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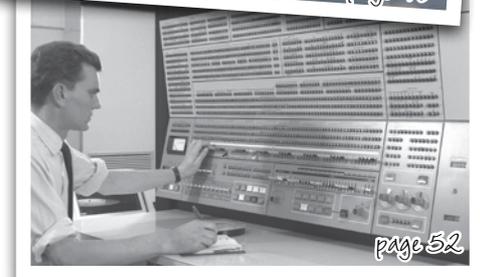
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ISSN: 1991-0452

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5623



With the month of June lurking around the corner, where the days are shorter and nights are longer, we have here a jam-packed issue of lip-smacking content.

What do you buy for the Dad in your life – the man who (most likely) has everything a man needs? My Dad does not need much, just the love of his children, but I know when asked, his answer will be: “A buffalo or two...”

If you want to find Dad something special, go find it on page 8.

In June we feature “Transmission & Distribution” and without these two critical systems we will not have electricity at our homes and offices. On page 34, we discuss the implementation of phasor measurement technology, aptly written by R. Moodley and B. Berry.

Our Power section on page 46, sports a very interesting article about “Using wind power effectively without towers and large structures” which can become unsightly if not installed aesthetically.

Mike Cary, SAIEE Past President, shares with us his memories and early days of Information Technology on page 52. After reading this article, I’ve come to realise how much things have changed. I remembered working on Lotus123, Multimedia and TurboCash as the first software packages I used – and I was trained on a telex machine. Now I’m giving my age away!

“Your Opinion” piece was submitted by Andrew Russell, in response to Paul van Niekerk’s opinion piece, published in the April issue of **wattnow**. It makes for very interesting reading. Find this on page 56.

At the recent, very successful African Utility Week, our Deputy President, Mr André Hoffmann launched the SAIEE Corporate Partnership. Read more about this very exciting venture on page 20.

Well, a lot has happened in the past month, visit the social pages to see if I might have clicked you at one of our events.

Enjoy this issue. Until next month, enjoy the read.



Visit www.wattnow.co.za to answer the questions related to these articles to earn your CPD points.

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 **General Cable**



Greetings to all our Members from SAIEE House, Johannesburg!

Let us all celebrate in the successful national and provincial elections of May 7. South Africa has reconfirmed its journey towards becoming a world class country. South Africa will continue to strengthen its attractiveness for foreign cash flows; both in direct and institutional investments. We will experience an increased flow of projects from the National Development Plan. I predict an engineering bull market. For the next decade or two, engineers will be overwhelmed with exciting and interesting projects. The professional engineer is re-energised to go forward with strength and confidence.

I have met with the leadership of the Engineering Council of South Africa.

This is a gathering of the joint leadership of the Voluntary Associations (VAs) and the Engineering Council of South Africa (ECSA). Currently ECSA has expectations of the VAs and we, as the VAs, have expectations of ECSA. We need to compact on our respective expectations, and measure our performance against each of those expectations. We both have equal obligations to serve and enhance the professional standing of all our engineers. In addition to South Africa's professional engineer recognition, as in Pr. Eng., we are exploring the International C.Eng. (Chartered Engineer) recognition for our members; similar to that of CA (SA), as promoted by the accounting institute for their members.

Our working with fellow voluntary associations continues to gather momentum. We have teamed with the South African Institute of Civil Engineers and presented at their Civolution Congress of 2014. We are also reaching out to other electrical and IT associated voluntary associations, and have invited them to work with the SAIEE. We have met with the leadership of the Society of Automation, Instrumentation, Measurement and Control and with the International Federation of Automation and Control. We have proposed closer workings between our respective Institutes, such that we can collectively add our voluntary energies and enhance our service to all our members and our students at the universities, as well as to the future engineers at school. Our discussions are promising and we will approach new members, new corporate partners and new MOUs between Institutes.

Academia has a special focus, as in student development, and for our

accelerated efforts for enhanced activities in test, research and investigations. We are supporting Master's and Doctoral students at the Durban University of Technology and the University of KwaZulu-Natal. I presented at the International Conference on Smart Grid and Micro Grid Engineering at the Cape Peninsula University of Technology. I also had the honour of delivering awards to third and final year undergraduate students at the Universities of Pretoria and North West, Potchefstroom Campus. SAIEE Council members have met with representatives of The University of the Witwatersrand and were shown their plans for a new Energy Hub and High Voltage laboratory on the Braamfontein campus. We are assisting with two ventures at the University of Johannesburg; one for a new focus on training customer-focussed utility engineers, as part of their Masters in Engineering offer, and the second for redevelopment and refurbishing of their Technolab with the aim at widening access to scholars. We have met with the senior undergraduate and postgraduate students at the University of Cape Town; agreeing to renew focus on their operations of the UCT Student Chapter as an integrated part of our Western Cape Centre. We hope to increase our workings with all the Universities as we progress with our active support of the various initiatives.

The Bergville Scholar Development Programme continues with our support. Our various efforts of supporting scholar development in the fields of mathematics and science will be forward planned and included in future budgets. I call on every member of the Institute to adopt your local high school and primary school, as part of each individual's own voluntary service, to promoting engineering, science and mathematics. We must

continue to close the gender diversity gap, and encourage more girls to take up careers in electrical engineering. SAIEE's first scholar promotional video material is complete. It is available on the web site, and copies are being distributed to all centres and sections for application.

Our aspiration to create more quality jobs for all South Africans remains top priority. One effort is "Buy South African". We are going to work to encourage the Chief Procurement Officers of South African Companies to place orders with local enterprises. We need our local industry to come forward as Corporate Partners to work with us and to charter the way forward. We need to create an empowering environment for workers, employees, customers and shareholders.

The governance and administration of the Institute is robust. The new organisational structure has been implemented with the major changes being the creation of a new Executive Committee (EXCO), in lieu of the old Office Bearers and the position of Chief Executive Officer has been created in lieu of Business Director. Council is fully populated with the newly elected and co-opted members. Council Committees are fully operational and we have retained past leadership for maximum continuity of business operations.

SAIEE is financially stable particularly as membership subscription and fees are ahead of budget performance. The Continuing Professional Development Department is growing. A lot of effort goes into sourcing relevant materials and presenters that add value to our members and South African industries.

SAIEE House is now at maximum utilization and the refurbished Innes House

is taking shape, with the Museum on the ground floor and the President's Office and Past President's Boardroom on the upper floor.

I have invited many of the Past Presidents to come forward and to be active in the leadership of our Institute. Engineers never work alone, we always work in teams.

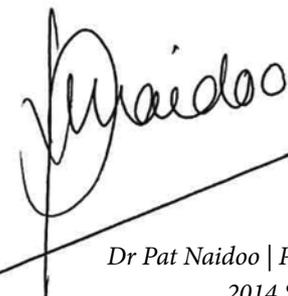
EXCO & Council's standing challenge is to get the maximum productivity and efficiency from all our resources. Our Chief Executive has met with the leadership of the National Research Foundation. He has shared our vision that the Observatory Campus be developed towards a Joint Campus for all the Voluntary Associations; thereby, providing us with an opportunity to share administration and costs. The Publications Committee, together with the SAIEE Administration, has developed and is implementing a turnaround strategy for **wattnow**; our forecasts show that revenue will exceed expenses. **wattnow** continues to deliver a quality read for our members and compliments our Africa Research Journal. Senior undergraduate and postgraduate students have been challenged to send **wattnow** contributions from their current thesis and dissertation projects. We will afford them an opportunity to get in their first publication, and later elevate their complete papers, to our NRF accredited Africa Research Journal. **wattnow** even has global readership; a member sent me very positive feedback from Oregon in the United States of America.

The month of June will start with the Joint Centre and Section Workshop. We will talk through our planned activities for 2014 and 2015 and ensure that we give maximum coverage to serving our members across South Africa. In particular we will be targeting Student Members and ensure their

space on the Institute's forward plans and budgets. Specifically, we will call upon all Engineering Faculties to encourage every third and final year student to register as student members; and to formally establish their local student chapter, and to have the Chair of the Student Chapter become a member of our local Centre or Section. This strategy will ensure that students form an active part of the Institute operations, and that we all work collectively in ensuring that all students receive maximum opportunity for quality in-service experiential work during vacations.

June will be concluded with the President's Invitation Lecture at the University of Johannesburg. My guest is Dr Lawrence Musaba of the Southern African Power Pool. This lecture is primarily available for members located in the greater Johannesburg area. However, we are willing to bring this and other Invitation Lectures to all our Centres.

Thank you to all Members of Council and to the Chief Executive and the Administration for their selfless and dedicated efforts in serving the Institute and our Membership. Our Institute blossoms as the darling of the VAs. Let us all continue to grow and strengthen the benchmark of a voluntary institute, and our standing legacy of being the home for all of South Africa's Electrical Engineers; certainly amongst the world's best. Thank You.



Dr Pat Naidoo | Pr. Eng | FSAIEE
2014 SAIEE President

WATTSHOT

15 June 2014 is Father's Day.

Here is a few ideas to treat the special Dad in your life....

If you are not a father yet, go ahead, spoil yourself anyway!



Kettle Braai Pizza Oven

kettleCADDY Pizza Oven can be used to convert your Weber Kettle Grill or any other 57cm charcoal kettle grill into an effective pizza oven. R1,499 (incl.)



Chillsner Ingenius Beer Chiller

Chillsner is the world's first in-bottle beer cooler. Store it in the freezer and when it's frozen, pop the top off of a bottle of beer, and insert the Chillsner. R350 (incl.)



Fotomatic Wallet

Carry your treasured memories with you. Slip photos into the clear old-school pockets of this wallet to create an on-trend accessory or inspired gift. R225 (incl.)



Bluelounge Cable Drop

The ever popular CableDrop manages your wires and cables easily solving your cable management needs. R119 (incl.) each.



Braai 6 Pack Apron

Slaving away at a braai, how refreshing would it be to have a load of your favourite canned drinks at hand? R250 (incl.)



Scientific Slim Projection Clock

This stylish projection clock projects the time and alarm directly onto the wall or ceiling. R1,699 (incl.)



WD My Passport Slim 1Tb - USB 3.0

A USB 3.0 bus-powered portable drive built around a standard rotational hard drive with a 1TB of storage capacity. R1,725 (incl)



Survivor for iPhone 5

Survivor Extreme-Duty Case is built from the inside out to protect your iPhone from extreme conditions. R499 (incl.)



iPad Leather case with Charger

It boasts a huge 6600mAh Lith-Ion rechargeable battery that is discretely built into the spine of the case. R895 (incl.)



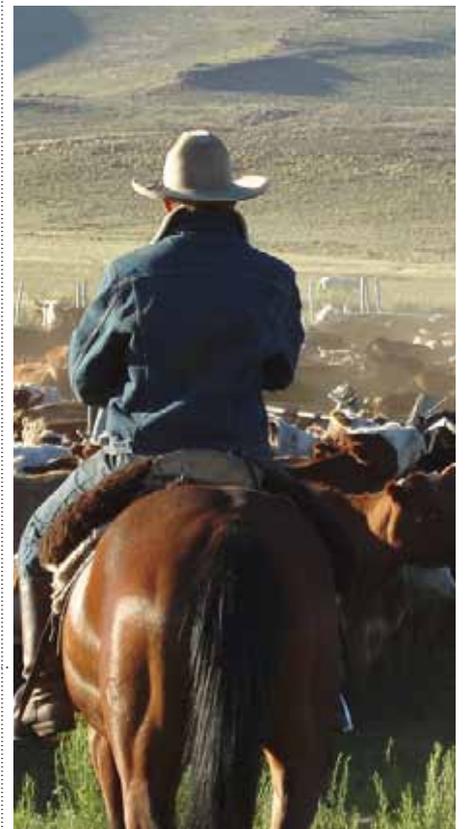
01 Binary Watch Spinning Wheel

These exceptional timepieces feature LED displays and a binary time-reading system. An 01 THE ONE watch is perfect for mathematicians, scientists and computer experts who want a one-of-a-kind watch. It is designed using the binary code, which consists of only the numbers zero and one. Zero represents the off state, while one represents the on state. Combined in groups of eight, these numbers can represent hundreds of different values including time. This watch features a black leather band, stainless steel case, and black dial. R1,899 (incl.)



USB Electric Men's Shaver

The Electric Shaver "Povos USB Shaver" is a world's first as it can be charged via a USB port. R395 (incl.)



City Slickers Cattle Drive

Calling all City Slickers! Have you ever wanted to be a cow boy or cow girl and you are a novice to experienced rider? Here is your chance to make that childhood dream come true. Go on an epic 4 hour adventure in the saddle. Round up cattle on horseback every Sunday in Cullinan, Gauteng. Make new friends and enjoy the outdoors. This experience includes breakfast and costs R450 p/p/d (incl.)



Fahrenheit 32 A/Shave 100ml

Fahrenheit by Dior was first manufactured in 1988. It is in the family of the floral citrus fragrances. R600 (incl.)

WATTSUP

Western Cape Centre Dinner & Dance

The annual Dinner & Dance of the SAIEE's Western Cape Centre took place on the 16th of May 2014 at the Kelvin Grove Club in Newlands, Cape Town. The function was attended by members of the WCC Committee, members of the institute and partners, various industry role players as well as the SAIEE Immediate Past President, Paul van Niekerk and his wife, Elizabeth.

On arrival, guests enjoyed welcoming drinks and the ladies were spoiled with gifts from the SAIEE Western Cape Centre. Phumelelo Ngxonono, Chairperson of the Western Cape Centre, officially welcomed everyone. Bruce Thomas, MC for the evening, acknowledged the sponsors for this soirée. A huge thank you goes out to Aberdare Cables, Cape Armature Winders, CBI Electric low voltage, Eskom Distribution, Eskom Transmission, Gibb Engineering & Science, Landis + Gyr, LHMarthinusen Electrical & Mechanical Engineers, Powertech Transformers and Schneider Electric.

The highlight of the evening was the presentation of a special award by Paul van Niekerk to Ian MacHutchon, for his 50 year membership of the SAIEE. Paul then proceeded with an inspiring talk reflecting on his year in office, which was followed by a toast to the SAIEE.



L – R: Bruce Thomas (Vice Chairman, Western Cape Centre), Paul van Niekerk (Immediate Past President), Phumi Ngxonono (Western Cape Centre Chairman) and Robbie Evans (Southern Cape Chairman).



(L-R) Phumi Ngxonono, Rod Harker, Elizabeth van Niekerk, Ann Harker, Paul van Niekerk and Gerda Geyer.



Elizabeth & Paul van Niekerk with Bruce Thomas.



Bruce Thomas & Phumi Ngxonono.



Ian MacHutchon accepting his 50 year membership certificate from Paul van Niekerk.



Robbie & Sonja Evans



Bruce & Olivedene Thomas



Elizabeth van Niekerk & Ifedayo Akinsete.

ECSA launches “Decades of Engineering Excellence”

“Decades of Engineering Excellence” was issued by the Engineering Council of South Africa (ECSA) to commemorate Engineering in South Africa. The book marks the first comprehensive acknowledgement of the industries’ achievements.

At the recent launch in Melrose Arch, the author, du Toit Grobler said: *“The inspiration for the book came from ‘The First Ten Decades – The History of the SAIEE 1909 -2009’ which was published while I served as Centenary President of the SAIEE during 2009.”*

“Decades of Engineering Excellence” is a 216 page hardcover prestige coffee table publication which gives you a colourful insight into South Africa’s engineering competence. The contents commemorates the excellence of engineering in South Africa over many decades.

The book provides an overview of most of the engineering categories, disciplines and sub-disciplines that are practised in South Africa and globally. Mention is made of South African Engineering achievements and the research being carried out at South African Universities. The author also discussed the role of the statutory body (ECSA) and its voluntary associations within the engineering profession in South Africa.

“The profiles of companies and bodies that provided sponsorships complement the contents of the book. Without the sponsors’ contributions the book could not have been published,” concluded du Toit Grobler.

The first copy of DoEE was presented to Mr Cyril Gamede, 2012-2016 President of ECSA.



L – R: Mr Cyril Gamede (2012-2016 ECSA President), du Toit Grobler (author), Mahalingum Govender (Head of the Property Management Trading Entity, Department of Public Works, vice the Minister) and Edgar Sabela (Acting CEO, ECSA).



L – R: André Hoffmann (SAIEE Deputy President) and Dr Pat Naidoo (SAIEE President).



L – R: Bob Pullen (ECSA President, mid 1990 to 2005) and du Toit Grobler.



L – R: Dr Pat Naidoo (SAIEE President) with Obed Letsholo (Past President of ICMEESA).



du Toit signs a book for André van Zyl (Mechanical Engineer, Read, Swatman & Voigt).



Author, du Toit Grobler with his family. L-R: Elize Grobler, Sonja Bodenstien (daughter), du Toit Grobler and eldest granddaughter, Suné Bodenstien.



Mr Cyril Gamede, 2012-2016 President of ECSA receives the first copy of “Decades of Engineering Excellence” from du Toit Grobler, author.

WATTSUP

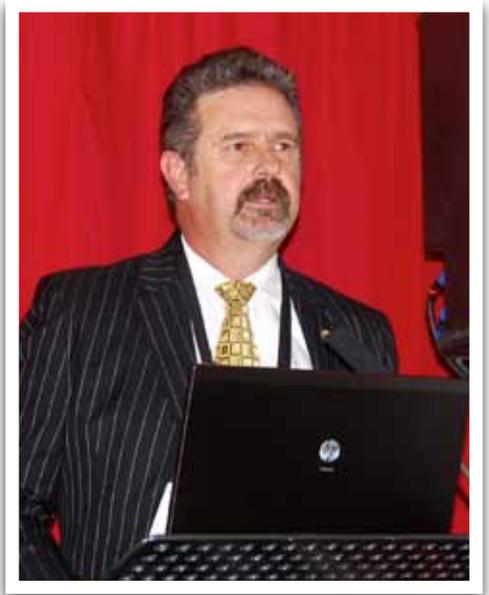
SAIEE networks at African Utility Week

The African Utility Week took place at the Cape Town International Convention Centre during May. The event was very well attended with workshops abuzz with engineers of different specialities.

The SAIEE ran various CPD accredited training courses and hosted a networking event. The SAIEE Deputy President, André Hoffmann presented the benefits of

becoming a SAIEE Corporate Partner to attendees. The Western Cape Centre was also represented and a lot of jokes were shared and new connections were made.

To read more about how to become a SAIEE Corporate Partner and to reap the benefits, go to page 20 or email Mike Cary on carymbc@netactive.co.za.



SAIEE Deputy President, André Hoffmann



Gary Venter (Powertech), Darin Mac Allister (Powertech) and Ria Louw (AJ Charnaud) Garry Craig (Exoweld) and Fred Visser (Quanta Services Africa)



Ken Ions, Andrew Climpson, Ian McKechnie, Minx Avrabos, Phumi Ngxonono and André Hoffmann

Thandeka Tyatyantsi, SEDA



The ARB team: (front-back) Ken Ions, Andrew Climpson and Scott Williamson

L-R: Phumi Ngxonono (Chairman, Western Cape Centre), Gerda Geyer, Sue Moseley, Minx Avrabos and Jamie Mabota, (Western Cape Centre).

Igor Djurdjevic, SABS

Alstom provides turbines to Iraq



Alstom has been awarded a contract worth approximately €225 million to provide power generation equipment for the Al-Anbar gas-fired combined-cycle power plant being built in the Anbar province in Iraq. A consortium of Metka SA and Metka Overseas Ltd is building the power plant for the Ministry of Electricity of Iraq.

The 1,642 MW power plant, due to be commissioned in 2016, will add much needed electricity to the Iraqi grid. Once in operation, it will be one of the largest and most efficient combined-cycle power plants in Iraq.

Under the scope of the contract, Alstom will supply four highly efficient GT26 gas turbines, four Heat Recovery Steam Generators (HRSG's), two steam turbines and six air-cooled turbogenerators.

Commenting on the contract, Steve Meszaros, Senior Vice-President of Alstom's Gas business said: *"The Middle East is the most promising market for gas-fired generation and we are extremely pleased at expanding our presence in this region. Alstom has been a steady partner in the reconstruction of Iraq's energy infrastructure and we are confident that our superior technology will make Al-Anbar a flagship project for the country"*.

CNH Industrial Announces Management Changes

CNH Industrial N.V. announced certain management changes. Richard Tobin, in addition to his position as Chief Executive Officer, assumes added responsibility as Brand President – Case Construction Equipment and New Holland Construction Equipment.

Smile 90.4Fm's Bobby Brown a Finalist in NSTF-BHP Billiton Awards



Bobby Brown of Smile 90.4FM has been short-listed as a finalist for the SAASTA sponsored category: Communication, Outreach and Creating Awareness of Science, Engineering, Technology & Innovation, of the annual NSTF-BHP Billiton Awards. Hosted by the National Science & Technology Forum (NSTF) and BHP Billiton, outstanding contributions to science will be celebrated at the prestigious awards gala dinner on 3 July 2014 in Johannesburg.

In appreciation for his outreach and awareness initiatives, Brown will be recognised for using radio, a popular and inexpensive medium, to make science important, interesting and fun. Brown produces and presents the iSmile Tech Report on Cape Town radio station Smile 90.4FM, six times a day, every day of the week. Using easily digestible 3 minute features, Brown 'edu-tains' listeners with news from the future, while making science, engineering, technology and innovation relevant.

Brown says: *"One of the main aims of the iSmile report is to break down industry jargon into simple language, so that ordinary people can understand. The stories I research are often sourced from industry publications that are littered with jargon and acronyms that can, quite frankly, make the content boring. The main aim of the iSmile Tech Report is to simplify and explain the importance and relevance of the content."*

WATTSUP

Schneider Electric SA appoints Bernhard Klöss to lead its Industry Business in Southern Africa



Schneider Electric South Africa, a specialist in energy management, is pleased to announce that Bernhard Klöss has joined the company as director of its Industry Business in southern Africa.

Klöss has held executive posts for the past six years, and also has 20 years of experience in the engineering, and oil and gas industries.

He therefore brings to the company extensive leadership experience as well as expertise in corporate account management, channel management, operations management, marketing and sales, general industries, and project and product business.

As the director for Industry Business, Klöss will be responsible for the

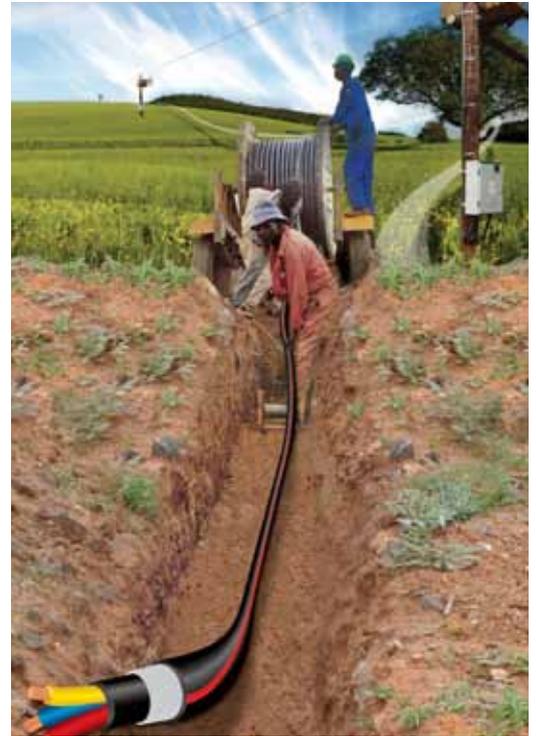
marketing, sales and execution of Schneider Electric's comprehensive range of industrial products and solutions.

His career began as a national product engineer for low voltage switchgear at Siemens in 1994. He later joined Asea Brown Boveri Pty (Ltd) as a proposals engineer in its composite plants division before returning to Siemens as the national product manager for low voltage switchgear.

Illustrating his business acumen, Klöss worked his way up through the ranks at Siemens, holding the posts of national sales manager for the automation and drives division, global corporate account manager for SABMiller, country divisional director for Siemens' oil and gas business in South Africa, and finally regional head of sales for South East Africa in the energy, oil and gas sector, and the business unit manager for oil and gas compression and solutions.

Klöss' experience is complemented by academic qualifications in national electrical engineering, focusing specifically on heavy current from the Vaal University of Technology (previously Vaal Triangle Technikon), a diploma in business management from Damelin College where he majored in marketing, finance, human resources and accounting, a GIMT strategic leadership diploma from Henley Management College, and a Henley diploma in business management also from Henley Management College.

ROBUST LONG DISTANCE POWER CABLE



Aberdare Cables' Armadac® provides a cost effective means of transferring power over long distances through intermediate voltage step-up step-down systems. Armadac consists of three circular stranded plain soft copper conductors, PVC insulated, PVC bedded, SteelWire armoured and PVC sheathed. It is suitable for 1,9 / 3,3 kV operation and is manufactured to SANS 1507-3.

The advantages of using an intermediate voltage cable over the conventional 400 V 3-phase system offered by the increased voltage of 3,3 kV include the fact that the voltage drop, expressed as a percentage, will be considerably lower and small conductor sizes (10 mm², 16 mm² or 25 mm²) will suffice for most applications. The Armadac cable is steel wire armoured and provides a robust mechanical protection to the cable, making it suitable for underground installation.

Suitable for use between -10°C-70°C temperature, Armadac is supplied in 500m wooden drums and is identified by red, yellow and blue cores.

Crabtree under new leadership



Mr James Calmeyer | CEO | Crabtree

Power Technologies (Pty) Ltd (Powertech), a wholly owned subsidiary of the JSE-listed Allied Electronics Corporation (Altron), is proud to announce the appointment of Mr James Calmeyer as CEO for its operation Crabtree. The operation will once again function as an autonomous, stand-alone company and will conduct its business from the combined manufacturing, sales and distribution premises in Wadeville.

James Calmeyer joined the Powertech group in 2007, when Powertech acquired IST. He subsequently took over the Managing Director position at Strike Technologies in 2010. With the amalgamation of Strike Technologies, TIS and Powertech IST to form Powertech System Integrators, Calmeyer was promoted to Business Development Executive for Utilities in the substantially larger company.

Powertech Group CEO, Neil Kayton comments: *“By consolidating the manufacturing, sales and distribution functions of Crabtree, we will be allowing the Low Voltage Electrical Accessories business to focus on the core competencies of the Crabtree name, being quality and innovation within the South African market. There are definitive and tangible opportunities for the electrical accessories business and we are positioning Crabtree for future sustained profitable growth.”*

The Crabtree brand has for many decades been a leading brand in South Africa for electrical accessories.

North West University boasts solar PV installation at Solar Training Center of SA



Campus grid-tied PV solar installation system at the North West University (NWU).

The North West University (NWU) in Potchefstroom campus boasts a campus grid-tied PV solar installation system which comprises a 5 x 3kW solar PV system that feeds directly into the engineering faculty's grid. In addition, a 1 x 3kW island system was installed close to the main entrance of the faculty with the main purpose of charging three electric scooters and an electric bicycle used as transport on the campus.

This system was installed as a partnership project between SUNFarming Germany and SUNCybernetics in South Africa to provide practical training opportunities at the NWU for persons at the faculty and in the region who require a comprehensive theoretical and practical understanding of PV solar systems.

The Solar Training Centre of South Africa is supported by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and is financed by the NWU, SUNfarming GmbH and KfW DEG.

SUNCybernetics has already facilitated training for over 120 candidates using a generic training module and the NWU's PV installation as the practical example to showcase the preparation, planning, project execution, installation techniques and commissioning of PV-plant installations on different roof areas.

The PV training course also covered the possibilities of PV technology and using solar radiation as an energy source whilst addressing the various technical considerations like fuse choices, overvoltage and EMF-protection, monitoring, metering, the electrical circuits as well as troubleshooting PV-plants. In addition an understanding of the basic functionality of PV systems and the different types of applications and their potential is discussed.

WATTSUP

Two SA companies join to identify opportunities in sub-Saharan Africa

Local infrastructure solutions group, Akhani, and South African energy management services company Energy Cybernetics, have joined forces to identify renewable energy and energy efficiency opportunities in Sub-Saharan Africa.

Akhani Group, a B-BBEE level 1 company, provides turnkey solutions of support infrastructure for the mining, oil, gas, energy sector and related industries and is based in South Africa, Mozambique and Tanzania. The Group consist of Mine Procurement Solutions (MPS) and Vhaselwa Engineering & Management Consulting (VEM).

Energy Cybernetics is an energy services company with a 16 year track record in the industrial, commercial and mining sectors. Energy Cybernetics delivers services to clients in Southern Africa and Australia.

The supply and availability of reliable and cost-effective energy to sites in remote locations is an important business driver for any mining operation. In many African countries, lagging infrastructure development means that many sites have to rely on diesel fuel as the primary source of energy. The cost of electricity generated from the combustion of diesel fuel is very high in comparison with other sources of energy. One alternative and viable source of energy to such sites is electricity generated by solar Photo-Voltaic (PV) technology.



Energy Cybernetics' recent venture into the PV market by establishing its renewable energy arm SUNCybernetics, with the backing of international knowledge transfer and skills development, places the company in a position to supply turnkey PV plants of the magnitude required in applications such as mining.

Combining Akhani and Energy Cybernetics' strengths will allow the identification and development of opportunities where solar PV can substantially reduce the overall cost of energy of a site. An initial target is to reduce the monthly energy cost of such sites by between 15 and 20%. By implementing energy efficiency projects in conjunction with the supply of solar PV generated electricity, monthly energy cost savings become possible.



The Veritek team, one of the first SANAS Accredited M&V Inspection Bodies for 12L energy efficiency tax incentives.

Get your 12L energy efficiency tax incentive process going

Veritek is one of the first SANAS Measurement & Verification (M&V) Inspection Bodies accredited to provide M&V services and issue certificates to claim a tax deduction for energy efficiency savings under the 12L Regulation released last year.

The 12L Regulation is an energy efficiency tax incentive which was promulgated by the Department of Treasury and came into operation in November 2013. It will assist organisations, whom are tax paying entities, to receive a deduction on their taxable income due to the savings achieved through energy efficiency projects.

Master Power Technologies commits to Zambia

Power solutions and data centre specialist, Master Power Technologies, has recently invested resources in Zambia in order to better service its local sites.

“Having identified a need to meet the ever increasing demand for power solutions and data centres in the region, the decision to invest in a full time direct presence was easy”, says Neill Schreiber, sales and marketing manager at Master Power Technologies.

The Zambian team is headed by Charlie Marshall: Regional Manager, Zambia. Currently there are offices in Kitwe and Lusaka to ensure timeous technical support to the local customer base.

“The reaction to our direct presence here has been overwhelming. We are connecting with our customers on the ground” says Marshall. *“We believe the investment in the region is paying huge dividends and sending a message that we are serious about doing business in this region.”*

“The offices were set up in January and plans are under way to increase our presence here, to include warehousing of products and spares as we see Zambia as a springboard to the rest of Africa” concludes Schreiber. *“We also envisage opening up more offices in Africa to enable other parts of the region to benefit from our quality products and technical expertise.”*

As an additional indication of its commitment to the region Master Power Technologies recently participated in the Copper Belt Mining Expo in Kitwe at the end of April with great success.

SA service provider makes good in Barcelona



TechRig produced an amazing AV spectacular on a recent conference for Boehringer Ingelheim (BI). The conference was hosted in Barcelona, Spain over 5 days with 500 delegates in attendance.

With a successful track record on the previous BI sales conference held in Italy in 2013, this year the technical had to be bigger, better and brighter. As with all sales conferences, the number one priority is to convey the business message in an engaging and consistent manner throughout the venue. It was a complex project with multiple elements.

All productions carried the conference theme of ‘BI ONIC’ through to all elements including; visuals, stage, guest speakers and entertainment.

TechRig has a global network of leading event equipment rental companies. “We

are driven by a mutual ambition to provide client the very best quality at competitive rates. By strictly selecting and working closely with partners, we are able to guarantee absolute reliability and quality. TechRig meets stringent international standards” says Michael Collyer CEO TechRig.

“TechRig has once again proved their mettle as the leading technical solutions agency both locally and abroad,” notes Collyer and added *“we have a demonstrable track record of getting the job done efficiently and saving our clients a lot of money in the process.”*

“With many years of experience across the world, operating from two offices worldwide, we bring consistency in design and delivery to our clients no matter where they are or what they need. Working internationally keeps our team abreast of the evolving technologies in our industry”.



AfriMold joins forces with SA Automotive Week

Two of Africa's leading manufacturing trade shows; South African Automotive Week (SAAW) and AfriMold have announced a co-hosting agreement for 2014.

Both shows will be hosted at Gallagher Convention Centre between 13-17 October at the Gallagher Convention Centre in Midrand.

South African Automotive Week Working Group Chairman and National Association of Automotive Component and Allied Manufacturers of South Africa (NAACAM) Director Robert Houdet said the co-hosting arrangement was a logical step that was in the interest of the industry.

"The events complement each other and their co-habitation will boost value to industry participants and create an even more powerful showcase of South Africa's manufacturing capability," Houdet said.

The AfriMold trade fair is a hub of innovation where local and international market leaders exhibit solutions for product development through - design, material selection, simulation, visualisation, engineering, CAE, CAD and CAM, rapid prototyping and tooling, patternmaking and prototyping, precision machining, mould-making, tooling, tools, machine tools, quality assurance and automation, as well as processing and finishing. South African Automotive Week is Africa's automotive intellectual gathering, focused on stimulating trade and partnership opportunities in manufacturing and related sectors. SAAW is the continent's showcase for manufacturers of vehicle components and Electric Vehicles.

"The synergies between these events are clear," says Ron MacLarty, MD of AfriMold. *"By presenting them simultaneously,*

we are enabling the full spectrum of automotive, machining, engineering, tooling, manufacturing and related sectors the opportunity to discover all the latest trends, strategies and solutions under one roof. The combined event can now offer a broad engineering industry focus, with Auto remaining the core theme, and the focus expanding from the technology behind the car all the way through to the finished product ecosystem."

South African Automotive Week Director, Andrew Binning said South African Automotive Week would comprise several activities including the trade show, technical or trade related workshops, a 2-day conference, site tours, an online match making programme and networking activities, including the NAACAM AGM on October 16.

"We are pleased to be co-hosting South African Automotive Week with AfriMold, as the arrangement focuses even greater automotive interest, particularly international interest, on South Africa over that time and enhances the attractiveness of South Africa as a trading partner."

Both events aim to grow SA's manufacturing capabilities and global competitiveness, traditionally attracting local and international participants from across the design, materials, prototyping, tooling, conversion, assembly, testing, packaging, distribution/logistics and automotive sectors.

The increased B2B, networking and cross-sector new business opportunities presented by co-hosting the events is expected to benefit exhibitors and attendees alike. *"Not only will the combined event put South African innovators in touch with international manufacturers able to deliver on their product innovations; it also presents a key opportunity for local manufacturers to showcase their capabilities to the world,"* claims a statement from the organisers.

The combined event now boasts endorsements and support from major bodies ranging from the Automotive Industry Development Centre (AIDC), National Association for Automotive Component and Allied Manufacturers (NAACAM), National Association of Automobile Assemblers of South Africa (NAAMSA), the Retail Motor Industry Organisation (RMI) and the Department of Trade and Industry, through to Manufacturing Circle, the Institute of Foundrymen (SAIF), the Tooling Association of South Africa (TASA), Aluminium Federation of South Africa (AFSA), the Southern Africa Stainless Steel Development Association (Sassda), NFTN, Plastics | SA and 16 constituent member bodies, The Plastics Institute of Southern Africa (PISA), The National Tooling Initiative (NTI) and locally, the Gauteng Tooling Initiative (GTI). In addition, University Design Competitions, Eco Speedweek, networking functions, site tours and a world class online match making programme will feature alongside the event. Eco Speedweek includes 'track day Friday', in which cars powered by alternative energy sources compete in an endurance race at Gerotek.

For more info contact either: Ann Evans at Tel: +27 82 336 6791; ann@afrimold.co.za OR Terri Bernstein at Tel: +27 83 635 3539 or terri@afrimold.co.za

BT Global Services continues to support Medo and Small Business Entrepreneurs

BT Global Services sponsored international trade programme recently took 15 local entrepreneurs to the UK. The trip included visiting an incubator in London; a visit to South Africa House hosted by the trade commission, two days at the University of

Coventry and its engineering centre as well as a visit to the Serious Gaming Institute.

Entrepreneurs also had 'free days' where they were asked to set up appointments (pre-trip) with local UK businesses and encouraged to sign deals on the trip. Before leaving the entrepreneurs were taken through a serious boot camp at the University of Stellenbosch's business school.

Martin Springer, Business Development and Strategy Director, BT Global Services, is excited about the programmes future. "I am excited and committed to the programme of support into next year. It is important to grow entrepreneurs and BT Global Services would like this growth to extend to these entrepreneurs becoming suppliers to our business. In fact we are already using someone as a supplier who benefited from this programme."

He says that teamwork is the key to success. "No entrepreneur can go this alone. The partnership that is created between MEDO, ourselves and the entrepreneur is what makes this work so well. But we cannot take the credit; it is the entrepreneurs who have made a difference. Their stories are inspiring and they are set to blaze a path into the future."

How the programme changes lives is inspiring. "The experience in the UK was invaluable. It has been rewarding to see how the entrepreneurs grow and how their businesses have grown." He pointed out that

the journey was not just about compliance but about contribution. "We all have a duty to try to grow small businesses in this region. We need to develop people and their skills for our business," says Springer.

The scorecard, originally an obligation, is now much more meaningful to the business, he says. "I have seen how this can make a positive contribution to your business if channeled properly. It is represented at board level at BT Global Services, which speaks volumes about the emphasis we place on it."

He says the company will continue to align with entrepreneurs and remain involved with the MEDO programme in the future. "The programme has reached a point where it must now be formalised with partners."

Work starts on Kinangop Wind Farm in Kenya

A new wind farm in Kenya will add to Sub-Saharan Africa's growing wind energy capacity, which is being driven by solid economic growth and an increasing population.

Aurecon has been appointed as owner's engineer by the project company, Kinangop Wind Park Ltd (KWP), for the construction phase of the 60.8 megawatt wind farm in Kenya's Kinangop region. This project has African Infrastructure Investment

Managers (AIIM) as the majority owner. The project has reached Financial Close and commissioning is expected to occur in mid-2015.

The wind farm will be built by Iberdrola Engineering, with General Electric to provide 38 1.6 megawatt wind turbines.

As owner's engineer, Aurecon will work closely with the project partners to ensure that the wind farm is delivered on time, within budget and meets the expected level of reliability for long-term operation.

"Kinangop is significant as the first major IPP wind farm in Kenya," said Aurecon Renewable Energy Service Leader Paul Nel.

According to GE, the wind farm will generate enough renewable electricity to power the equivalent of 150 000 homes in the country.

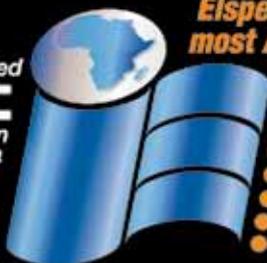
"Kenya is an exciting growth market for renewable energy with an attractive policy framework, which has enabled the progression of a number of wind and geothermal projects," Nel said.

"This appointment builds on Aurecon's strong presence in the South African renewables market and commitment to our key client AIIM who is a major stakeholder in the project. It also reflects our depth in East Africa as a leading engineering service provider," Nel added.

Impact Energy

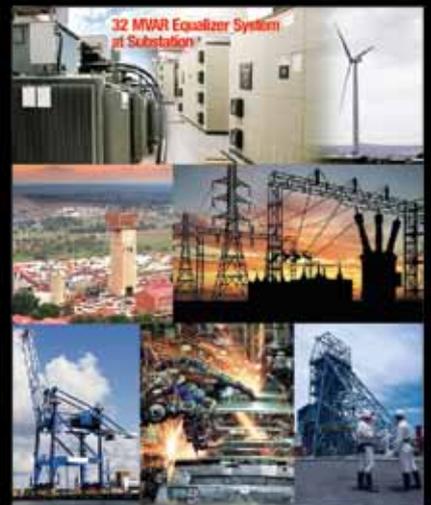
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A Call to Action!

Dedicated to the interest of professional Electrical and Electronic Engineering in South Africa, The South African Institute of Electrical Engineers (SAIEE), formed in 1909, has grown to more than 6,000 members who are professionally engaged in the full range of engineering activities.

SAIEE has initiated a Corporate Partner Programme which aims at providing meaningful benefits to corporate organizations, seeking to market relevant products and services to its members, as well as providing a professional and well governed channel for the delivery of corporate social responsibility programmes.

The University of Johannesburg (UJ), in collaboration with RobotScience and key stakeholders with an interest in skills development in South Africa, are seeking partners with synergistic visions and objectives, to join in partnership with the SAIEE.

UJ has offered its TechnoLab facilities at the Auckland Park campus as the 'home-base' for this initiative and seeks funding for the ongoing operational expenses of the proposed program.

TechnoLab, a division of the Faculty of Engineering and the Built Environment at UJ, is located on the Auckland Park Kingsway Campus. Its vision is to encourage the youth of South Africa to explore and discover engineering technology. RobotScience provides basic training in

electronics and robotics, presented in an enjoyable and fun modularised format, with tested and robust working models, supported by online videos to supplement training.

By involvement in the UJ TechnoLab project, the SAIEE seeks to extend its outreach programme that aims at fulfilling its mission and objectives towards supporting skills development and the engineering pipeline in South Africa.

THE PROJECT

Michael Ettershank from www.robotscience.co.za approached UJ TechnoLab looking for a home for an exciting project that teaches teenagers and young adults electronics and technology skills, which is much needed in South Africa.

It is estimated that this bold initiative will train approximately 800 students in the first phase. Students will complete a course of 16 x 2 hour sessions in order to graduate from this programme.

THE UJ CONTRIBUTION

UJ TechnoLab would like to be able to extend its current TechnoLab curriculum to offer basic robotics and electronics training for economically disadvantaged young South



Africans, UJ undergraduates and teenagers in the feeder areas of the university, on an ongoing basis.

Once a sustainable business model has been developed, UJ through its TechnoLab initiative, is committed to supporting this project, and will undertake to cater for:

- Facilities for the training course
- Administrative support
- Required resources and equipment
- Optimized procurement and sourcing of parts

The funding required from Partners is to cover the costs of employing a full time project leader to roll out the programme and take it forward and assist UJ TechnoLab to achieve its objectives.

WHY BECOME A PARTNER?

Advantages to UJ TechnoLab and the community

1. A permanent central home base for www.robotscience.co.za that is accessible by safe public transport;
2. Full time availability to deliver training and the further development of training modules;
3. Tapping into UJ infrastructure and expertise to support delivery and expansion of scope;
4. Improved governance with UJ offering transparent audited monitoring processes and procedures; and
5. Associating the project with the UJ brand and establishing a track record of delivery.

SAIEE CORPORATE PARTNER BENEFITS

1. Brand association with reputable professional organizations such as the University of Johannesburg and the SAIEE;
2. Well managed contribution towards corporate social responsibility;
3. Improved corporate brand awareness to students, stakeholders and professional engineers through access to UJ and SAIEE media channels;

Invest now in a future South Africa in which our children and our grandchildren will want to live.

Don't delay – act now and be a part of legacy of which you can be proud.

FOR MORE INFORMATION:

TECHNOLAB: André Hoffmann – androleohoffmann@gmail.com
SAIEE CORPORATE PARTNERSHIP: Mike Cary - carymbc@netactive.co.za
www.saiee.org.za

SAIEE Museum of Electrical Engineering

A significant step was taken on 20th March 2014 towards the establishment of a museum of electrical engineering at the SAIEE headquarters in Observatory, Johannesburg.

BY | MAX CLARKE | CHAIRMAN | HISTORICAL SECTION

This was in the form of a preview function held in the recently refurbished Innes House at which a number of members of the Institute's Council and invited guests were present.

The 2013 SAIEE President, Paul van Niekerk, officially welcomed visitors and invited them to inspect the first displays and the audio-visual presentation that had been arranged, and to provide comments and feedback.

During the proceedings he unveiled a small name-board identifying the room in which the history of telegraphy and telephones is depicted as the "Mervyn Emms" room. He pointed out that not only was Mervyn a member of the SAIEE of more than 50 years standing, but that he was the longest serving member of the Historical Section.

This Section is responsible for setting up the displays and generally developing the museum and Mervyn has provided numerous artefacts and valuable advice for this process over many years.

Although not yet in its final form, the audio-visual equipment is positioned in one of the Innes House rooms and is able to tell the story of a number of outstanding South Africans in short slide presentations with appropriate commentary.

One of the other displays that visitors were able to inspect was the radio communication equipment. Not only were they able to view amongst others, original and unique communication radios designed by the late Dr Trevor Wadley, but they were also treated to a live broadcast by Richard Dismore, Past President of the Antique Wireless Association (AWA) who conveyed greetings and congratulations from the Association over specially installed temporary radio equipment for this important occasion.

This is a taste of things to come as the AWA will eventually be operating permanent equipment in the room as an integral part of the displays.

The SAIEE President pointed out that the Council has already approved a budget for the next phase of the

museum's establishment and that the Historical Section is now planning the action steps necessary to carry on the development work.

The museum is regarded not only as a safe repository for priceless artefacts, but also as an integral part of the Institutes drive to display aspects of the electrical engineering profession, and thereby attract people to the profession.

He expressed appreciation to the Historical Section team for their enthusiasm and hard work in developing the project.

There is still a great deal of work to be done, but on completion, the museum will be open to Institute members and the general public by appointment, until such time as it is necessary and practical to have some form of permanent supervision in place.

These details are still to be worked through, but in the meantime anyone wishing to view what is being done, is welcome to contact SAIEE head office to arrange a visit. **wn**



Members of the Historical Section with 2013 SAIEE President: (L-R) Max Clarke; Chairman Historical Section, Dirk Vermeulen; Vice Chairman Historical Section, Paul van Niekerk; 2013 SAIEE President and Mervyn Emms; 50 year member of the SAIEE and longest serving Historical Section committee member.



Viv Cohen & Mike Little.



Mervyn Emms & Paul van Niekerk.



Viv Crone & Max Clarke.



Mike Little, Jane Buisson-Street & Bill Bergmann.



Mike Crouch listening to a live broadcast by Richard Dismore, Past President of AWA.



Max Clarke, Richard Dismore, Paul van Niekerk.



An inside-look into the Mervyn Emms room.



Nothing better than having the family's support with such a venture. Max & Eileen Clarke, with their daughters Jeanette Hogg and Liz Posthumous.



du Toit Grobler (2009 SAIEE President) with the commemorative centenary plaque outside the museum.

'Switch to portable solar power' – solving Africa's pressing energy problems



575 million people across Africa, 10 million in South Africa alone, are not connected to any form of electricity. Compounded by Eskom's recent load shedding which has placed enormous strain on business and communities alike, the need for a safe, sustainable, cost-effective and environmentally friendly solution to Africa's pressing energy problem is critical.

Switch to Portable Solar Power' comprises a full range of portable plug-and-play solar products capable of addressing any power requirement. Endorsed by local cricket heroes, Jacques Kallis and Dale Steyn, 'Switch to Portable Solar Power' aims to improve the quality of life for all South Africans through the provision of low cost power solutions.

"With most areas in South Africa receiving an average of 2,500 hours of sunshine per year, the use of solar power is an obvious answer," says Ryan Steytler, Co-founder, Co-owner and Director of New Product Development and Innovation at In2Brands. By harnessing the sun's energy and offering innovative, safe and effective portable power solutions, the very real opportunity exists to bring power to Africa and empower its people.

The current portfolio of portable solar products includes In2Brand's own locally designed and created "EcoBoxx", and the Dutch "WakaWaka" for which In2Brands enjoy exclusive sales rights within Africa. Both make use of the very latest in patented solar technology to supply electricity to those in need.

A solar generator providing plug-and-play portable power, EcoBoxx is powered by unique lead crystal battery technology making it highly durable with double the lifespan of conventional alternatives. With a range of more than 15 power Qubes (50W – 1500W), EcoBoxx caters to any and all power needs. The availability of

specially designed custom kits further ensures the right fit, re-enforcing its plug-and-play capability.

EcoBoxx provides numerous benefits across lifestyle, recreational, business and industrial from the lighting up of rural communities, as a backup source of power for construction work or even the only source of power on remote film locations or during outdoor activities.

For those who require a smaller, yet equally effective solution, WakaWaka ('Shine Bright' in Swahili) offers a portable solar powered lamp and phone charger. It provides in excess of 40 hours of safe, bright reading light from a single eight hour charge and has the ability to power any USB-enabled device or smartphone in less than two hours. WakaWaka increases safety and security whilst enhancing outdoor and lifestyle experiences. Inspired by rural South Africa during the 2010 Soccer World Cup, sales of WakaWaka as lifestyle accessories have generated more than R40m since its original European launch in 2012 whilst more than 500,000 people living in disaster zones have benefitted from free or low cost lamps.

Currently, the use of kerosene lamps remains the main source of alternative lighting for those not connected to the grid. This is inefficient, dangerous and expensive, bringing with it enormous health and environmental hazards. The use of solar powered products, and in particular portable solar products, eliminates these dangers whilst saving

money. It enables communication, facilitating entrepreneurship and thereby increasing income-generating capacity for families, whilst the improvement of study conditions results in better school grades.

The EcoBoxx and WakaWaka range of portable solar power products are reliable, durable, green, renewable and cost effective. Their plug-and-play capability enables anyone to harness the sun's energy for when it is needed, anytime and anywhere. Access to local, sustainable energy is a fundamental human right - it empowers, it powers connectivity and it saves lives. *"As part of our 'Switch to Portable Solar Power' campaign, we are committed to ensuring that in addition to enhancing recreational activities and improving safety and security, our products empower communities where daily consumption of electricity is not a reality,"* says Steytler.

To this end, In2Brands has established the 'Light4Life' Trust which will receive a percentage of all product sales. Under the guidance of The Community Chest of South Africa, in existence for 80+ years and currently supporting more than 520 social welfare and development organisations, In2Brands will provide portable solar power to the areas and communities in South Africa where it is needed most.

"Stable power is fundamental to business and to the survival of a country," says Lorenzo Davids, CEO, The Community Chest of South Africa. *"It is the oxygen of an economy and without it entrepreneurship, and life as we know it, cannot survive or flourish."* **wn**

Acclaimed engineering company celebrates 20 years in Cape Town

Zest WEG Group first established a small office in Cape Town 20 years ago to cater for local customers who require fast turnaround times on the supply of electric motors. Today, this thriving business provides the entire Western Cape with a range of quality electric motors, variable speed drives (VSDs), softstarters, switchgear, standby generators, transformers and access to renewable energy equipment, all under the well-known and respected WEG brand.

Optimally situated in the Montague Gardens area of Cape Town, Zest WEG Group's Cape Town branch operations include offices, a CETA-accredited training facility, workshops and a 4308 m² warehouse. Branch manager Marthinus Greeff, joined the branch 10 months ago after having spent several years with the group in Johannesburg. He explains that Zest WEG Group Cape Town's success is based on a number of critical and uncompromising factors.

"Our experienced and technically competent team, led by Hendrik Britz for almost 19 years boasts a number of people

who have been with us for many years. Longevity of service provides customers with a feeling of security, and this is just as important as the fact that the WEG product offerings offer consistent best quality and reliability," says Greeff.

The Zest WEG Group Cape Town team has developed a reputation for going beyond the call of duty and Greeff is ably assisted by electric motor sales manager Leonard Smith and drives and automation sales manager Jeff Smith in delivering unquestionable service to the industry.

"Our technical service team is on call 24/7 and this ability to quickly and efficiently expedite maintenance and technical issues

places us on an extremely good footing with our diverse customer base," says Greeff.

The field sales team is supported by dedicated technicians operating out of a fully equipped workshop capable of undertaking repairs to VSDs on site and includes a test bay for load testing of the VSDs. All technical personnel receive extensive training both at WEG in Brazil and locally under the supervision of Zest WEG Group's training officer from Johannesburg.

Zest WEG Group Cape Town boasts its own comprehensive training facility with five custom built benches and this



Zest WEG Group's Cape Town branch provides the entire Western Cape with a range of quality electric motors, variable speed drives (VSDs), softstarters, switchgear, standby generators, transformers and access to renewable energy equipment.



Zest WEG Group Cape Town branch manager, Marthinus Greeff.



Drives and automation sales manager at Zest WEG Group's Cape Town branch, Jeff Smith.



Electric motor sales manager at Zest WEG Group's Cape Town branch, Leonard Smith.

allows the branch to provide customers with complimentary training on WEG's range of electric motors, VSDs, softstarters and switchgear. Greeff explains that all the training courses are also certified by CETA.

Greeff says that availability of product is a major differentiator that Zest WEG Group can offer its customers. *"We have a significant investment in our stockholding which includes WEG electric motors from 0.37 kW up to 370 kW. The WEG electric motor range encompasses aluminium motors, W22 high efficiency motors, flameproof motors, brake motors, dedicated aluminium pad motors and Smokex pad type motors. Our on-site workshop facilities allow us to mechanically*

modify motors, and trained and certified Ex technicians can certify motors for non-spark and dust ignition applications."

"We also stock 220 V single phase, 380 V and 525 V VSDs and a full range of low voltage switchgear. In addition, we hold all consumables and parts for each of these items of equipment. Our turnaround times on products and consumables are never compromised, since we receive all our shipments directly from the feeder factories."

The incorporation of the EML brand of electric motors into the Zest WEG Group electric motor business resulted in the most comprehensive range of premium

through to entry-level motors available in the Western Cape. *"There is a synergy between the two product ranges that allows us to provide improved service levels and optimise our resources. Each sales engineer is capable of dealing with enquiries on both electric motor product ranges as well as our other products. This allows them to provide optimal product solutions for each individual customer's needs and applications,"* Greeff explains.

"With our customers' visions and our solutions, we look forward to providing the Western Cape with many more years of excellent service and consistent best quality and reliable products," Greeff concludes. **Wn**

Utility week under an African sky

With over four and a half thousand visitors, the Cape Town International Convention Centre (CTICC) was at its capacity during the two days it hosted African Utility Week from 13 – 14 May, and according to published statistics, interest in the key concerns of the exhibition, such as renewable energy and solar power, has grown exponentially over the past five years.

Visitors from all over the world, including China and in particular, the African states of Kenya, Tanzania and Zimbabwe, showed interest in the necessity for African energy re-evaluation towards greener sustainable solutions.

According to reports from the exhibition organisers of African Utility Week, attendance has grown over the past five years by almost 500%. Shawn Roets, Western Cape Regional Manager for the Voltex group, one of the 215 exhibitors said, *“The resounding interest in better energy options indicates that people are starting to become aware of the necessity in investing in these long-term solutions.”* In a large display of two stands at the CTICC, Voltex had the opportunity to introduce its newest brands to its network. *“The objectives set out by African Utility Week,”* explains Roets, *“were perfectly exemplified by our newly-acquired brands and their products.”*

Roets indicated how, by way of example, it utilized the impressive Activar to showcase the importance of using efficient products that assists in power optimizing, in order to have a lesser impact on energy demand. Not only did the efficacy of the brands Voltex showcased during the two days impress visitors, but it was the endorsement and

approvals that their product ranges carry that really got people talking. One of African Utility Week’s supporting organisations, the International Electrotechnical Commission (IEC), has given official certification to many of the products that Voltex stocks. Furthermore, Voltex are an affiliate member to Safehouse. An organisation dedicated to protecting consumers and informing consumers of sub-standard products.

“We had phenomenal interest in our new products,” says Roets; *“many of the attendees stopped to ask about MV/LV Solutions because of its unique ability to manufacture products to the specific needs of customers.”* Roets also said that MV/LV Solutions, which is now part of the Proudly Bidvest Voltex Group, is a fully SABS approved company. In the same section of display, Voltex one of the largest electrical distributors in Africa, exhibited its LSis core resin transformers. *“There was particular interest in this product because of its operation without using oil, and decreased maintenance requirements”* said Roets.

In accordance with the general principle of African Utility Week, this new resin transformer is environmentally safe; it does not emit oil or toxic gases into the atmosphere.



The Voltex Team (from left to right): Gary Paterson, Shawn Roets, Dean Martch, Kim Petersen & John Carter.

The visitors also had the opportunity to observe not only electrical solution processes, of which Voltex has in abundance, but also to see the artistic, innovative side of the electrical industry through its Voltex Smart Solutions products.

Since African Utility Week is a platform for global suppliers and investors to provide the industry with valuable knowledge and case studies to help develop the sector and close the funding gap to support

Africa's economic growth, Envirotel, another division within the Voltex Group, contributed to this through its display.

"Visitors showed interest in Envirotel's efficient metering systems," said Roets, adding that the systems are *"not only efficient, but 'smart' too, and covers metering as well as vending options."*

The Voltex Group, including the staff at the exhibition, said that success of African Utility Week was so exceptional that they

are looking forward to next year's event in which, according to Roets, Voltex plans to have an even bigger display section. *"The response was so great that next year we'll definitely have more products on show,"* said Roets. **wn**

For more information about Voltex and the products it displayed at African Utility Week, please email info@voltex.co.za or visit its website at www.voltex.co.za.



ALTON LOCK
1945 - 2014

Alton Lock

It is with deep regret that we record the death of Alton Lock, a long standing member of the Institute, who passed to higher service in May 2014.

BY I ROBBIE EVANS | MAX CLARKE

It is with great sadness that we record the sudden death of Alton Lock, a former Executive Officer (Director) of what was known as Johannesburg Electricity, and is now City Power. He was born in December 1945, and after starting work with the Johannesburg Electricity Department as an apprentice, he worked his way through the ranks until he took early retirement, and moved to Plettenberg Bay 10 years ago.

He gained a B.Sc. in Electrical Engineering from Wits and served the Department in a number of capacities including Director of Distribution, which position he held until his retirement. He was a clear thinker and carried the organisation through some of its most difficult periods. His high ethical standards, dedication to public service and his professional conduct earned him the respect of all who had contact with him.

Alton joined the SAIEE 40 years ago. When the Southern Cape Centre of the SAIEE was established he transferred his membership and was a regular attendee at the Centre's

talks and technical visits. He was invited to join the Committee about 4 years ago and held the portfolio for evaluating CPD points for talks and visits. In 2012 he was elected as Vice Chairman.

Alton was a man of high morals and always conducted himself as a true gentleman. He left an indelible mark on the lives of all those who he came into contact with. We give praise and thanks to the Lord for allowing us the privilege of being a part of Alton's life. Alton is a great loss to our Institute and the furtherance of Electrical Engineering in our Country.

He was 69 years of age at the time of his death and is survived by his wife Avril. Our thoughts and condolences are extended to her and the extended family during this difficult time. His passing is a great loss to the Institute and the Electrical Engineering profession in South Africa.

Alton, we, the members of the SAIEE and committee members of the Southern Cape Centre, will miss you not only as a fellow colleague but also as a mentor and friend. Rest in peace, Alton – you've earned it. **wn**

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Felix Bosch

It is with deep regret that we record the passing of Felix Bosch, a senior SAIEE member since 1958, who passed away in July 2013, right after his last article saw the light in **wattnow**.

BY I DUDLEY BASSON | DEREK WOODBURN

F.W.L. BOSCH
1938 - 2013

Felix Bosch was born and bred in Pretoria. He is well remembered from high school days, in the early 1950s at the Pretoria Technical College, by Derek Woodburn, Dudley Basson and Gabriel Korvink.

After matriculating with distinction and obtaining an Engineering Diploma, he held various technical and training positions in several government and semi-government organizations.

He obtained the MDP and AEP at Unisa's School of Business Leadership and was appointed as business manager.

He became a member of the South African Institute of Electrical Engineers in 1958, and was also a member of the South African Institute of Mechanical Engineers, a member of the Institute of Nuclear Engineers (London) and a member of the Institute of Incorporated Engineers (London).

In October 1962, while employed at the Atomic Energy Board as Head of the Design Drawing Office, Felix was invited

to join a top secret group, which would much later be acknowledged to be the uranium enrichment project. Felix has written in detail about this in the June and July 2013 issues of the **wattnow** magazine.

Felix regarded his participation in this extremely challenging but highly successful project, as a career highlight. The celebratory luncheon was held in the "Uranium" room of the President Hotel in December 1970.

Felix was a past area governor of Toastmasters and a past president of the Verwoerdburg Toastmasters Club and has competed in speech competitions up to national level. Felix Bosch was a Distinguished Toastmaster and holder of the Able Toastmaster (Silver), Toastmaster International's highest awards. He has presented numerous courses on public speaking and meeting procedures. He was appointed district chief judge, Toastmasters Southern Africa (District 74) in 1991.

At a 40th school reunion Felix gave me a

treasured copy of his excellent book on public speaking "*Your Attention Please!*". A brief extract:

"What is the single thing that people fear most? Is it death? Is it fire? No. Is it water? No. The one thing that people fear the most is public speaking ... what then is it that scares people about public speaking? Quite simply, it is the fear of making a fool of yourself, letting your slip show in front of your peers, subordinates, colleagues and strangers". Felix then goes on to deal with the matter.

We can possibly get some measure of the greatness of the man from an anecdote about Felix's idea about driving a status car.

A manager of his firm once suggested that he should buy a car more in keeping with his position and status in the company. Felix responded: "*I give status to the car - not the car to me*".

On behalf of all his colleagues and friends in the SAIEE, we extend our deepest sympathy to Sarie, the children and grandchildren. **wn**

IN MEMORIAM



ANTHONY LIONEL CHARLES 1922 - 2014

A.L. (Tony) Charles was born in Southern Rhodesia in 1922. He graduated from Wits with a B.Sc.(Elec) Eng before enlisting with the Special Signals Service of the S.A. Corps of Signals until the end of WW2.

After the war he joined the English Electric Company of South Africa working in various capacities eventually becoming MD of GEC – English Electric in 1969.

He was three times Chairman of the Electrical Engineering and Allied Industries Association and President of the Steel and Engineering Industries Federation of South Africa.

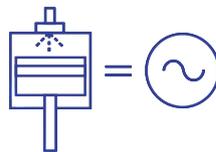
Other qualifications included MSAIEE and AMI(Cert) E. Tony retired from GEC S.A. as deputy chairman in 1984, remaining in industry as Director of various companies until his retirement in 1993.

A natural sportsman, he was a keen golfer and bowler in his later years – a sport that he kept up well into his eighties. He died on 1 April 2014 at the age of ninety one.

Tony was a devoted husband to Dianna, the love of his life who survives him. They were married for 59 years and have three children, all of whom are successful in business and still reside in South Africa. Dianna is daughter of the well-known broadcaster “Billy” Matthews.

The condolences of the President and Council of the SAIEE go out to Dianna and her family at this time. **wn**

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The implementation of phasor measurement technology

BY I R. MOODLEY | B.W.D BERRY

The modern era of power delivery is faced with many challenges due to decreased reserves, increased use of renewable generation, Flexible Alternating Current Transmission System (FACTS) devices, and changes in customer/load behaviour.

In order to manage the risks introduced by these challenges, it is important to have near real time observability of the health of the power system.

large scale in Eskom and summarises the benefits of Wide Area Monitoring System (WAMS) applications that can contribute toward a smarter transmission grid.

INTRODUCTION

Phasor Measurement Unit (PMU) technology has come to the forefront in terms of smart measurement of the power system in general because it provides accurate, high resolution monitoring of important analysis metrics. Eskom has identified the need to enhance the situational awareness of operators at the National Control Centre by implementing synchronised phasor measurements technology to improve the power system reliability and operational security during normal and highly stressed operating conditions.

This paper discusses the implementation of Phasor Measurement Technology on a

Eskom initiated a project for the installation of PMU modules and substation class Phasor Data Concentrator (PDC) equipment at 15 key substations. This included: Installation of the Phasor Data Concentrator (PDC), synchronised measurements historian, interface to Energy Management System (EMS), visualisation and stability applications at the National Control Centre (NCC). The project covered the short term requirements but has been engineered to meet future requirements as well. The project has completed the Factory Acceptance Test for the control centre WAMS application and substation



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equipment. The installation of the PMUs is currently in progress. The Integrated Site Acceptance Test shall commence after Eskom has completed PMU installations at 8 substations. The future WAMS scope includes an increase in coverage of critical nodes in the network to install a total of 52 substations.

PMU MEASUREMENT TECHNOLOGY

One of the key benefits of PMU measurement technology is the use of highly accurate GPS timing to measure phase angle which can be compared over a wide area. This is done in the following way: the GPS time is used to construct a time reference (this is essentially the same over a wide area due to the high accuracy of GPS timing). This time reference is transmitted to the PMU via a 1 Pulse per Second (PPS) signal which is used to define

the start of the second. The phase angle is then measured as the angle difference between the start of the second and the peak of the wave as shown in Figure 1.

This time reference can then be replicated over each sample so that a relative angle can be calculated per frame. Therefore if the voltage is at synchronous frequency (i.e. 50 Hz) and the frame rate is a factor of this frequency (i.e. 10, 25 or 50 Hz) then the phasor would remain stationary.

However if the frequency of the voltage signal was off nominal, the phasor would then rotate at a speed of $f_m - f_n$ where f_m is the measured frequency and f_n is nominal frequency.

This technique of phase angle measurement allows for the comparison of angles over a wide area. As per Figure 2, the difference

between the voltage angles of bus 1 and 2 can be determined simply because they share the same time reference.

Combining this measurement with high resolution reporting (up to 50 frames a second), makes this data extremely useful.

As seen in figure 3, the Eskom WAMS consists of PMUs and Substation Phasor Data Concentrators (SPDC) deployed at Eskom transmission stations and a Central Phasor Data Concentrator (CPDC) and WAMS Data Centre facility deployed at the Eskom National Control Centre.

The PMUs transmit synchrophasor data using the IEEE C37.118 protocol. The data is time-stamped by the PMU using a GPS clock and the data is then transmitted to an SPDC. All communications use the Eskom telecommunications WAN routers and bandwidth management equipment.

SPDCs collect IEEE C37.118 data from up to 8 sources and combine the data into a single IEEE C37.118 PDC stream transmitted to the Control Centre. The WAMS Control Centre consists of computer and data storage equipment running the Psymetrix PhasorPoint software. Client workstations running the PhasorPoint workbench software can interface with the central servers to provide phasor data visualization and analysis tools.

The CPDC and WAMS Data Centre consists of computer and data storage equipment running the Psymetrix PhasorPoint software suite supporting data management applications, phasor measurement visualisation, and synchronised measurement applications. The system inter-faces with Eskom's EMS (TEMSE)

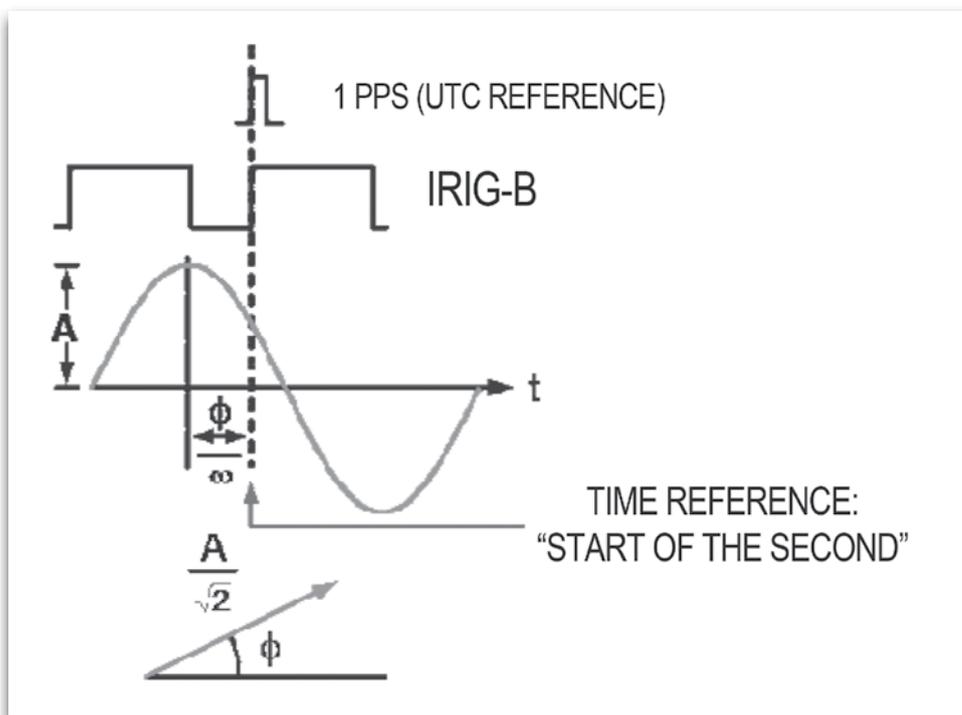


Figure 1: Phase angle measurement using a GPS time reference via the 1 PPS signal [1]

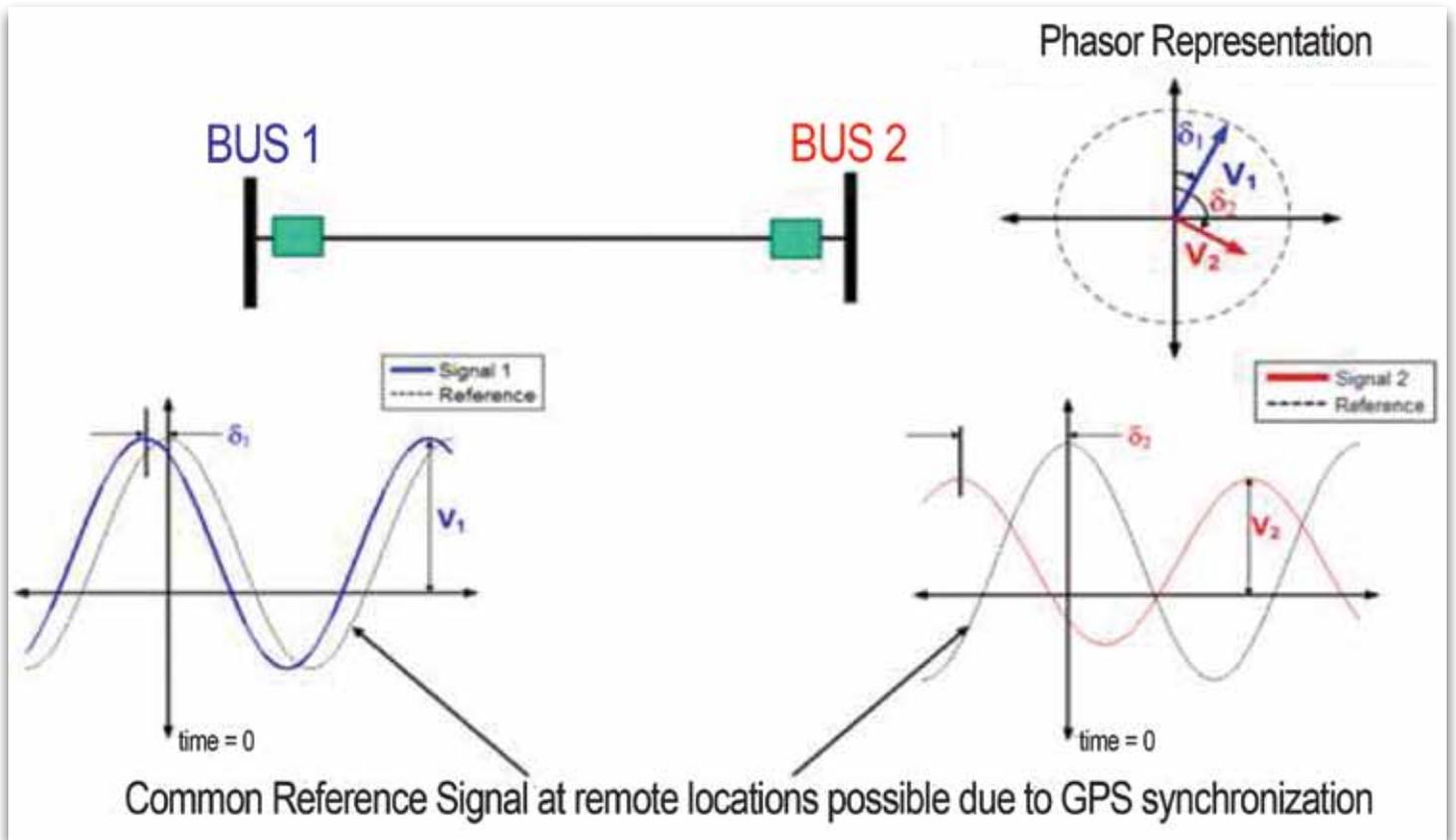


Figure 2: Voltage angle comparison over wide area [2]

and Enterprise Information System (EIS). In addition, client workstations running the PhasorPoint workbench software can interface with the central servers to provide data visualization and analysis tools.

The CPDC and WAMS Data Centre consist of dual redundant mirrored servers, providing a highly available data storage and processing facility.

SUBSTATION ARCHITECTURE

WAMS communications within the substation between the PMUs and the SPDC operates via a dedicated network switch as shown in figure 4 above. The infrastructure supports up-to eight PMUs connected to an SPDC. PMUs and the SPDC are allocated IP addresses and communications between

devices is mediated by the IEEE C37.118 protocol over TCP/IP.

At the substation, SPDCs cache all received IEEE C37.118 stream data. This provides a short term data repository (seven days) that permits data to be retrieved directly from the substation if required

Production Scheme Design

Each production scheme consists of two portions:

1. Common Services items such as the DC Secure Supply (chop over) system, SPDC, GPS, auxiliary relays, global MCBs and the cubicle (panel) itself.
2. PMU Module items including the Alstom Grid MiCOM P847B, PK-2 test blocks, PMU-specific MCBs and a

Voltage Transformer Selection scheme.

Eskom's specification for the WAMS requires up to eight PMUs communicating with the WAMS Control Centre through one sPDC. The design drawings, exploiting the modular concept, incorporate eight PMU modules in three panels as shown in figure 5.

A 48U PMU panel accommodates a maximum of three PMU modules (capacity for 12 sets of currents, and three sets of voltages).

The synchronizing unit Alstom Grid MiCOM P594 has one IRIG-B BNC output and 4 x 1PPS outputs and it is able to synchronize up to 4 PMUs.

The implementation of phasor measurement technology

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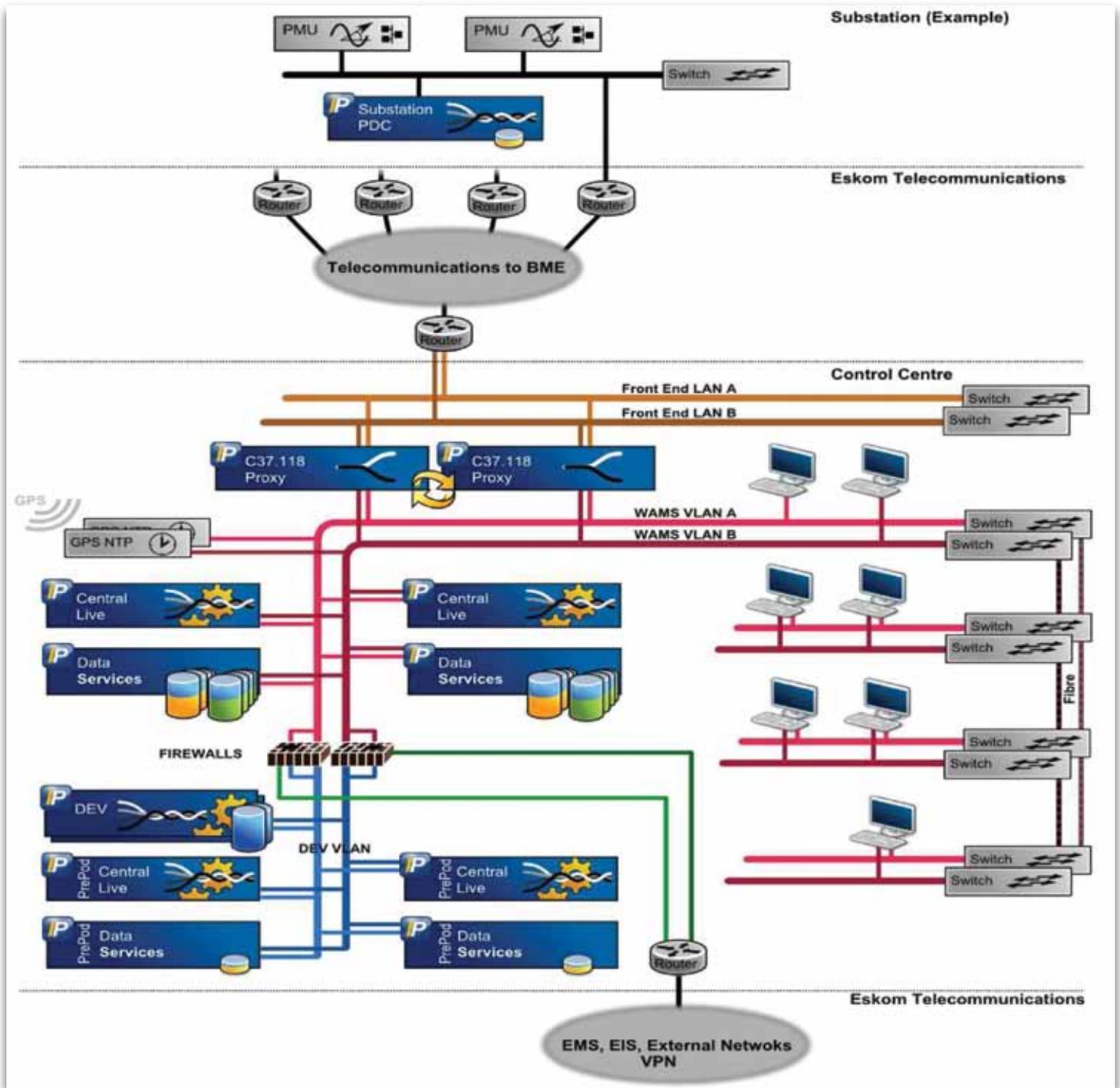


Figure 3: Schematic network diagram illustrating the Control Centre WAMS components and their inter-connection. A single example substation is shown to illustrate wide area connectivity.

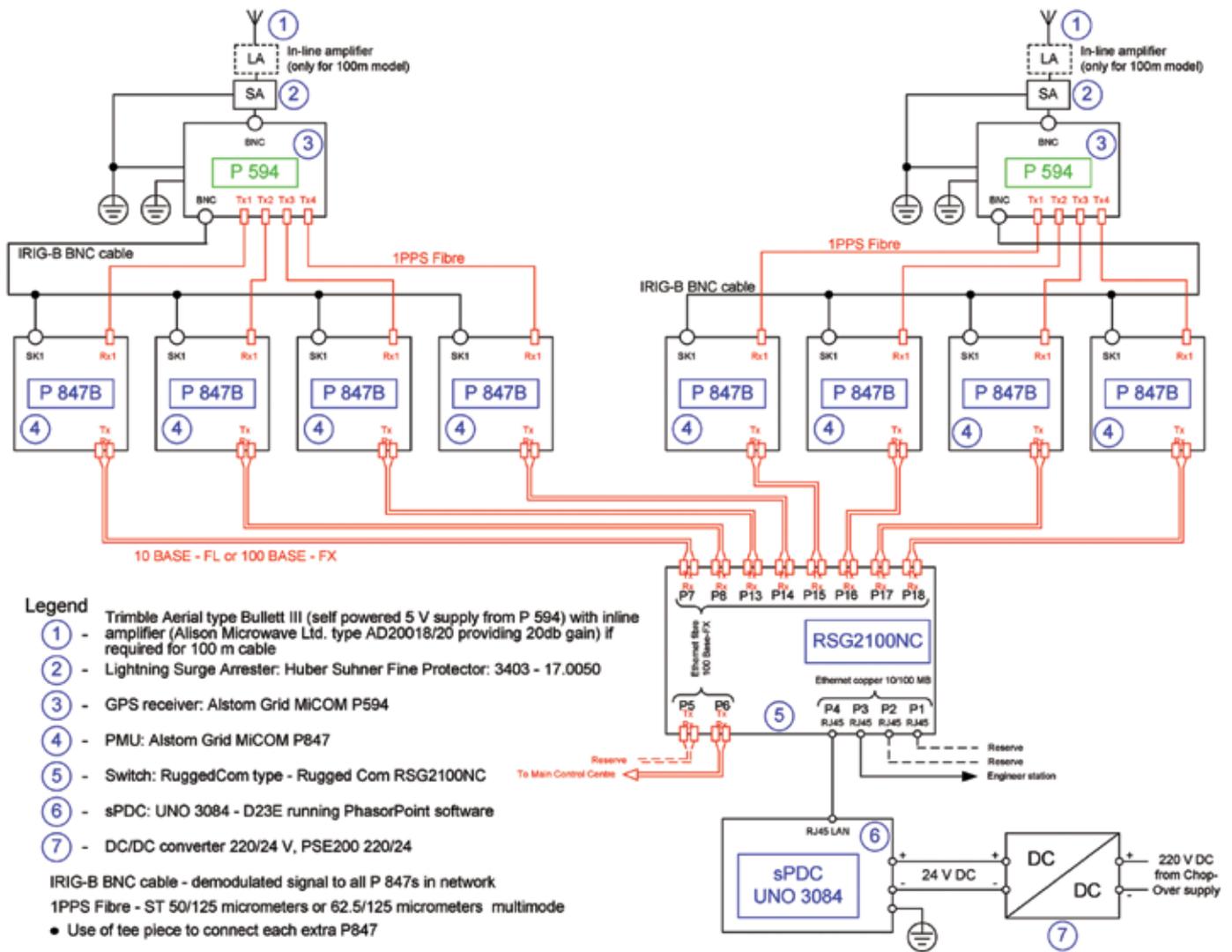


Figure 4 - Substation architecture – Communications

High Availability

A robust, highly available (HA), control centre architecture is provided. The core phasor processing, analysis, visualisation and storage functions are duplicated across two PhasorPoint HA server stacks.

Each stack consists of two servers. In addition, two C37.118 proxy servers ensure a robust duplication of identical IEEE C37.118 streams to each server stack.

The PhasorPoint server stacks operate as a mirrored redundant pair, both processing and analysing the identical IEEE C37.118 data streams provided via the proxy servers.

Each consists of multiple servers operating together in a functionally integrated server stack. The two server stacks are located on different floors of the NCC and operate together to maximise both the integrity and accessibility of the WAMS data collection,

analysis and event notifications. A single PhasorPoint server stack operates as the master server affording workbench and CPDC configuration.

In the event of single server failure, no data is lost as both servers receive and store the stream data. In addition, workbench clients connected to the failed server detect the service interruption and migrate to supply the available server. Once the failed server

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Figure 5: Three panel scheme design incorporating 8 PMUs

is operational, recovery is automatically initiated, synchronising the configuration and restoring missing stream and processed data from the operational server.

The two server stacks continuously monitor each other. If one server stack functionally becomes unavailable, an associated event is created on the pair server.

Interfaces

The PhasorPoint servers provide the following remote service interfaces:

- Access to HMI workbench applications which provide advanced visualisation, analysis and alarming.
- PhasorPoint Structured Query Language (SQL) interface providing SQL access to all phasor and derived data via ODBC or JDBC drivers.

- IEC 60870-5-104 interface permitting transfer of phasor data and alarms to the EMS.
- IEEE C37.118 interface allowing PDC streams to be transmitted to additional destinations.

Historical Phasor Data

Each PhasorPoint server stack maintains two logical data archives.

- The Short Term Rolling Archive holds the data at the native (received) data rate for a fixed short duration. Data is kept in the rolling archive for a user configurable amount of time, set by default to three months, before it is automatically deleted to make way for new data.
- The Long Term Rolling Archive holds the data for a significantly longer duration (duration depends on physical storage space, selected data rate and quantity of high resolution snapshots).

In addition users can copy a time bounded selection (snapshots) of the WAMS data from the Short Term Rolling Archive to the Long Term Archive. This copies all of the WAMS data (including phasor, analogue, and digital IEEE C37.118 data and oscillatory stability analysis data) for the selected time to the Long Term archive. Snapshots can also be generated automatically (“triggered”) upon events.

Development

Independent development servers are also provided which run a single central PDC PhasorPoint service to support simulated data, testing, training and the development of applications which interact with PhasorPoint. The PhasorPoint system on



Figure 6: Picture of PMU Scheme -Prototype

the development server provides the full range of functions (excluding HA related functions) as provided by the primary PhasorPoint service. The development server has no direct access to the highly available IEEE C37.118 streams provided by the C37.118 proxies. However, it is possible for the server to directly and independently connect to remote SPDCs and PMUs, for example, for pre-commissioning testing. In addition, the operational PhasorPoint servers can be configured to provide an IEEE C37.118 PDC output stream retransmitting user-selected live PMU data to the development server. All data received from IEEE C37.118 is available to be sent via PDC output streams.

Security and Network Isolation

Functional isolation of the WAMS network from the EMS, EIS, and external networks is provided using physical firewall devices. In addition, the firewalls mediate VPN access to the WAMS network.

The development environment is also isolated from the control centre WAMS network, utilising a different VLAN and firewall.

Workstations and GPS

Five (5) operator workstations are provided for access to the WAMS visualisation and application features.

Two (2) Meinberg M900 GPS Clocks provide Stratum 1 time sources. In addition, the clocks provide an NTP service for all of the Control Centre servers and workstations and for the remote WAMS SPDCs.

NETWORK INFRASTRUCTURE

A redundant 10-100-1000 baseT standard Ethernet LAN underlies the WAMS networking infrastructure at the NCC for the critical computer equipment. Dual redundant control centre network switch infrastructure is provided for communication robustness.

Each of the servers in the server stacks implementing WAMS functions including the Development (PDS Environment) Servers and the workstations in the NCC Control Room connects to two independent switches. The server stacks in redundant configuration are integrated inside cubicles and are installed on the 1st and 2nd floors of the NCC building. The general network architecture is as described in the Figure 8

BENEFITS OF WAMS

- **Improved State Estimation**

State estimation provides the initial condition for all online applications such as contingency and stability analysis. The high accuracy of PMU data and the measurement of voltage angle difference allow the estimation algorithm to be vastly improved. This will start as a hybrid system with the eventual goal being a linear state estimator which uses non-iterative, algebraic equations to find the system state.

- **Real time monitoring of importance power system metrics**

WAMS is able to calculate and monitor

The implementation of phasor measurement technology

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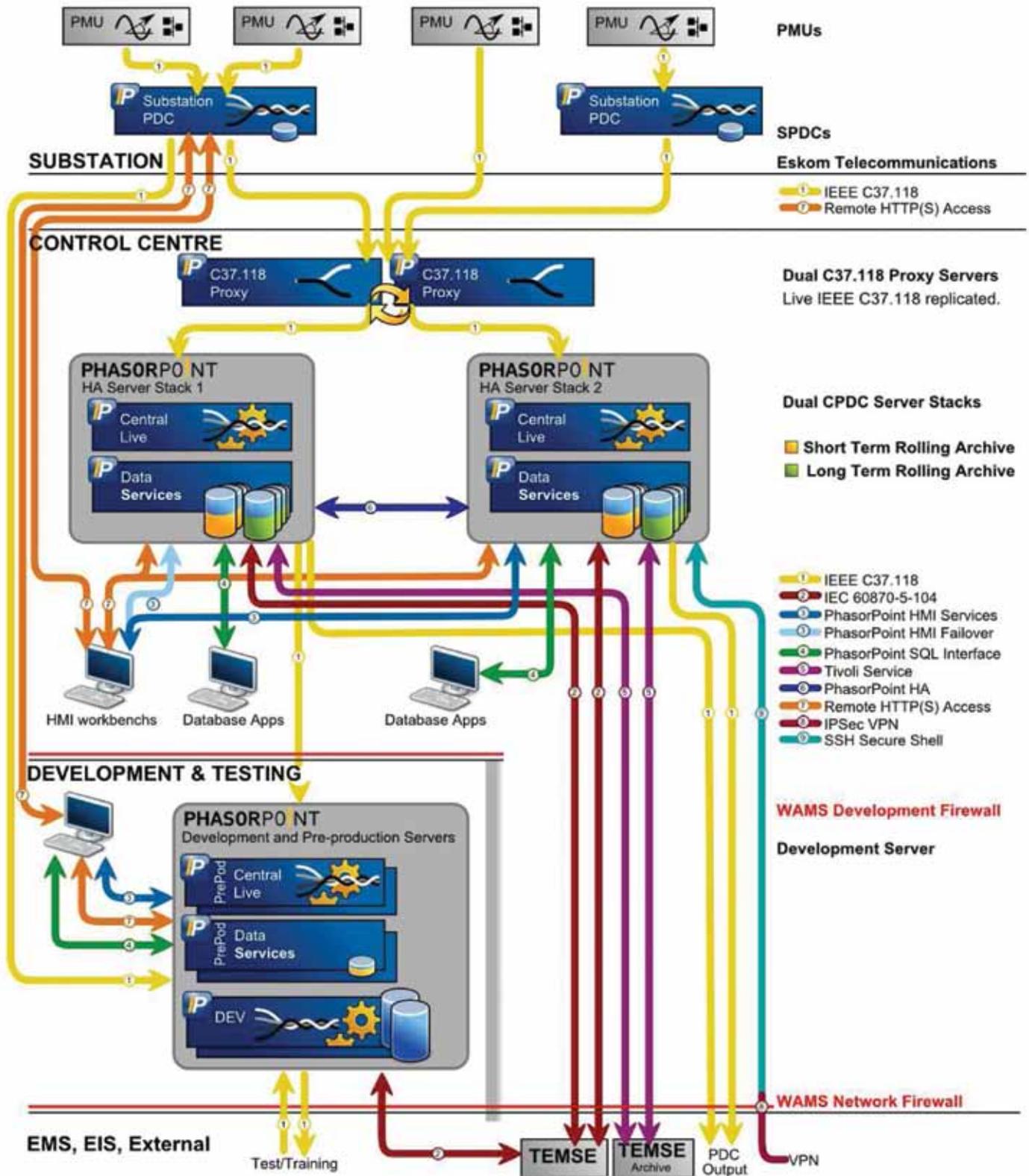


Figure 7: WAMS Schematic illustrating key components and example data flows.

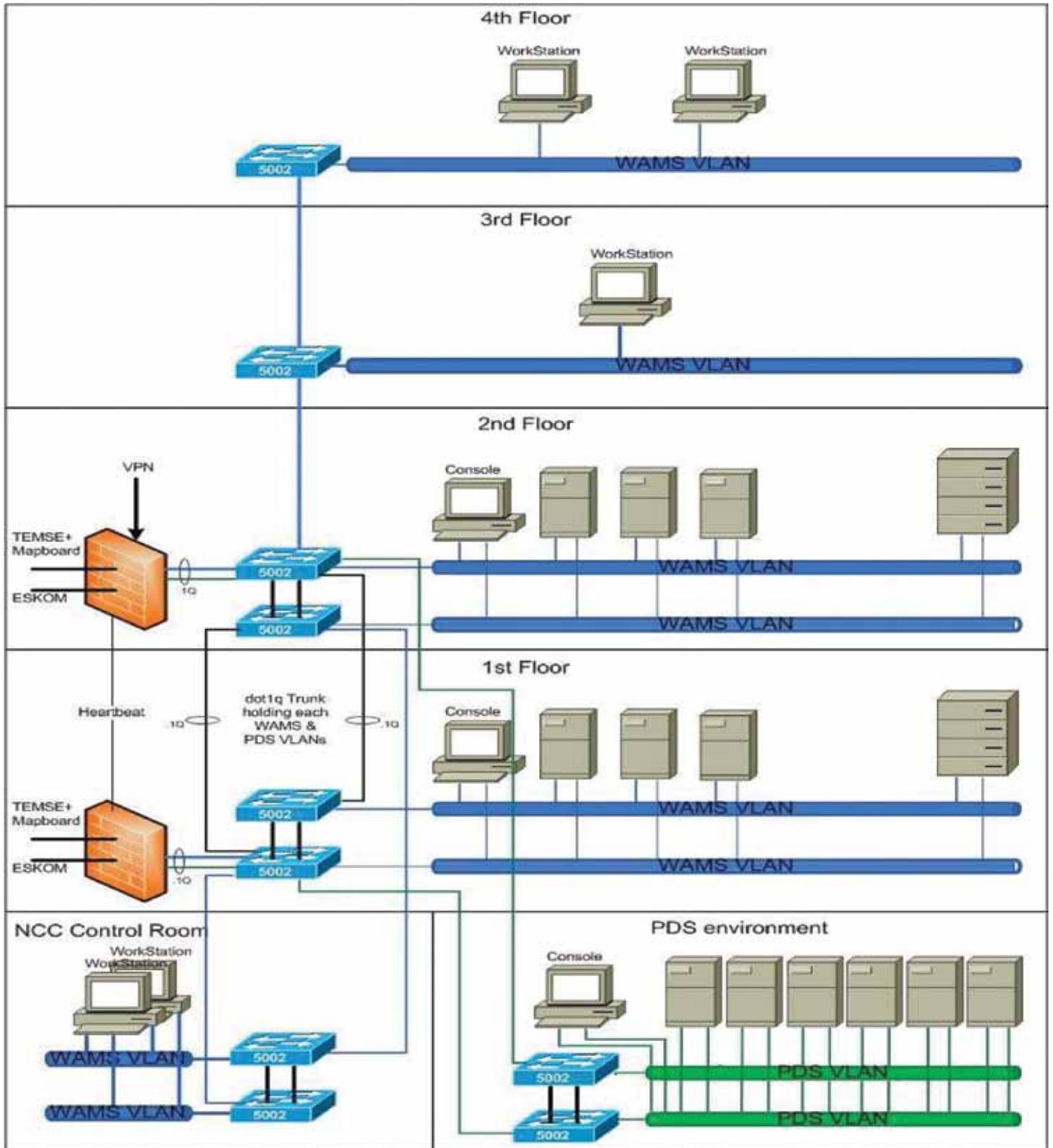


Figure 8: General network architecture

The implementation of phasor measurement technology

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voltage magnitude and phase, real and reactive power and frequency. These are important metrics for understanding the stress in the network over a wide area at any given time. Voltage angle difference between two points in the network shows a multidimensional metric for stress because this angle is dependent on the voltage magnitudes, impedance and power flowing through the corridor. Alarming on all of these metrics allows the controllers to easily diagnose system problems and react accordingly.

- **Real time monitoring of power system oscillations**

All power systems are prone to power oscillations due to the nature of synchronous systems. Whilst these oscillations cannot be eliminated they must be monitored and controlled to ensure that they dissipate quickly (i.e. good damping). WAMS has real time estimation techniques that determine the oscillation mode frequencies, damping, amplitude and phase. When these metrics are shown over a wide area, it is possible to determine how system is oscillating and where the mode originates from.

- **Enhanced post disturbance event analysis**

Current recording systems are prone to missing crucial data: disturbance recorders use high resolution sampling but record for only short durations around fault conditions and SCADA recordings use a very low resolution (less than one sample every four seconds). WAMS provides continuous, time-stamped, high resolution data over a wide area which has proven critical for understanding system events and has aided root-cause analysis during investigations.

- **Validate our system models with real time recordings**

Improves the simulation accuracy of offline studies therefore reducing risk and possibly increasing transfer capability.

- **Improved ability to re-synchronising islanded networks**

Since all PMUs measure frequency these are useful during blackstart or islanded conditions to reconnect portions of the power system. The phase angle and frequency differences between islands can be shown in real time and therefore aid the controllers in moving the system to a state which will reduce the stress across synchronisation points and allow the sync check relays to operate effectively.

- **Monitoring the overall power system stability**

The high resolution data is useful for monitoring stability in the network, i.e. frequency, small-signal, transient and voltage stability.

- **Provide the foundation for developing control staff Situational Awareness through new metrics and displays**

The development environment allows for the facilitation of simulated exercises where large disturbances can be observed and understood so that controllers and staff are better equipped to react to and minimise the effect of catastrophic events.

CHALLENGES

- **Cyber Security**

Traditional Master to Remote communication over serial links which implies a non-routable protocol for

Cyber Security. The allocation of IP addresses to conform to the Eskom IP allocation standard.

- **Outage Constraints**

Delays in the implementation of the PMUs in the field due to the outage constraints.

- **Asset assignment**

This device does not lend itself to any one of the traditional departments, i.e. Protection, Control, or Metering due to its accuracy and application. This causes problems when defining work scopes and allocating resources since no department feels it is directly within its responsibility.

- **Compliance to IEEE C37.118 standard**

The newest revision of the standard was released at the end of 2011. Whilst vendors claimed to be compliant, little proof was available at the time of tender evaluation. Due to the high expectation set by the standard, vendors have largely left the issue of performance to the utilities. This means extensive tests must be done in order to verify and understand device settings and performance.

- **Limited knowledge of the new technology**

Many new technologies are met with reluctance to change, and PMUs are no different. Many training sessions have been initiated in order to share the idea of the new technology and its benefits. In particular, the control shift staff needs to understand how this technology is different to SCADA and how it can be used to their benefit.

FUTURE WAMS SCOPE

- Rolling out this technology to more



substations, more PMUs mean more visualization to support the real time grid operators;

- The ultimate end state is a Linear state estimator which uses only PMU data to provide full observability. For this, 33 % of the transmission network will require PMUs. Future WAMS scope to increase coverage of critical nodes in the network to install a total of 52 substations;
- More Advanced situational awareness/stability monitoring applications;
- Add new EMS applications to fully exploit PMU data;
- Integrate the PMU functionality with the protection relay;
- Synchrophasors and IEC 61850;
- Grid Protection: develop protective control schemes that dynamically adapt to current power system conditions, to preserve the integrity of the power system grid as an entity.

The implementation and acquisition of phasor measurements data is predicated on the following requirements as per Table 1 over the short, medium and long term.

CONCLUSION

After successful completion of a number of research projects, Eskom realised the benefits of Phasor Measurement Technology and is currently in the process of installing 59 PMUs in 15 Transmission substations as part of Phase 1 of the WAMS project. PMU technology is not a replacement to the traditional SCADA system but complements it.

The phasor measurements data with its advanced visualisation features and early detection of abnormal events, will be used to enhance the control staff decision making allowing the staff to move from a purely

Short Term 1-3 years	Medium Term 3-5 years	Long Term > 5 years
Situational Awareness – Advanced Visualization Tools	Advanced Situational Awareness Applications	State Measurement (Linear)
Post Mortem Analysis	Model Benchmarking; Parameter Estimation (Dynamic)	Real-Time Control
State Estimation (Improve)	State Estimation (hybrid system)	Adaptive Protection
Model Benchmarking; Parameter Estimation (Steady state/Dynamic)	Advanced Stability monitoring applications	WA Stabilization (WA-PSS)
Power System Restoration		Planned Power-System Separation – Special Protection Systems
Voltage Stability Monitoring		
Small Signal Stability monitoring applications		

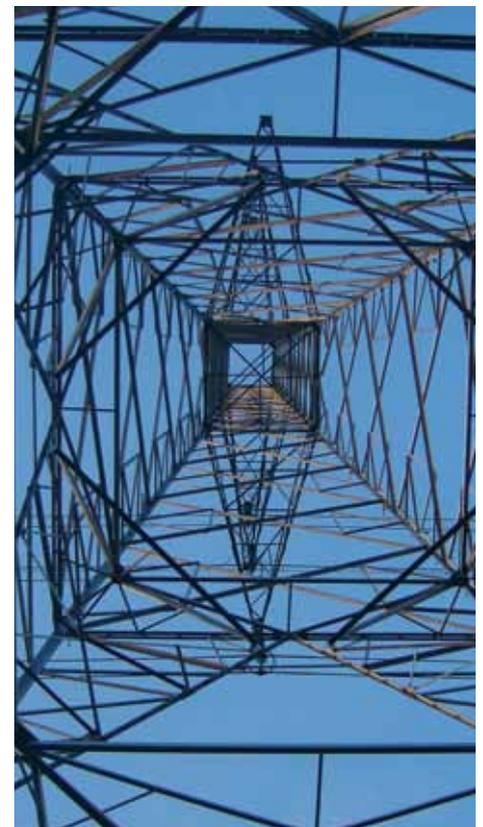
Table 1: Eskom short, medium, long term requirements

reactive response mode to a predictive and proactive process. The WAMS applications provide powerful tools to improve power system security and ensure we march towards a smarter grid. **wn**

[6] Eskom WAMS Substation Detailed Design (ALSTOM GRID Inc. & Psymetrix Limited)

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Using wind power effectively – without towers and large structures

Changes in energy policy pose special challenges on technology. However, while increasingly effective, recyclable products are demanded on the consumption side, wind turbines are moving in the opposite direction: the designs are becoming larger, heavier and more complex.



BY | ANDREAS ZEIFF | CHEM. ENG.
DIETRICH HOMBURG | ENG. GRADUATE (FH)

MICRODRIVES AID IN THE CONTROL OF "ENERGY KITES"

Efficiency is equal to effort divided by benefit, or, in this case, the ratio of the energy and raw materials used in the construction to the output achieved over the operating life. A large amount of steel, GRP or foundation concrete are counterproductive here. A new approach, which harvests wind power through the use of comparatively small turbines by means of steerable kites, is setting new standards. Microdrives support the fully automatic control of the kite.

Today, ecologically generated power is a sought-after source of energy. How is "ecological" defined? Does it refer only to the generation of power, or does the manufacture of the turbine flow into the calculation? Cement and steel plants are front and foremost when it comes to industrial energy consumption. Large foundations and giant steel towers have an ecological cost even before the first kWh flows. The EnerKite company is therefore taking a new approach: instead of the dinosaurs of wind technology, it is using slim solutions that concentrate on the key components needed to utilise wind power.

A steerable kite transfers the energy of the wind to a generator via a rope. A fully automatic control holds the functional component, i.e. the kite, at high altitude in the best wind window. This ensures high efficiency. To be able to respond quickly to wind gusts, drives from FAULHABER aid in controlling the kite.

A steerable kite transfers the energy of the wind to a generator via a rope. A fully automatic control holds the functional component, i.e. the kite, at high altitude in the best wind window. This ensures high efficiency. To be able to respond quickly to wind gusts, drives from FAULHABER aid in controlling the kite.

NEW PHILOSOPHY FOR NEW TECHNOLOGY

To achieve change in energy policy, innovative technology for power generation is needed. Unfortunately, many alternative concepts are based on inventions that are more reminiscent of the steam engine era than of modern solutions. Without a doubt, this technology also works. However, like the steam locomotive, which is much more resource intensive than modern three-phase locomotives with respect to construction and operation, it rather contradicts an ecological approach.

A great amount of material is needed to construct windmills, since the rotor and the heavy generator act on the tower with bending moments and with enormous static loads.

Overload events complicate the dilemma: a tower cannot be simply retracted in the event of a hurricane. To safely dissipate the forces, massive concrete or pile foundations, which are a major cost factor and require a large amount of energy, are therefore needed (figure 1). With respect to size and expense, the subterranean structures look more like the 2 m thick steel domes of nuclear reactors than ecological structures. Off the coast, the manufacture of the foundations is particularly complex and expensive, and dismantling after use is rather doubtful.

While the kites likewise operate according to an ancient principle for utilizing the wind, the technology is refined through the use of modern material and control technology. In

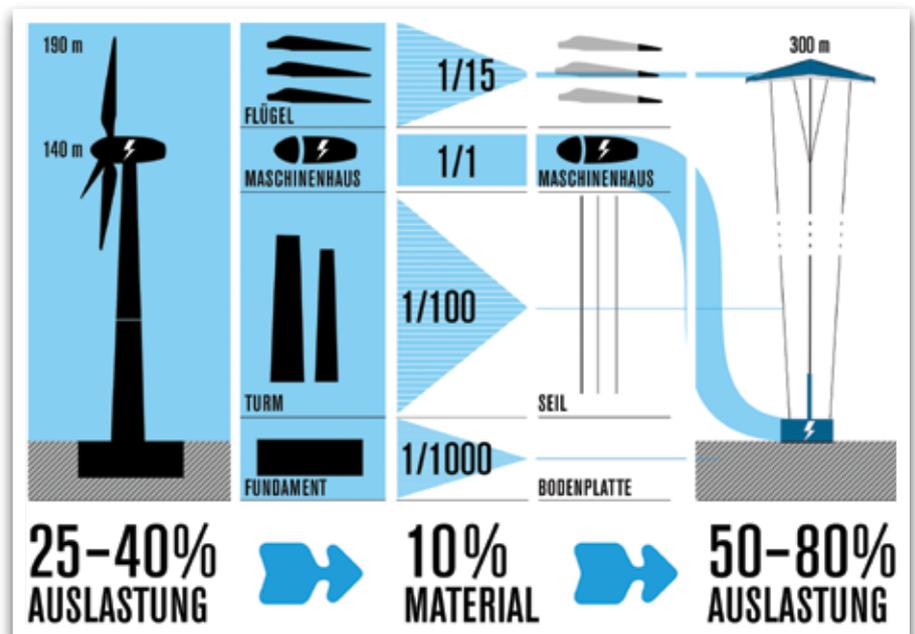


Figure 1: The kite generator operates with a 50% smaller CO₂ footprint and twice the energy output of 140 m windmills

Using wind power effectively

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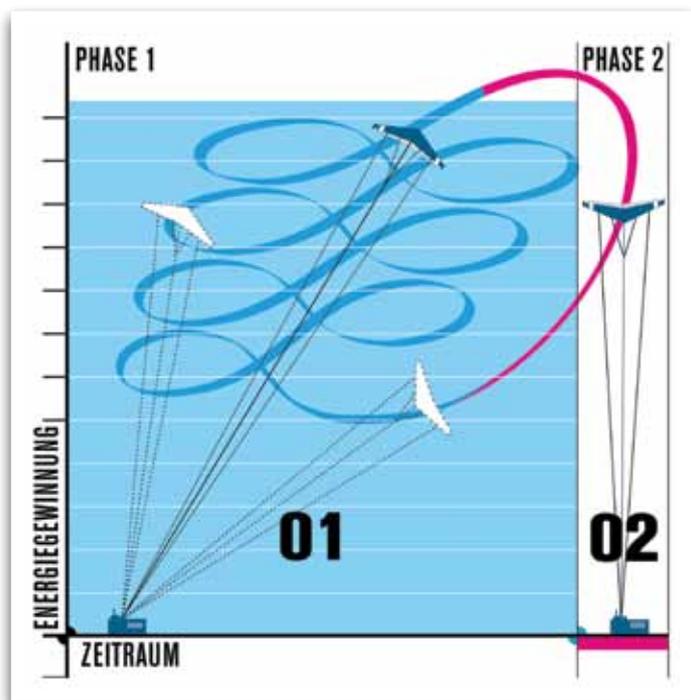


Figure 2: Diagram of the flight concept: flying in a figure 8 pattern, the kite rises and produces power, then quickly descends before rising again.

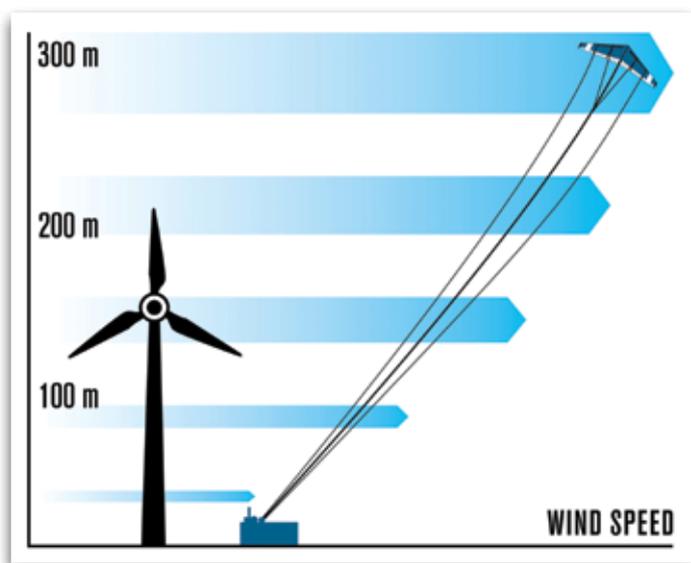


Figure 3: The altitude advantage: at altitudes above 100 m, the wind blows more frequently, power output increases

order to produce power, a generator is needed in which a magnetic field rotates in a coil. Conventionally, the rotational movement is transferred via heavy, rigid rods and shafts. The developers from Berlin instead use lightweight, high-performance ropes made of heavy-duty fibers for power transmission. Peter Kövesdi, design engineer and specialist for wind systems at EnerKite, offers a visual comparison: “Just like you can use thin spokes placed under tension to make a wheel that uses much less material than one which is solid, ropes can be used to transfer large forces with very little material.”

FOCUS ON EFFICIENCY

With the EnerKite, a flexible kite – a so-called parafoil – is brought to a height of approximately 150 m. There, unlike on the ground, the wind blows constantly, largely free of turbulence and at higher speed. One load rope and two control ropes transfer the pulling force of the kite to three generator drums.

The kite is then “pulled” by the wind automatically from 100 m to 300 m, thereby generating the effective power. Once it has reached the maximum altitude, the kite is controlled in such a way so as to turn it out of the wind and the ropes are quickly drawn in. Very little energy is necessary for this purpose. Afterwards, the kite begins to climb, thereby generating power again (figure 2).

Peter Kövesdi compares the good aerodynamic properties of the kite to the “down-to-earth” solutions as follows: “The advantage of the kite over windmills is the better utilization of the wind, as there is no turbulence caused by upwind rotor blades or by the tower. The kite is also always at an altitude in excess of 100 m (figure 3) and not, like the rotors, intermittently closer to the ground and intermittently higher than the tower (figure 4). Thus, the technology can be designed for more uniform loading; in the event of a storm, the kite can be drawn in. This, too, reduces construction costs.

The slow movement of the rope while the kite is close to the ground prevents collisions with birds, and the soft parafoil eliminates the risk of falling ice, as ice accumulations quickly flake off.” (figure 5).

At sea, simple anchor buoys suffice for securing the generator pontoon; on land the turbine can be both stationary as well as mobile. Large access aisles for giant rotor blades and tower elements are not necessary. A kite can simply be rolled up like a tent; the same applies for the ropes.



EXACT CONTROL IN THE WIND

In addition to the towing rope, two so-called steering ropes are attached to the kite. In the lingo of kite experts, the EnerKite is a three-liner. The fully automatic control was one of the main problems in making the new technology suitable for practical use. The experts now have a handle on the programming. The best control is only as good as the executing actuator permits. Here, the miniature drives from the town of Schönaich come into play. Ropes can only be precisely wound on rope drums while under tension. The wind is a very “dynamic system” with short-term fluctuations. So-called negative gusts can allow the control rope to sag at short notice. This is not a problem for the flight characteristics, but a “no go” for the rope drums. The developers therefore placed a rope tensioner in front of the winding drum that always ensures a defined rope tension at the drum.

At winding speeds of 20 to 30 m/s and a pressure roll with diameter of approx. 30 mm, the rope tension motor needs to operate at high speeds that can exceed 10,000 rpm and must be able to very dynamically respond to demands for changes in speed. Here, an electronically commutated standard motor with an output power of approximately 200 W was able to deliver the required performance (figure 6). The motor is connected to a 32 mm diameter, very robust Planetary Gearhead with all-metal construction. The high required torque for the pressure is thereby ensured.

A Motion Controller optimally matched to the motors relieves the EnerKite control of motor management and allows the dynamics of the microdrives to be used optimally.

With this application, the motto is “small but efficient”, as the microdrives perform a substantial part of the work in controlling the new wind power generator. They ensure that the kite can quickly respond to changes in the wind and that the new material-saving system safely functions in practical operation. In this case as well, drives right off of the shelf could be used to reliably implement the developers’ specifications. In difficult situations, simple, small changes to components often facilitate optimum operation.

The use of microdrives is limited more by imagination than by technology. The application described here illustrates that even unusual ideas can be practically implemented. **wn**



Figure 4: Size comparison: the kite flies considerably higher than the blades of the windmills and is thereby able to use the higher wind speed present there



Figure 5: Bird's eye view: the view from above captured by a camera mounted on the kite



Figure 6: A microdrive motor is the key for the efficient control of the kite and, thus, the generation of power



It's no secret that there is a significant skills shortage within South Africa's engineering sector and, according to Arcelor Mittal, only 30,000 engineering professionals are currently registered with the Engineering Council of South Africa, which means that there are fewer than 500 engineers per million people.

When learners complete their studies, they are faced with a serious disconnect between the information and skills that they have acquired, and those which are required by the workplace. There is not enough support from within the industry to help students to obtain practical experience. A high student-to-teacher ratio within our universities is also a contributing factor because students are not getting enough one-on-one time with lecturers.

A recent report by the UK Royal Academy of Engineering focused on the engineering capacity requirements in sub-Saharan

Africa. This report found that after graduation, engineering students struggle to gain the necessary experience, because further training is only able to take place on-the-job. According to Vaughan Rimbault, CEO of the South African Institution of Mechanical Engineering, there is a great need for more educational opportunities to be made available to aspiring engineers.

Up until now, the major upsurge in e-learning has taken place mainly in the corporate sector, but South Africa is pooling its resources in order to shift the focus over to primary, secondary and tertiary education. Many universities in

Africa who don't offer e-learning as an alternative learning solution, are in the process of incorporating it into their courseware.

E-learning is able to assist engineering students at any level of study, with simple and cost-effective courseware, which is also easily updateable. The key to having this information digested and effectively understood, is to present it visually, through digital learning. Visual content is the primary source of information retention, and courses can even be created using different spoken languages and dialects. Modules can focus primarily on the safe

Bridging the Engineering Skills Gap through E-Learning

BY | KIRSTY CHADWICK | FOUNDER | THE TRAINING ROOM ONLINE

usage and maintenance of heavy duty equipment used in hazardous conditions. These modules are able to show the user what parts of the machine to check on a daily basis, as well as examples of parts that are in good working order. Also to compare parts that are in poor working order, and need to be repaired or replaced. The controls on the dashboard of the machines can be simulated, and example videos can be shown in order to convey what each control or button does, and how the gauges react under different circumstances.

Skills development via simulation is able to take place in a risk-free environment, where students can learn by trial and error, without the fear of causing insurmountable damage to the machinery and/or to themselves. These simulations are not intended to replace training on the actual machinery - they simply serve as a means of shortening the training time and optimising operational efficiency. Simulation has the ability to expose learners to situations which are rarely encountered, thereby preparing them in advance for unforeseen circumstances.

Another aspect of e-learning which can be of great benefit to engineering students is gamification, which is the process of using game thinking and game dynamics in order to engage audiences and solve problems. Gamification creates a learning experience

which focuses on slightly different learning outcomes, like the application of knowledge, decision making and critical thinking, rather than the acquisition and reproduction of knowledge. Gamification allows learners to have fun while attaining information, and encourages them to share that information with their peers. By offering rewards and recognition for retention of information, learners are likely to be more motivated to succeed.

In 2011, Siemens launched an online game called Plantville, which simulates the experience of being a plant manager. The game is played by thousands of employees and engineering recruits on a daily basis and the objective is to maintain operation of the plant through improving processes, productivity and various other objectives. Through this initiative, gamers are measured on various Key Performance Indicators, while becoming more familiar with the general operation of a plant and applying products and solutions from Siemens.

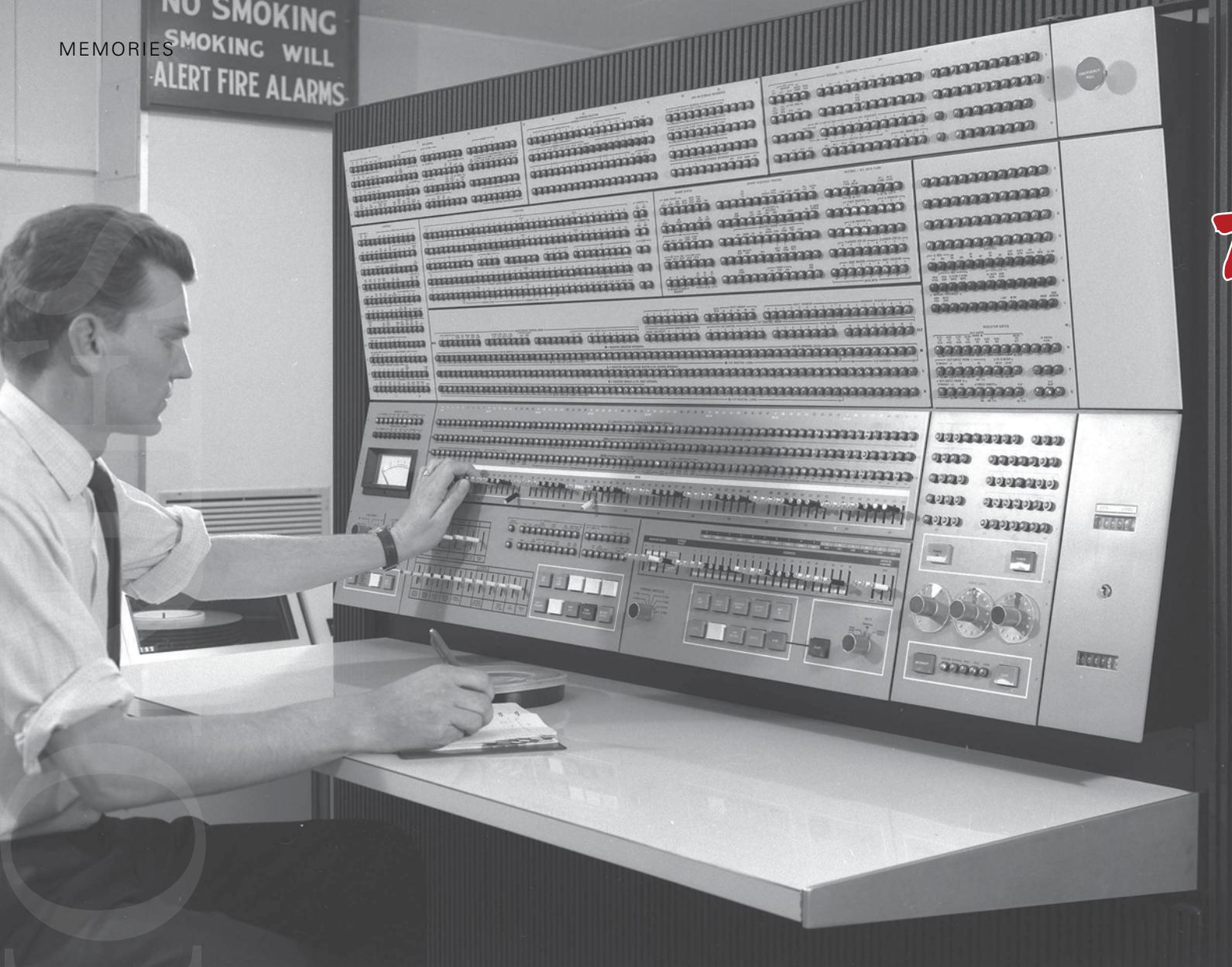
This initiative is just one example of how gamification, through e-learning, can benefit the engineering industry. Gamification enables learning at a faster pace in a forgiving environment, which allows risk-free mistakes. Even if you're not a gamer, you are likely to be intrigued by the tasks that are presented through

a gamified training course, and this will encourage you to continue exploring.

When we think of learning, we think of a vast array of information that needs to be cemented into our memories, and the difficulties that we are likely to encounter in the process of doing so. E-learning strives to use different learning methods in order to keep the content engaging, and to make it something that the learner will be drawn to, rather than something that they dread. With the help of talented creatives, such as instructional designers, editors, graphic designers, content developers and animators, learning material that is effective, interactive and memorable can be created.

E-learning has the ability to deliver a consistent message which can easily be updated as needed. The learner is able to work at his or her own pace and higher retention levels are attained through visual entertainment. With the right approach and a solid support structure, training within the engineering industry can be consistent and highly effective for everyone.

Training and developing people is about putting the right tools in the right hands and utilising available technology is the key to offering an education to millions of people in Africa that will give them the opportunity to live a better life. **wn**

NO SMOKING
SMOKING WILL
ALERT FIRE ALARMS

Reminiscence from the past -Information Technology

50 years ago in 1967 – well almost 50 years – I was in my final year of Engineering at Wits. We were offered a supplementary course in computer programming – this included both B.A.S.I.C. (Beginner's All-purpose Symbolic Instruction Code) as well as FORTRAN. These computer languages were very new and with a few others such as COBOL were the next step up from machine language.

BY | MIKE CARY | PR ENG | SAIEE PAST PRESIDENT

As an Eskom Bursar, I served my Pupilage at Eskom Test at Simmerpan working for the renowned Pat Candy, and thereafter I joined the newly formed Electrical Research Department as the first employee of that Department reporting to the late Peter Randall, a past President of the SAIEE, who also “persuaded” me to become a member of SAIEE in 1970.

In my new position as a research engineer, my programming “knowledge” became invaluable. The process in those days, however, was a lot different from what it is today.

I made use of mainly FORTRAN – a scientific language. One would have to compile a programme by writing on a special blocked sheet, line by line, and numbering each line.

The numbers had to be in ascending order and not duplicated. One normally commenced by using multiples of ten so that additional lines could be added later if required.

Once you were satisfied that your compilation was as correct as you could ascertain, you would proceed to the punch room situated on the second floor of Eskom House in Braamfontein (the then headquarters of Eskom). The punch room was about 20 metres by 15 metres big. All the walls had fairly wide shelves on which the punching machines were placed. Even chairs were provided!!! You would then punch a card for each line in your compiled programme. These cards were approximately 150 mm x 75mm in size, and the thickness would have been that of a business card. You would then proceed to the window where you would hand in your punched cards to the

operators taking care not to drop them (the pile could become quite unwieldy), lest you disturbed that very critical order. The computer was a “very powerful” Control Data unit with magnetic tapes that carried its entire memory. I never did find out its operating specifications but would imagine that the measurements were in kilos rather than gigas.

The operators would then run your programme, together with numerous other programmes which had been handed in at the window, overnight. You would then go to the window the next morning to receive your report, and the results of your labours. Invariably, you would receive one or more error messages: “Error in line 190”. You would then correct the error by re-punching the card relating to the line with the error, and re-submitting the programme at the black hole called the window.

Then the following morning, if you were lucky, you would receive the results and report you expected.

This whole process would take up to 72 hours (if a week-end did not intervene). Today it could take up to 5 minutes using a lap-top or iPad.

Computer technology developed at pace, and the Disk Operating System (DOS) was introduced. One then could write B.A.S.I.C. programmes, using DOS commands such as “Open File”, “Save File etc – a leap forward from those punched cards. However, the hardware had not developed at that stage, and one had to work with random access memories of 256 kBytes (RAM), and use floppy disks of 512 kBytes capacity. It forced you to make sure that every command that you used was relevant to your programme. I have a suspicion that today, there are

many chunks of programming that are not required and only take up memory. The writers of these programmes rely on the fact that the hardware is becoming quicker and has ever increasing capacity.

The limitations of the hardware in those days were dramatically illustrated when I compiled a programme to design and cost-optimize distribution transformers. The optimizing process was achieved by nesting a series of commands, increasing the value of a parameter by small increments specifying viable start and end values. This way a whole matrix of combinations can be calculated (in 7 or more dimensions) and a design with an optimized cost can be chosen for industrialization. I started running this programme during the day, and when 5 o'clock came, it was still running.

I decided to let it run during the night, and to my surprise it was still busy in the morning. I calculated that it would have taken about a year to finish – because of the capability of the then hardware. I eventually achieved a result by changing start and end values, as well as increasing the size of the increments.

The next “big” advancement was Lotus 123, which also ran on DOS. This was my introduction to spread sheets – no doubt it was at least the inspiration for Windows Excel.

This was followed by the introduction of “icons” which when clicked upon activated a short cut to a programme, document, picture etc.

The touch screen followed, and now voice activated commands are in use.

What's next - a computer that can read your mind? **wn**

June

COMPILED BY | JANE BUISSON-STREET
SMSAIEE | PMIITPSA

June is the month with the longest daylight hours of the year in the Northern Hemisphere and the shortest daylight hours of the year in the Southern Hemisphere.



as brothers Joseph-Michel and Jacques-Etienne Montgolfier slowly rose 2000m into the air, for 10 minutes, in a “hot air” balloon. The balloon was made of linen and paper, and was “powered” by an ingenious method whereby heat from a fire on the ground warmed the inside the balloon.

(yup, it is the delivery of mail by rocket or missile; which never “took off” due to the cost of the schemes and numerous failures...).

6 June

1984 Tetris, one of the best-selling computer games of all time, was released.



1 June

1880 The world’s first “public” telephone was tried out in New Haven, Connecticut, USA. It was in the Connecticut Telephone Company Office in the Yale Street Bank. People wishing to use the telephone had to pay a toll to an attendant.

2 June

1966 America’s Surveyor landed on the moon’s Oceanus Procellarum.

3 June

1946 The world’s first bikini went on show in Paris.

4 June

1937 The first supermarket trolley was used in a supermarket in Oklahoma, USA.

5 June

1937 In Annonay, France, astonished local government officials watched



7 June

1975 The inaugural Cricket World Cup began in England.

8 June

1959 The USS Barbero and United States Postal Service attempted the delivery of mail via Missile Mail

9 June

1924 George Mallory, the British climber who wanted to be the first to climb Everest just “because it’s there”, and his partner, Andrew “Sandy” Irvine disappeared about 305m from the summit. Mallory’s ultimate fate was unknown for 75 years, until his body was discovered on 1 May 1999 by an expedition that had set out to search for the climbers’ remains.

10 June

1965 A de Havilland jet aeroplane belonging to British European Airways made the first landing by automatic control.



17 June

1823 Charles Macintosh, Glasgow, Scotland patented a waterproof material.

18 June

1942 South Africa's 23rd President, Thabo Mvuyelwa Mbeki, was born in Mbewuleni, a tiny village in Idutywa in Transkei.



19 June

1910 The first Father's Day was celebrated in Spokane, Washington.

20 June

1990 Nelson Mandela receives a ticker tape welcome in New York.

21 June

2004 SpaceShipOne becomes the first privately funded spaceplane to achieve spaceflight.

22 June

1907 The London Underground's Charing Cross, Euston and Hampstead Railway opened.

23 June

1868 American Christopher Latham Sholes received a patent for an invention he called the "Type-Writer." His QWERTY system is still in use today.

24 June

1995 During the Rugby World Cup final South Africa defeated New Zealand. Nelson Mandela presented Francois Pienaar with the Webb-Ellis trophy.

25 June

1991 Martina Navratilova wins record 100th singles match at Wimbledon.

26 June

1977 Elvis Presley sings in Indianapolis, the last performance of his career.

27 June

1954 1st atomic power station opens at Obninsk, near Moscow, Russia.

28 June

1924 Test cricket umpire debut for Frank Chester, vs. South Africa at Lord's, England.



29 June

2008 Thomas Beatie, the world's first pregnant man, gives birth to a daughter.

30 June

1905 Albert Einstein publishes the article on the "Electrodynamics of Moving Bodies", in which he introduces special relativity. **Wn**

11 June

1935 Inventor Edwin Armstrong gave the first public demonstration of FM broadcasting in the United States at Alpine, New Jersey.

12 June

2009 All television broadcasts in the United States switched from analogue NTSC to digital ATSC transmission.

13 June

1956 Britain gave up its claims to the Suez Canal and ends 72 years of British occupation of Egypt.

14 June

1789 An American, Rev Elijah Craig, produced whiskey, an alcoholic drink distilled from maize. It was named Bourbon because Rev Craig lived in Bourbon County, Kentucky.

15 June

1667 The first fully documented human blood transfusion was administered by Dr Jean-Baptiste Denys. He transfused about twelve ounces of sheep blood into a 15-year old boy. The boy survived the transfusion.

16 June

1911 IBM was founded as the Computing-Tabulating-Recording Company in Endicott, New York.



In Defense of Eskom and Public Utilities

A RESPONSE TO PAUL VAN NIEKERK

We are all entitled to our opinions. However, when we publish in the official mouthpiece of the South African Institute of Electrical Engineers we have a responsibility to present a reasoned opinion based on research and tangible data.

BY | ANDREW RUSSELL | B.SC. ENG (ELEC) (WITS) | LL.B. (WITS) | LL.M. (GEORGETOWN, USA) | MSAIEE

PAUL VAN NIEKERK'S opinion piece (the "*Opinion*", *wattnow* April 2014) advancing the case for the denationalization and unbundling of Eskom makes a number of assertions that require a greater degree of scrutiny than that presented in his article.

In summary, the piece states what South Africa has known all along: the country needs "*affordable electricity prices and a reliable consistent supply*" and that "*the free market will dictate the price of energy and it will balance out by means of supply and demand in the same way as any other commodity*".

It then makes somewhat of a leap of faith to the conclusion that the indisputable way to achieve this is through the denationalization and unbundling of Eskom and the introduction of a "*free market*" for electricity (although precisely what is meant by this and what form it should take is not fully analysed).

As the *Opinion* notes, this proposition is nothing new at all. Liberalisation of public utilities has been attempted in the U.S., Europe, Australia and parts of Latin America.

Surprisingly, the *Opinion* makes no reference to this experience and lessons learned in substantiating its central thesis.

The aim of this response is threefold. First, I interrogate a number of assumptions about liberalisation that the *Opinion* seems to hold out as proven fact. Second, I present research that indicates that electricity is not the same as "any other commodity". Third, I assert that we, the leaders that steer the electrical industry, have an essential duty to consider both sides of the denationalisation debate, in fairness and with thorough research, and to continue to express informed opinions in the critical spirit that has come to

be expected of a long-standing and influential society steeped in academic tradition.

MYTH NUMBER ONE:

Liberalisation of Eskom will bring affordable electricity prices

Attempts in Australia and the U.S. in fact provide examples that illustrate a trend of dramatic increases and volatility in the price of electricity following liberalisation. In the 1990s, parts of Australia (Victoria and South Australia) privatized the national electric grid. Motivated by the desire to cut state spending and following relentless lobbying by corporate-funded think tanks and the IMF/World Bank, Australia opened its state owned electricity firms to private corporations' purchase at bargain prices.

Communities strongly opposed privatisation in most states, but, with "intense pressure" and financial



incentives from the Commonwealth government, South Australia agreed to restructure its electricity industry and partake in the National Electricity Market (NEM)¹.

Three notable effects to the price of electricity resulted from the “free market”.

First, prices of electricity fluctuated excessively, causing a chaotic market of unpredictability.

Second, electricity did not become more affordable, and costs rose instead. Research indicates that immediately after liberalisation, prices to consumers increased while distribution companies creamed off exorbitant profits in the range of 30% - 40%, much higher than profits earned by other listed companies in Australia.

And third, price manipulation emerged as a perverse outcome, through both physical tactics (such as the withholding of generator capacity to limit supply and drive up prices) and economic tactics (such as bidding large blocks of capacity at inflated prices so as to distort the entire market)².

In a matter of 10 years from restructuring, residential rates in South Australia had increased by 40% and households were paying more for electricity than anywhere else in Australia. Similar accounts have been documented in Texas where consumers have consistently paid 8.5% above the national average for privatised electricity supply³ and California where suppliers increased year on year profit by 700% in some cases⁴.

In the UK it was expected that generators would engage in price wars that would benefit consumers. Instead the generation industry consolidated amongst a handful of large, powerful companies that became big and complex enough in corporate structure to avoid meaningful competition.

To assert that denationalization and unbundling of the central backbone of electricity supply will provide South Africans with more affordable electricity is a bold statement; one which is not in any way guaranteed and certainly not vindicated by existing evidence and experience. A far greater degree of scrutiny is necessary before I am convinced.

MYTH NUMBER TWO:

Liberalisation of Eskom will increase investment and reliability.

The debate on the liberalisation of the electricity markets tends to refer to investment in power generation primarily.

The *Opinion* asserts that the introduction of markets will spur much-needed investment in the generation assets that Eskom has been unable to develop. Here again, there is evidence to suggest otherwise. In Australia and California, the establishment of energy markets not only failed to spur investment in generation assets, it retarded the expansion of generation. The experience from those markets show that energy markets provide very limited incentive for private companies to invest in new capacity for two reasons.

First, undersupply keeps market prices and profits high. Second, spending money on standby generation assets (necessary to ensure system reliability) erodes generator profit. Generator profit is inversely proportional to the levels of reserve plant and there is no obvious incentive in the free market system for reliability⁵.

In Defense of Eskom and Public Utilities

continues from page 57



What the *Opinion* fails to address - and of great significance to electricity supply - is investment in transmission lines.

Experience from across most states in the U.S. thus far indicates that the “free market” structure has been unable to spur adequate investment in transmission lines because the margins are not attractive enough for private investors⁶.

These assets are key as they provide the route to market for generators and it is now well documented that lack of investment in transmission assets greatly hinders competition in electricity markets. It may well be that the nature of electricity itself (being consumed the instant it is generated, the high degree of interconnectedness of the system and the fact that large supplies of electricity cannot be stored) makes the electricity supply industry a “special case”, distinguishable from any other commodity, that cannot be accommodated within our current understanding of market structures.

MYTH NUMBER THREE

Liberalisation will increase accountability
A much-cited reason for Eskom’s under performance is a lack of accountability.

The assertion then that Eskom must be denationalised and unbundled in order to facilitate accountability does not necessarily follow. The question that should be asked is “*accountability to whom?*” Private companies are ultimately accountable to their shareholders. Shareholders ruthlessly demand a return on investment, not a reliable and affordable electricity supply for the benefit of consumers. We, as a nation, face a very real risk of losing control of our state-owned assets through privatisation.

This loss of control of essential national assets is not exclusive to the electric industry and has come under sustained criticism in the case of water and sewerage⁷, and most recently national roads in the e-tolls debate⁸.

Van Niekerk is entirely correct - problems with electricity supply certainly do exist. Yet, Eskom remains directly accountable to the nation, politically through parliament and NERSA, publically through the media, and, legally through legislation such as the PFMA.

If Eskom is privatised, how are we as a nation going to ensure the accountability of faceless institutional shareholders located in New York, London and Paris? While there is a growing movement worldwide to enhance institutional investment accountability, it remains a significant risk and I am not convinced that the essential services of our country should be exposed to such risk.

CONCLUSION

The delays in the Medupi and Kusile contracts, the success of the renewables IPP procurement programme (which contrary to the intimation in the Opinion is not based on a totally free market structure) and the recent stalling of the ISMO Bill in parliament make this an opportune time to robustly debate whether the denationalization of Eskom would serve South Africa best. The SAIEE plays an important role in informing and guiding this debate, which relies on a fair representation of all sides of the debate. Electricity supply may well be a “special case” and as such denationalization of the national electricity supply should be assessed on its merits, rather than

automatically being deemed detrimental or suboptimal based on nationalisation debates for other commodities. **wn**

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Watt’s your Opinion?

Please submit your comments or your own opinion piece to minx@saiee.org.za.

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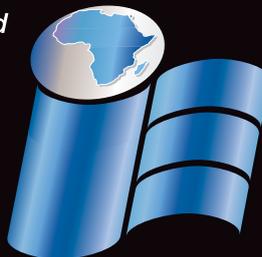
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On the light... (er..) side



Isn't it odd how you can go through life failing to really 'see' things? How many of us have been driving along and wondered out loud...

'Funny, I never noticed or thought about that before'? It was only after marrying an engineer that I began to realize just how 'blind' I had been towards many things.

BY | ANGELA PRICE

electricity – its generation, transmission and distribution was just one such example. I had previously given very little thought to its origin and distribution. I am sure the same could be said for many South Africans, however in recent years we have become far more 'switched on' about electricity, its generation and consumption – primarily due to rising costs and involuntarily being 'switched off' every now and again.

The true level of my ignorance about all things electrical, was demonstrated very early on in our relationship. I had been watching an investigative journalism TV programme one Sunday night, which highlighted the dangers of living in close proximity to overhead power lines. The evidence against the power lines was stacking up when the reporter delivered his coup d'état - pictures of the traumatised tree. There it was, undisputable, photographic evidence of a tree growing away from the power line above, as though repelled. The reporter put it to us that the radiation from the line was the cause, and if it did this to a mere tree what could it do to a mortal?!

In an ill-thought out attempt to impress my new, electrical engineering boyfriend, I began telling him about the dangers of these power cables - whilst driving down a residential street in our suburb. I should mention that most streets in our suburb are lined with deciduous Pin Oaks - enjoyed by few and cursed by many (mostly the gardeners in autumn). It was a rather one sided conversation and the silence made me realise that I was not convincing him. Suddenly the solution became evident. 'Look love', I exclaimed, pointing to the trees lining the street. Sure enough, all the tree branches were growing away from the power cables - there was not a stick of vegetation near them. Ha - case in point I thought smugly.

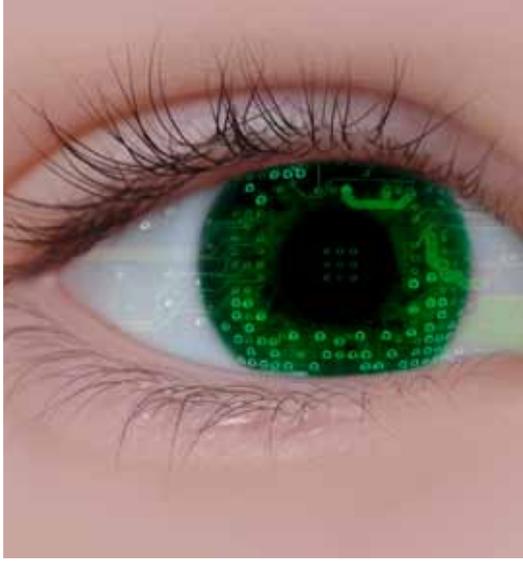
I will never forget just how small I felt when (as though talking to a child) he replied, 'So you don't think maybe that's because they trim the branches away to keep the lines clear?' Doh!

Whilst nationally there is a lot of discussion about power generation (or lack thereof), here in leafy suburbia the topic of conversation centres around power distribution and/or the re-distribution of wealth.

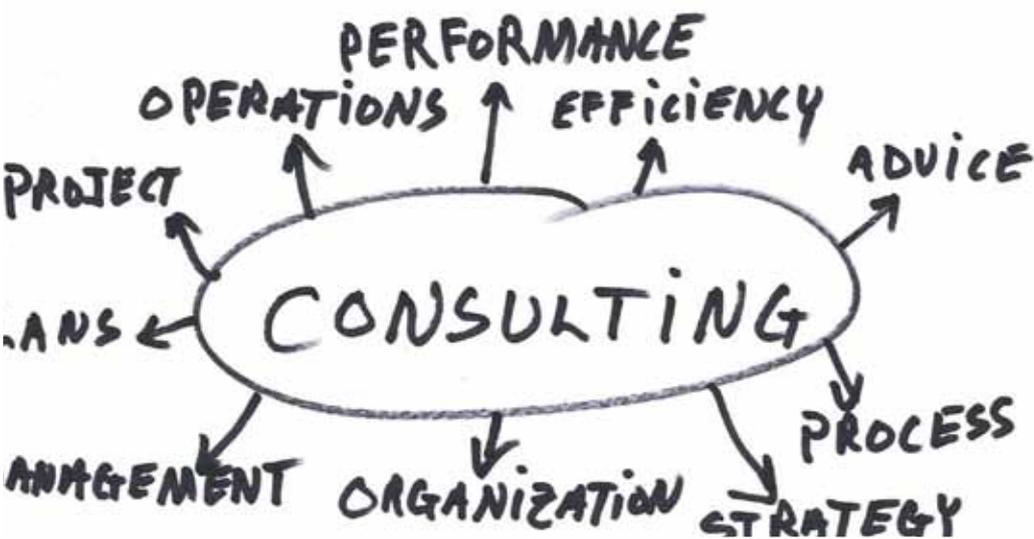
Now, as I understand it, transmission refers to the process of sending the high voltage electricity from the power plant to the sub stations (via overhead lines) to the local population (who, if they watched the same documentary I did, should not be living underneath those lines!) Distribution is the process of then sending the electricity from the substation to the end user in a safe, usable, 220V format. Well, that's if a guy armed with rudimentary wire cutting 'tools' doesn't get there first.

Residents of our (strategically pruned) tree lined streets are regularly and unwillingly taken off the grid by cable thieves who plague the suburb. And if you are fortunate enough not to have had these opportunists in your street you may still be unlucky enough to have your wealth re-distributed for you by some unwelcome guests.

In an attempt to discourage these visitors my husband has been looking into some power transmission and distribution of our own. So far the electric fence seems to be transmitting 4000 volts very successfully - here's hoping we don't have to see how effectively it can distribute those volts ... **wn**



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If you want to see your function or event listed here, please send the details to Minx Avrabos at minx@saiee.org.za

Calendar of events

JUNE 2014

3	SAIEE President's Invitation Lecture	Mpumalanga Centre	www.saiee.org.za
4	SAIEE President's Invitation Lecture	Vaal Centre	www.saiee.org.za
9-12	Managing Projects Effectively	CPD Training Course, East London	www.saiee.org.za
11	SAIEE President's Invitation Lecture	NMMU University, Port Elizabeth	www.saiee.org.za
11-12	Technical Document Writing For Engineers	CPD Training Course, East London	www.saiee.org.za
13	SAIEE President's Invitation Lecture	Bloemfontein Centre	www.saiee.org.za
24	Charnaud & Co Breakfast Presentation	SAIEE House, Johannesburg	www.saiee.org.za
26	SAIEE President's Invitation Lecture	University of Johannesburg, Hotel School	www.saiee.org.za

JULY 2014

9-10	Photovoltaic Solar Systems	CPD training Course, Johannesburg	www.saiee.org.za
16	Practical Lighting Design Workshop For Commerical & Industrial Applications / SAIEE House		www.saiee.org.za
22-25	Insulating Oil Management	CPD training Course, Johannesburg	www.saiee.org.za
24	Variable Frequency Control	CPD training Course, Johannesburg	www.saiee.org.za

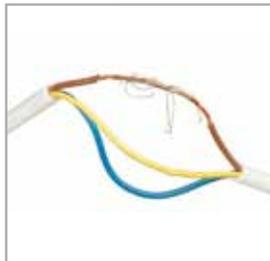
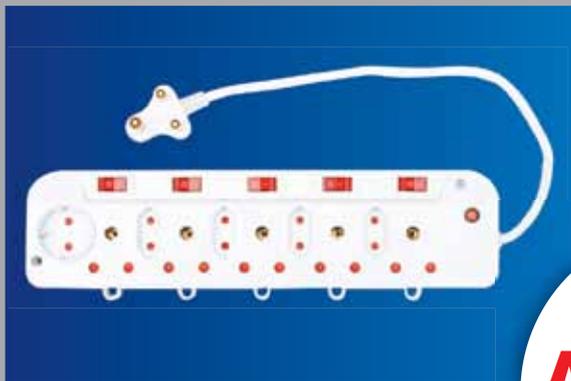
AUGUST 2014

5-6	High Temperature Low Sag Overhead Line Conductors	CPD training Course, Johannesburg	www.saiee.org.za
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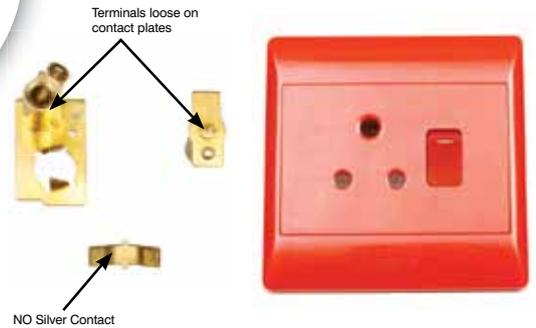
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