passed testing are used in the luminaires and that the fitting carries a valid warranty.

Custom-made and locally manufactured products must have an LOA and unfortunately, in most cases, these are the products that normally do not comply because they did not go through the proper testing procedures.

LOAs for imported products are policed at customs and if a product does not have an LOA in place, the product is blocked and importation is refused. Locally manufactured products are unfortunately not controlled and are often illegal.

Spazio often finds illegal products on the market with many illegal features which are sold under the pretence of being locally manufactured products. It is therefore important to ensure that you buy light fittings from reputable shops and wholesalers that supply goods with the necessary documentation in place.

Enquiries: +27 (0)11 555 5555

Lighting trends to switch you on

DECOREX AFRICA'S TREND REPORT for 2020 gives us a teasing glimpse of what to expect from Decorex Durban, Cape Town and Joburg 2020, where designers and manufacturers showcase all the latest trends, concepts and products that will guide and inspire us. The broad themes emphasised in the report will be featured in the Mobelli Furniture + Living Trend House – Urban Living by Design, Insta-Interiors, the Trend Kitchen by Cosentino and Trend Installations as well as pop-up restaurants, cafés and feature areas at each show. Make a special note to visit the Lighting by Design Project, which will showcase exciting lighting trends at all three shows.

Creative director, Anita Bloom, who authored the report, ran her own design studio, Just Bloom Designs, before moving to Inspire Trade Expo for four years and then joining the Decorex Africa team, and her vast experience in graphic design and exhibition curation perfectly positions her to identify and share shifting design and décor trends.

When it comes to how we'll be illuminating our homes, Bloom says we'll be putting the strict minimalism of Scandinavian design behind us. "We're moving towards softer, more nature-inspired interiors and correspondingly gentle illumination," she reveals. "Think a multitude of hanging lights, floor lamps, table lamps, candles and lanterns to add a more sensual touch to our homes and moderate the stark lighting of Scandi design. In fact, there's a move towards more natural light and a less-is-more approach to lighting solutions. Fireplaces are back and they bring flickering light and undeniable cosiness to living rooms."

Another growing trend to be aware of is the use of paper lamps – Asian-inspired light fixtures that add an eclectic touch to any décor. Japadi Style (a blend of Scandi and traditional Japanese details), along with Wabi Sabi (the idea that imperfection is beautiful and life is impermanent) permeate lighting design, with cylinders, ovals and globes in white or neutral colours illuminating softened interiors. "Whether oversized, used singly or in bunches, these lights are sure to magically transform rooms," says Bloom.

Rounded and organic shapes will dominate when it comes to lighting – and the circle will be the most important (but by no means only) geometric shape that will influence designers in 2020. The most significant trend, however, is towards creating essential shapes that can adapt to any space, lasting as different styles come and go.

Another trend to watch is the resurgence of neon – think names, phrases and slogans up in lights or strategic blocks of colour. "Done well, neon features read like modern art installations. You can opt for a subtle glow or the full 'shock and awe' effect," says Bloom.

Enquiries: decorexinfo@reedexpoafrica.co.za

Reflecting on a journey in lighting

I would like to wish the readers an extremely successful and profitable 2020. We all hope that Eskom keeps the lights on, but I will do my best to contribute to enhanced energy efficiency by keeping you well informed about the latest lighting and lighting control technologies.

Before launching into writing this first article for my column in *Sparks Electrical News,* I would like to thank Gregg Cocking for asking me to contribute to the magazine content. It is a real privilege and a big responsibility.

I have been in the lighting industry for 49 years. In that time, we have seen incredible changes and advancements in the field of lighting. The first compact fluorescent lamps from Philips appeared in 1976, Thorn Lighting released its 2D mini-fluorescent lamp in 1981, while next to make an appearance were the metal halide lamps and products, which entered the market in 1995.

Enter the LED

The first commercial use of LEDs took place in 1968 when Hewlett-Packard started using them in LED lit electronic calculators. I recall purchasing a Facit electronic calculator from Garlick's Office Machines in 1972. It was very expensive, but I 'needed one'.

My first encounter, and possibly also your first encounter was around 2007. I remember finding it incredibly hard to believe that anyone would manufacture such a blue colour white light which barely provided enough light to see your hand. It was the start of my journey into what is today, the amazing world of LED lighting.

It is, in fact, quite mind-blowing to reflect on how far LED lighting technology has advanced.

From the basic LED down lights that we scarcely use in lighting designs today to some of the most advanced LED luminaires and technology.

The Fourth Industrial Revolution

The Fourth Industrial Revolution or 4IR as it is often referred to, has heralded in some of the most exciting new LED lighting that I have ever experienced or had the pleasure using in lighting designs.

Over the coming editions of *Sparks Electrical News*, I will discuss each of the technologies, but let me whet your appetite by making mention of those that are by no means the limit of the technological advances.

A key feature of the technologies is that they are disruptive in nature. They change the way we think about lighting; they change the way we install lighting; and they change the way people, consumers, users and occupants interact with lighting. The technologies make considerable use of the Internet of Things (IoT) where they can be interconnected to other devices, can be controlled by a variety of devices within a single installation and which deliver entirely new experiences for the occupants.

Here are some of the exciting new technologies already in wide use, albeit not yet in South Africa.

South Africa is experiencing an energy crisis with the threat of load-shedding hanging like the sword of Damocles over our heads. Apart from Solar PV systems, wind turbines and Thermal Power Generation, there are ways that energy efficiency can be boosted by the adoption and correct use of the 4IR new lighting technologies.

New LED lighting technologies

Who would have imagined that lighting could be powered through network data cables? Yes, that is the way to boost energy efficiency whilst at the same time incorporating sensor technologies, connectivity, Human Centric Lighting and more, into the luminaire.

With the growing expansion of The Internet of Things, luminaires or light fittings can now provide better and easier connectivity to the network and Internet. This is called Visible Light Communication (VLC) where, using Power over Ethernet, the light fitting becomes a connectivity point to the existing WiFi or ethernet system. But, even better still, how about using LiFi?

LiFi is more secure and faster. Using light to communicate and it can transmit from 1 MB to 100 MB of data at high speed using the visible light spectrum which has 10 000 times more bandwidth than radio frequency (RF) bandwidth.

You all know what the Global Positioning System (GPS) is about, well let me introduce IPS – Indoor Positioning Systems. Imagine going into a shopping centre and finding a line of people all wanting to locate a retail store at the store locator board. It is now possible to do that using an app which can be downloaded onto your smart device, of course only where the system has been installed. It is already widely used overseas in shopping malls and individual retail stores and supermarkets where shoppers are guided through the store quickly and easily. In some stores, you can even shop off the shopping list you first created at home, complete your shopping, the shop checks that you have not forgotten any item, updates your loyalty points and deducts the amount from your bank account, all this without ever interacting with a living soul!

Finally, Human Centric Lighting which makes use of luminaires which adapt the light during the day to provide the occupants in an office, for example, with the best light colour and intensity to ensure their well-being, health, and enhanced productivity levels.

Of course, lighting controls have kept pace with LED lighting developments. These will feature in later columns and articles.

ABOUT PHILIP HAMMOND

Philip Hammond is the Director and Principal of BHA School of Lighting which offers a variety of courses from entry level Foundation Lighting right through to Advanced Diploma and Master Diploma in Illumination Engineering Courses. Other courses include Photometry, Lighting Economics, Relux Lighting Design Software courses, and more…

Enquiries: www.bhaschooloflighting.co.za

Newport Lighting heads outdoors with exterior lighting offering

Increasingly, our outdoor spaces seem to mimic our indoor spaces. This 'blurring of the lines' is largely as a result of developments in more hardwearing materials, and associated technology.

With that in mind, and with summer here, Newport Lighting has turned its focus to exterior lighting with its ASTRO offering reflecting the latest European trends.

As one of Britain's leading, and award-winning, lighting design brands, ASTRO recently unveiled several new outdoor collections at Euroluce in Milan. This varied exterior lighting collection is characterised by its considered simplicity, and reflects the synthesis of timeless design principles and brand-new finishes.

A favourite of Newport Lighting's is the moon-like Eclipse Wall Light that floats on walls whilst emanating a soft lunar glow. Also worth a mention is the sleek and stylish Harvard Wall Light, available in fashion-forward black, polished stainless steel, bronze and brass.

Another favourite is a modern take on a classic. The Pimlico Wall Light is cleanly and elegantly designed, perfect for showcasing vintage-style filament lamps. It works well with both modern and more traditional architecture.

When it comes to finishes, expect robust antique brass textures that add a chic industrial style; personified in the Cabin lighting range. Other finishes include polished brass, nickel and chrome; encompassing a more refined aesthetic, whilst matte textured black, white and grey create a contemporary impression.

Included in the myriad of finishes is the option of frosted glass. This provides a less fussy overall aesthetic whilst diffusing the light from these lamps.

To make your outdoors feel like true extensions of your indoors – extending your alfresco entertaining hours – consider these hardworking yet stylish lighting options by ASTRO available from Newport Lighting.

Enquiries: www.newport.co.za

Rechargeable LED desk lamp for the home, hobbyists, DIYers and industry

Recently launched, the cordless Li-ion, USB rechargeable lamp from Tork Craft offers 60 lumens with 3-8 times magnifying capability. Used for precision work, it can be moved anywhere as its cordless; it does not need batteries as it is rechargeable and comes with a bright white light from its six LED lighting units.

It has two on/off switches, a manual switch at the bottom back of the base and a quick touch control switch at the top on the front of the unit. It comes with a guarantee of 25 000 hours of light time. A desk and clamp fitting connects to the sturdy base which measures 135 x 180 x 23 mm so that it can be attached to any surface.

"This Tork Craft desk unit is very popular overseas and opened all sorts of new markets," said Dale Englebrecht Commercial Director Vermont Sales. "It is very handy in the kitchen, the kids school desks and is certainly a must for hobbyists and fine work in the workshops, for both the trade and DIYers," said Englebrecht.

Enquiries: +27 (0)11 314 7711

UPCOMING INDUSTRY EVENTS

P&T Technology 2020 course calendar

Inspect, test and certify and single phase electrical installations

3-5 February
8-10 June
5-7 October

Inspect, test and certify and three phase electrical installations

3-5 February
20-22 April
8-10 June
3-5 August
5-7 October

Inspect, test and certify and hazardous electrical installations

17-21 February
18-22 May
17-21 August
19-23 October

Refresher course: Testing & Inspecting Single & Three phase

7 February
24 April
12 June
7 August
9 October

Electric fence installer

2-4 March
11-13 May
20-22 July
14-16 September

KNX Basic course

17-21 February
18-22 May
17-21 August
19-23 October
Enquiries: www.pandttechnology.co.za

ECA Electric Fence System Installer courses

The ECA(SA)'s first Electric Fence System Installer course for 2020 will be held from 12-14 February at the Meadowdale Training Centre and it's an opportunity for Installation Electricians (IEs) to qualify with EWSETA and be registered with the Department of Labour as Electric Fence System Installers (EFSIs). This three-day course is an RPL (Recognition of Prior Learning) course for persons who have been in the Electric Fence Installation field for more than two years.

Electric fence installations may only be done (and a Certificate of Compliance therefore issued) by registered Electric Fence System Installers (EFSIs) and anyone who would like to register as an EFSI in terms of the Electrical Machinery Regulations 12 – 14, can attend the ECA(SA)'s EWSETA-accredited Electric Fence Installer course, which is presented at the Highveld Training Centre eight times a year.

Venue: The course is presented at the ECA(SA)'s Meadowdale Training Centre, 91 Newton Road, Meadowdale Ext 2, Germiston, 1401.

Course dates first quarter of 2020:

12-14 February
16-18 March
22-24 April
Enquiries: Keabetswe.matolong@ecasa.co.za

IESSA courses in 2020

IESSA has as a tenet in the advancement of lighting knowledge. To this end we offer a number of lighting courses from basics to intermediate as well as with those handling specific areas of lighting have been developed.

The Basic lighting Concepts, Vision, Lamps and Colour course is designed to provide persons associated with, or entering into the lighting industry with an understanding of basic lighting terminology and techniques.

The specialised courses are dedicated to various specific aspects of light and covers aspects such as road lighting and maintenance, shop and retail lighting, emergency lighting, and industrial lighting as well as the use of lighting tools such as the 'Relux computer design program'. These courses range from 1 day to 2 days. The candidates to the courses are recognised with either certificates of attendance or certificates of accomplishment as appropriate.

2020 Course Calendar

3-4 February: Lighting Concepts, Vision, Lamps and Colour (Johannesburg)
27-28 February: Quality Assurance – Public Framework (KZN)
16-17 March: Interior Lighting Course (Johannesburg)
2-3 April: Photometry (KZN)
20-21 April: Exterior Lighting Course (Johannesburg)
7-8 May: Lighting Concepts, Vision, Lamps & Colour (Cape Town)
18-19 May: Lighting for Energy Efficiency in Industry (KZN)
21-22 May: Quality Assurance - Public Framework (Johannesburg)
9-10 July: Interior Lighting Course (Cape Town)
13-14 July: Lighting for Roads & Precincts (KZN)
30-31 July: Photometry
3-4 August: RELUX Lighting Design (KZN)
27-28 August: Lighting for Energy Efficiency in Industry (Johannesburg)
10-11 September: Exterior Lighting Course (Cape Town)
29-30 September: Lighting for Roads & Precincts (Johannesburg)
8-9 October: Retail & Shop Lighting (KZN)
15-16 October: Quality Assurance – Public Framework (Cape Town)
19-20 October: RELUX Lighting Design (Johannesburg)
16-17 November: Retail & Shop Lighting (Johannesburg)
12-13 November: Lighting for Energy Efficiency in Industry (Cape Town)

DATES TO DIARISE IN 2020

Gauteng Homemakers Expo

27 February-1 March

The Johannesburg Home Makers Expo celebrates the authenticity behind real homes and their beauty. Home is the very place where we laugh, we cry, we grow up and raise our children so it's no wonder that we all want to tell our stories through our decor and designs, mimicking the past, present and future between our four walls. The show will present the very latest in home renovation, interiors, soft furnishings, lighting, kitchens, furniture, and more. Meet leaders in the home lifestyle industry with exclusive insider tips and professional advice. The Expo features a significant amount of attractions to keep you informed and entertained including demonstrations by DIY celebs.

Internet of Things Forum Africa Exhibition

25-26 March

Internet of Things Forum Africa Exhibition is a highly anticipated conference, targeted at thought leaders, IoT ecosystem participants and experts in Africa, and will create a platform for all players to share their knowledge of real-world IoT trends, challenges, and solutions. IoT Forum Africa will gather thought-leaders, solution providers and decision-makers from diverse industries. Past sponsors of IOTFA include BCX, MTN, Huawei, Schneider Electric, Software AG, Altech, Dimension Data, Grant Thornton, Dark Fibre Africa amongst many others.

The Solar Show Africa

31 March-1 April 2020

The Solar Show Africa brings together thousands of industry professionals who want to share their ideas on the newest innovations on solar power generation and the entire solar value chain. The show maximises the learning through:

- Keynote speakers
- Regional project case studies
- Roundtable discussions
- On-floor seminars

Discover what are the top trends in the solar energy sector and what are the biggest opportunities thanks to a superior content on smart electricity: solar, nuclear, maintenance and asset management, coal, power distribution, energy storage, gas power, finance, investment and billing.And if you are going to exhibit, explore exciting technologies by networking and participating in live demos taking place on all the exhibition floors.

Power & Electricity World Africa

31 March-1 April

Power & Electricity World Africa bring innovators, disrupters and change agents together to talk and engage in healthy business pertaining to power and electricity. This serves as a platform for thought leaders and disruptors to showcase their solutions to Africa power and energy buyer community. This event focusses largely on creative, organic and customer-focused approach to bring new innovations in power industry.

Securex

2-4 June

Securex South Africa is one of the most important trade fairs for commercial security and fire protection, which takes place once a year in Johannesburg. The exhibition sets new standards for the future and is therefore a must for many decision makers from the industry. The event attracts visitors and exhibitors from all over the country as well as top experts from around the world that are represented with pavilions at the fair. The visitors are able to inform themselves in detail and comprehensively on security, fire protection, energy and environment and on the latest developments, trends, services and products in the fields. Other topics include access control, biometrics, video surveillance, IP security and intelligent buildings. The goal is to merge the systems and strategies of all firms, so that the industry becomes more profitable, more efficient and a lot more effective.

A-OSH Expo

2-4 June

Occupational health and safety are important issues when it comes to the workplace. To address these questions and themes, the A-OSH Expo South Africa was created. She is a national trade fair for occupational safety and health at work and takes place annually in the Gallagher Convention Center in Johannesburg. The fair offers the perfect opportunity to talk with industry experts to gather information, share knowledge and provide critical questions about OSH. It is a platform for anyone who has to do with health and safety, even when it comes to the points of commitment, training and equipment. Visitors can discover and test the latest innovations, products and services from many leading companies. In addition, the fair is an important meeting place, to provide themselves with valuable contacts, to network with colleagues in the industry and to share ideas, opinions and best practices. The exhibition is accompanied by a conference, by first aid demonstrations and demonstrations of working at heights.

SAITEX

21-23 June

One of Africa's largest and most well-established trade exhibitions, SAITEX is an annual product sourcing opportunity for the entire continent's retail and trade industry. Africa featuring electronics and home appliances, homeware and household products as well as building materials and tools.

Interbuild Africa

29 July-1 August

Interbuild Africa in Johannesburg is a trade fair for construction and an excellent platform for exhibitors to meet with new and existing customers, introduce new products, sign sales contracts, to strengthen their own brand, to interact with suppliers and to get information on events in the market. Visitors can find in depth and comprehensive information here about the latest developments, trends, products and services in various fields.

Electra Mining

7-11 September

Electra Mining Africa is the ultimate meeting and market place for all stakeholders involved in the mining, construction, industrial and power generation industries. It offers both exhibitors and visitors the opportunity to make valuable business connections, discuss the latest developments, technologies, trends, products and services in these sectors. Many new innovations are showcased including energy efficiencies and environmentally friendly products, as well as products in line with the mining industry's goals on health and safety. Electra Mining Africa is co-located with Elenex Africa (power generation, electrical engineering and lighting) and Transport Expo (construction and mining transport).

AFRIBUILD

13-15 October

AfriBuild is aimed at equipping the local building sector with the practical examples, demonstrations, skills, and advice needed for successful future development. The new expo will take place over three days, bringing together hundreds of local and global exhibitors – ranging from mechanical, electrical and plumbing (MEP) providers and tools, equipment and materials experts, to structure, occupational health and safety (OHS), and technology and innovation specialists – to showcase their expertise, products and services.

Planning any training courses or events for 2020? Publicise them in the monthly *Sparks Electrical News* Industry Events page. Email the event details to sparks@crown.co.za

PEOPLE ON THE MOVE

Magnet

Derek Ernest
Project Manager

Syed (Sak) Basha
External Sales Representative

Veeam

Danny Allan
Chief Technology Officer

Rand-Air

Kim Coetzee
General Manager

SUBMIT your photos of new appointments and promotions to People on the Move at sparks@crown.co.za. All photos must be in jpeg format and high resolution (at least 1 MB when attached).

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BRIGHT SPARK

TAKE A GUESS

When can you add two to eleven and get one as the correct answer?

JANUARY SOLUTION

None, because a hole contains no dirt!

MARCH FEATURES

- Energy measurement and supply
- Tools of the trade
- Lighting

Buyers' guide

- Tools and instruments

APRIL FEATURES

- MCCs and motor protection
- Cables and cable accessories
- Lighting

Buyers' guide

- Motors and drives

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