

WATTnow

Be Enlightened

**Cut electricity
consumption with
automation**

**Running out of fuel
– grow your own**

**Special solutions
are needed for
South Africa**



Official Magazine of

SAIEE

South Africa • R21.95 (incl. vat) Other countries • R19.15 (excl tax)

July 2008



How can disease be detected before it strikes?

How can you manufacture customised products at affordable prices?

How can you power a planet hungry for electricity without damaging it?

We're providing answers to the toughest questions. This is a Siemens tradition and - has been for the last 160 years.

Innovations are our answers to today's questions. Our employees are driven by the challenge to create leading-edge solutions - worldwide, in nearly 190 countries. A network of ideas and experience set in motion by Werner von Siemens 160 years ago. www.siemens.co.za

Answers for South Africa.

SIEMENS

Government, please use available technologies

You know sometimes this wonderful government of ours leaves me speechless. I could understand and accept that President Thabo Mbeki apologised to us all for not allocated money for electricity to Eskom. He admitted that he and his government had misjudged the situation, had miscalculated the investment needed by Eskom and had even under-estimated the severity of Eskom's pleas for more cash.

However, one that is less easy to follow is when our Deputy President Phumzile Mlambo-Ngcuka says that the government is busy shooting itself in the foot when it comes to electricity distribution. The easy way to stop hurting a foot is to stop firing the gun.

She urged delegates at a power summit held in Midrand to embrace the concept of Regional Electricity Distributors. Of course she – along with many of the government representatives – have not told us what these distributors will add to the direct unit price of electricity now and in the future.

What we do know, instead, is that the cost of repairing the backlog in maintenance for the distribution network is around R25-billion and that will keep climbing every month as maintenance work remains unresolved.

Interestingly, though, there might be an alternative solution for South Africa which already has a reasonable well-establishing telecommunications and mobile network infrastructure. By deploying a new first world technology using smart grids and ZigBee applications it would be possible to reduce electricity consumption dramatically and at the same time pinpoint failures in the network.

This sort of intervention means that there is no longer a reliance on the competence of people to make accurate guesses about the state of the distribution network. Smart grids allow each potential fault to be identified before and outage occurs and, if an failure happens, to pinpoint exactly where that failure has occurred.

It has been used in a number of countries around the world and it seems to me that if South Africa is planning to improve its distribution then surely now is the right time to do so. South Africa's network, in keeping with many other countries is based on technology that was developed and deployed in the 1950s and little has been done to upgrade it since then

This explains not only the extensive maintenance work that is needed by also why R25-billion – and possibly even more – will be needed to keep the network running. Eskom – and many others too – acknowledge that electricity is being stolen from the network through illegal connections but they have no idea just what those annual losses amount to other than 'a helluva lot'.

Again, by using the smart grid technology that is freely available for South African engineers the illegal connections could immediately be identified and switched off never to be connected again. If the indications in America are correct then industrial concerns could make huge savings of up to 37 percent of the monthly consumption simply by adopting the ZigBee technology used in conjunction with the smart grids.

I think that it's now time for the government, its regulatory officials and Eskom to look at deploying new 21st Century technologies while upgrading the ailing distribution network. There has been a lot of talk over the years about how South Africa wants to maintain its infrastructure and hold onto its position as a leading country in Africa.

But to do that means that our government and our business community must continue to invest in the infrastructure that has already been established. And it means that we must surely deploy cost effective new technologies to protect and improve this infrastructure.

If we do so now then we all might get a more stable electricity supply in the short term while new power stations are being built.

And wouldn't that be a pleasure.

Paddy Hartdegen - Editor
paddyh@crowm.co.za



WATTnow

Editor
Paddy Hartdegen
paddyh@crowm.co.za

Contributors
Antonio Ruffini
Glynnis Koch
Peter Middleton

Design & Layout
Adèl Janse van Rensburg

Creative Direction
Lesley Testa

Published monthly by
Crown Publications cc
2 Theunis Street
Bedford Gardens
Johannesburg
Tel: (011) 622-4770
Fax: (011) 615-6108
e-mail: crownmag@crowm.co.za

Publisher
Jenny Warwick

Deputy Publisher
Karen Grant
crownmag@crowm.co.za

Technical Advisor
Ian Jandrell, PrEng, PhD

Advertising Manager
Veronica Breedt
veronicab@crowm.co.za

Merchandising
Kirsten Kelly

Circulation and Subscriptions:
Norma Massey
normam@crowm.co.za
R199 (incl. Vat) per annum
Postage extra outside RSA



All enquiries for WattNow:
P O Box 140
Bedfordview, 2008

All enquiries for SAIEE:
P O Box 751253
Gardenview, 2047
crouchm@saiee.org.za



SAIEE 2008 Office Bearers
President: Victor Wilson
Deputy President: Du Toit Grobler
Vice President: Angus Hay
Past President: Ian McKechnie
Honorary Treasurer: Les James

ISSN: 1991-0452
Crown Publications cc. All material is strictly copyright and all rights are reserved. Reproduction without permission is forbidden. The views expressed in this publication are not necessarily those of the publisher or the SAIEE.

Printed by: CTP Web, Cape Town
Distributed by: RNA

WATT'S

WATT'S HAPPENING

10> South Africa's Power Crisis and its own Special Solutions

The electricity issues facing South Africa are real and Antonio Ruffini looks at the many complex issues that affect this country.

15> WATTnow launches CPD programme

WATTnow, in conjunction with the South African Institute of Electrical Engineers, has created an innovative CPD programme for professional engineers that will give them a one-stop-shop to fulfill their CPD needs.

18> Smart houses could reduce electricity consumption dramatically

Smart grid technology that manages electricity consumption via a computer network and relies on Internet protocols could provide significant power savings for the country, making the entire distribution network more efficient.

25> Watt Says

Comments from readers responding to the recent articles published in WATTnow over the past few months.

31> Kimberley turns itself on before anyone else

Paddy Hartdegen looks at the development of street lighting in South Africa and recounts how Kimberley was the first city in South Africa to have electrically powered street lights.

35> On the lighter side

Brain Busters provides a couple of rather tricky questions that challenge the way you think. Give it a go. On the lighter side looks at some of the crazy studies done by scientists in the pursuit of understanding.

5> WATT'S NEW

iPhones come to South Africa; AMD starts shipping its new chipsets; Touchscreen technology, new laptops from HP; Asus computer for less than \$300; GPS wristwatch for runners; Bond-style digital pen and audio recorder; 1 TB external drive from Iomega.



53> SAIEE

Mrs Danai Magugumela delivers the keynote speech at the prize giving of the Faculty of Engineering and the Built Environment; The Impact of Distributed Generation on Electricity Restructuring and the Security of Power Systems; From the President's Pen; New SAIEE Centres in SASOL territory; SAIEE presents prize at the Faculty of Engineering awards.



INSIDE

33> WATT'S TECHNOLOGY

Bright boys 'programmed' for Egypt; Super-cable for Africa by 2010; Neotel offering 700 kbs Internet access; Safari bug has serious implications; PlayStations guzzle power even in standby mode; Waterless washing machines coming? Voluntary recall of 970 000 NEC computers; Curved TV displays provide exceptional clarity.



47> WATT'S ENERGY

25% premium for Cape Town's 'darling'; Hybrid technology for cell phones? Jordan to build nuclear reactor; Battery car for SA from SA; Abu-Dhabi to make thin-film solar cells; 500 MW wind-power generating plant approved; Private sector urged to generate power; Water from dirty oil sludge; Running out of petrol – grown your own.

45> WATT'S SCIENCE

Humpback whale inspires new blade design; Really hot, really short, sharp blast; It would have been a café to die for; Pisa's 'scoliosis' reduced by 37 cm; Chip holds 70 W of electrical power; Drilling causes massive mud leak; Sounds and colours enhance food flavours; Gas sensors that last forever.



ABC Certified
Total Paid Circulation 607, Total Free 6145, Total Circulation 6752
Jan-Mar 2008

Together, leaping forward!

CEF (Pty) Ltd is involved in the search for appropriate energy solutions to meet the future needs of South Africa, the Southern African Development Community and the sub-Saharan African region.

The Group manages specific energy interests for the Government and primarily acts as a catalyst for the development of new energy entities. Its mandate is to pursue commercially viable opportunities in oil, gas, coal, sustainable and renewable energy.

CEF targets market sectors where there is insufficient private sector activity as well as areas where the Government, for strategic reasons, believes that State investment and development projects are required.

For more information visit www.cef.org.za



saneri
South African National Energy Research Institute



iPhones come to South Africa

At last South Africa will join the rest of the modern world when Apple's new 3G iPhone is launched later this month. Apple's chief executive Steve Jobs, speaking at Apple's Worldwide Developer Conference in San Francisco said that the new 3G iPhone would launch simultaneously in 22 countries on July 11 with 70 more countries being added between July and December.

The iPhone is expected to launch in South Africa on July 20 and indications are that it will cost around R2 000. Jobs said that networks throughout the world will be able to charge a maximum price of \$199 (about R1 500) for the phone. However, once local duties and taxes have been added the retail price will be somewhere around R2 000.

Rumour has it that there are more than 1-million iPhones destined for South Africa. The new 3G phone has built in GPS for navigation applications, comes with 8 GB of memory and will provide users with up to 300 hours of standby time, 10 hours of talk-time on 2G networks, between five and six hours of web browsing and seven hours of video playback. Audio playback will last for about 24 hours.

Among other novelties in the new phone is a 'location-aware' application for the Associated Press news service which will provide news based on where you live. Apple has also introduced a service called MobileMe which will provide a central repository so that users can keep records of e-mail, contacts and calendars which will link directly to their Mac or Windows software such as Outlook, Entourage or Windows Mail.

Photographs taken with the iPhone can be deposited in the MobileMe repository and shared with friends, family or others. Millions of iPhones have already been sold around the world and millions more are expected to be sold when the phone reaches the new markets including South Africa.



AMD starts shipping its new chipsets

AMD is shipping its Radeon HD4000 series of video chipsets to manufacturers and stores around the world. These chipsets are said to represent a significant boost in clock speed compared with the earlier mid-range 3850 series, without affecting heat. The core speed increases from 670 MHz to 800 MHz while still occupying a single card slot.

AMD has said that the new video chipsets will retail for between \$179 and \$219 for a standard card with just 512 MB of memory. Although the chipsets have been shipped to retailers and manufacturers, AMD has not yet officially launched its new range which was due to take place towards the end of June.

AMD has come under increasing pressure to reduce the price of its lower-cost cards to more effectively compete with NVIDIA's up-coming GeForce and GTX cards expected to be released later this year. AMD says that its high-end Radeon HD4870 and 4870 X2 will be available in the third quarter of this year.



Global Climate Change & Local Power Cuts



where is the road taking us?

We're building South Africa's first commercial hydro power plant. The carbon emission reduction projects we designed are the first to be implemented on the continent. We're the only South African based company with international experience in commercial wind farm development.

Let NuPlanet put your clean energy ideas into practice.

NuPlanet
clean energy

South Africa +27 12 349 2944, the Netherlands +31 313 414 665, Colombia +57 1 245 4431

www.nuplanet.nl



GPS wristwatch for runners

Casio has released its latest GPR-100 lightweight device that uses global positioning systems technology to display real-time data on distance, speed and pace predominantly for runners. It is apparently the world's smallest and lightest GPS device and is worn on the wrist like a watch.

According to Casio it will assist runners to adjust their pace over long distances thus increasing individual performance. When used for long-distance training the GPR-100 can display the difference between preset time and distance goals and the actual times being achieved. It can record all the data for up to 50 different runs and up to 100 laps per run and this data can then be used to compare an athlete's progress during training.

Apart from being conventional wristwatch which can display times for 141 different cities around the world in 38 different time zones the GPR-100 can measure distance from 100 metres to 999,99 kilometres with a speed range of between 0,1 km/h and 40,0 km/h.

Using the GPS function a single charge will last for 2 hours in standard mode and just over 4 hours in low-power mode.



Bond-style digital pen and audio recorder

Digital pens that combine ink with technology may become a vital tool and complement the keyboard on computers.

The LiveScribe Pulse – which records audio signals while writing – allows you tap a place in your notes and it will playback what it was hearing as you were writing.

The developers believe that the new pen will be a boon for students, journalists and minute-takers around the world. The LiveScribe pulse works with an ordinary computer – rather than the considerably more expensive Tablet PCs. The standard pen, with 1 GB of memory sells for \$149 while a model with twice as much memory sells for \$199.

The standard LiveScribe pen will record up to 35 hours of audio at high quality or more than 100 hours at a lower setting. However, to write with this pen it's necessary to buy special quality paper that has been pre-printed with dots. Four 100-page notebooks sell for \$19,95.

For years computer companies have been trying to devise technology that will allow handwritten notes to be transformed into text accurately and quickly and many different types of technology have been tried. More than 10 years ago Apple introduced the Newton which used special handwriting recognition technology and the company is believed to be reconsidering the introduction of this system for its iPhones.

In most cases electronic devices tend to recognise block letters more accurately than cursive handwriting and certain of these gadgets have even used special letters (to be learned by the user) to improve accuracy.

ITB external drive from Iomega



Iomega has developed a stylish one Terabit external hard drive capable of holding 18 500 hours of music, 1 500 hours of video or 4-million photographs. The 1 TB eGo has a USB 2.0 connection and is available in three different colours. It sells for about \$255 and is available from Iomega's website in the United States.

It is by no means the largest external hard drive available as a number of manufacturers have already started selling 2 TB disks. Until recently the largest drive made by Iomega was a 320 GB model.

The new drive is bundled with Retrospect, Iomega's back-up software for Windows computers. The company has also released a new eGo Portable model that comes in 160 GB, 250 GB and 320 GB variations and a range of new colours including leather-wrapped and camouflage models.

These pocket-sized drives do not need an external power supply. These portable drives all supply and carry Iomega's drop-guard feature to prevent the drive from being damaged even if it is accidentally dropped.

Are you struggling to find directions and purpose?

Are you not sure what you want to do when school is over or what careers are out there?

The answer is here!



Sturdy file available!

Butcher, Baker, Candlestick Maker - Be what you want to be!

SA Career Focus MAGAZINE

- Book & CD reviews
- Job info from people in the industry
- Start your own business - full guide
- Sports, Hobbies & Part-time Jobs
- Why subjects are important, etc.

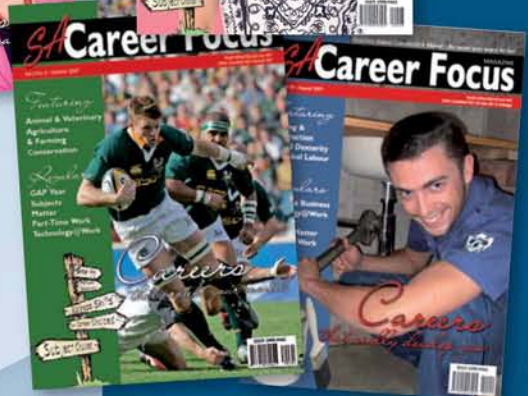


Whether you've made up your mind, still looking or still learning, SA Career Focus is the ultimate guide!



Just a little sneak preview of what we are up to in the next couple of months...

- Biology & Life Sciences
- Printing and Packaging
- Beauty & Hairdressing
- Business & Management
- Retailing
- Foreign Services
- Aviation
- Medical
- Technology@work
- Running your own Business
- Hobbies



Valuable career guide for teachers, learners and school leavers!

SUBSCRIPTION FORM

10 ISSUES AND A FILE FOR ONLY R 250.00 (SOUTH AFRICA)

SUBSCRIBERS POSTAL ADDRESS:

NAME _____ TITLE _____

ADDRESS _____

CODE _____
TEL (08h00 - 16h30) () _____ MOBILE _____

E-MAIL _____

GIFT SUBSCRIPTION POSTAL ADDRESS:

NAME _____ TITLE _____

ADDRESS _____

CODE _____
TEL (08h00 - 16h30) () _____ MOBILE _____

E-MAIL _____

PAYMENT Banking Details: Standard Bank, Lyttelton
Branch Code 010945, Acc No 011731621

FILE + ONE YEAR SUBSCRIPTION R 250.00 New

ONE YEAR SUBSCRIPTION ONLY R 200.00 Renewal

Cheques payable to: SA Career Focus

EFT MASTER CARD VISA CASH CHEQUE

CARD NUMBER _____

EXPIRY DATE / / CVC

I authorise a deduction of R _____
from my credit card _____

SIGNATURE _____

ISSUE CALENDAR

(mark only 1 issue as start issue)

Sep 2006		Oct 2006	
Nov/Dec 2006		Jan 2007	
Feb 2007		Mar 2007	
Apr 2007		May 2007	
Jun/Jul 2007		Aug 2007	
Sept 2007		Oct 2007	
Nov/Dec 2007		Jan 2008	
Feb 2008		Mar 2008	
Apr 2008		May 2008	

10 successive issues from earliest issue marked will be posted

FOR OFFICE USE ONLY

Date received	Y	Y	Y	Y	M	M	D	D
Date posted	Y	Y	Y	Y	M	M	D	D
Subscriber no.								



POST TO: P.O. BOX 14138, LYTTELTON, CENTURION, 0140
WEB www.sacareerfocus.co.za
PHONE 012 664 3264 / 086 MY WORK FAX TO: 086 615 9279

Touch-screen technology, new laptops from HP

HP has unveiled its new TouchSmart All-in-One personal computers, which are priced at just \$1 299 and come with touch-screen technology that allows users to work with photographs, music files, videos and browse the Internet by tapping or swiping the screen.

According to HP's executive vice president, Todd Bradley the new computers are available in 17 different countries including United States, Japan, China, India and Britain. At this stage there is no indication of when these computers will be available in South Africa.

The computer range will provide a television service, comes with a DVD writer, has a built in Webcam and high quality stereo speakers. It has a 22" (diagonal) high-definition widescreen display and uses Intel's Core 2 Duo processor. The range has built in Wi-Fi, comes with 4 GB of memory, a media card reader and a choice of large-capacity high-speed hard drives.

HP has also introduced 16 new laptop computers including its top of the range EliteBook premium series and Bradley claims that these new products have a striking design that has been tailored to the "ever-changing mobile lifestyle that consumers are now demanding."

The new computers feature the liquid-metallic HP Imprint 2 surface design. The laptops offer a choice of processors including the AMD Turion 64X2 Ultra dual-core mobile processors and the Intel Centrino @ and Centrino 2 with vPro. The HP ProtectSmart hard drive protection technology is standard on the new range of laptops.



Asus computer for less than \$300

Asus has released its Ebox computer that uses a 1,6 GHz Atom processor, has built-in Wi-Fi, Bluetooth and a 1 GB ethernet connect. It has a 160 GB hard disk and 1 GB of RAM and is expected to sell for less than \$300.

The small box computer has connectors for a USB keyboard and mouse and a conventional VGA monitor. Its video chip is capable of playing high definition video in DivX formats and is said to be surprisingly quick. It is about the size of a satellite decoder.

Various test models have been released to computer analysts who say the machine has a near-instant pre-boot environment and using the Linux-based ExpressGate it will let users browse photographs on the web, make Skype calls and handle instant messages through Pidgin without starting up the full desktop operating system.



SA's Power Crisis and its own Special Solutions

By Antonio Ruffini

After the electric power crisis struck South Africa earlier this year, statements were made in an attempt to contextualise it, such as how power generation capacity constraints is a global problem.

This is true, but only up to a point.

It is true in that: Lusaka, Zambia's capital city experiences regular blackouts for hours at a time. Brazil underwent a major power crunch five years ago when drought affected its mainly hydro powered generation capacity, something that gave impetus to Brazil's biofuels policy. India, which has the world's fifth largest installed power generation capacity at 132,000 MW, estimates it needs to add 70,000 MW by 2012. The European Union (EU), though it has not reached the stage of involuntary load shedding, has to start building new plants now if it is not to face that scenario. The city of Auckland in New Zealand experienced days of blackouts through distribution failure, though New Zealand's future infrastructure constraint is not one of generation capacity but that of transmission of power between its islands.

Further, the World Energy Council (WEC) projects that humanity's total energy usage will more than double by 2050. "The key assumption here is that by then the global population per capita energy usage will match today's energy usage per capita of Poland," Brian Statham, Chairman of South Africa's National Energy Association (SANEA), the World Energy Council representative in South Africa, says. "It also assumes today's affluent consumers of electricity will level off at current demand."

The Energy Information Administration (EIA) of the USA's Department of Energy offers similar figures. The EIA expects total energy consumption in the world to increase to 22 billion tonnes of oil equivalent (Gtoe) per year in 2050, from the current 10 Gtoe a year.

According to the EIA base case scenario, by 2050 the world's currently developing regions will account for two thirds of total global

energy demand. However, while the growth in energy consumption is expected to be slower than the rate of global economic growth, the growth in electricity consumption will keep pace with economic growth. Thus, in 2050, the global demand for electricity is predicted to be four times greater than it is today.

The lesson here is no matter what scenario one chooses to believe, any calls from environmentalists to fix energy consumption at existing levels are unrealistic. "Social sustainability will fail if one does not deliver energy to those who lack it. We will see migration to places where such resources are available and, as South Africa is experiencing, the corresponding chaos," Statham says.

However, while South Africa's generation crunch is not out of line with broad global trends, its power crisis is also unique and unmirrored elsewhere. While the global benchmark of a 15% generation capacity reserve margin, which also happens to be South Africa's target, is fairly ubiquitous for a well managed network, comparisons between tightness of power generation capacity in South Africa and the EU cannot be directly compared.

South Africa's power grid is a large network with limited regional backup, so in effect it is a large system in isolation. In the EU, when a particular national grid is in difficulty it can seek help from its neighbours. "Even if South Africa was surrounded by countries with large power networks, these would all be on similar time zones and would experience their peaks at about the same time. Europe because of its lateral geographic spread sees Ukraine experience its peak power demand period several hours before countries in Western Europe, and that can allow peak supply to shift," Statham says.

It was a secret to nobody that if South Africa was not going to put in place additional generation capacity it would face a shortfall in the ability to supply electricity in about 2007/8. This happened exactly on schedule. Studies going back many years made that prediction, so we aren't even being brilliant through hindsight.



That Eskom saw this coming and felt itself powerless to respond because of government directives is well documented, as is the discussion about the quality of leadership shown by Eskom. However, Statham offers a deeper perspective as to why South Africa's government got caught in a power crisis.

"In 1994 when the government came into power it had no direct experience of governing, not even in an opposition role, and it had to take over a fairly sophisticated economy. Most of the training its members had undergone involved communist ideology, and this was reflected in the first speech Nelson Mandela gave, about the priority of nationalisation. However, the new government was inundated with 'consultants', many of them from the western world, USA and Scandinavian countries in particular."

Within two years government rhetoric had switched to support market liberalisation. "After Eskom was told not to build, the government waited for the market to reward it." Statham says the answer to 'how did SA get into such a mess?' in part lies in the fact that the consultants picked up their fees but no project developers followed up by investing in this infrastructure.

"However, developers of projects, before investing, were always going to want a stable well defined market with a track record, legislative and financial certainty and creditable counter parties," Statham says. "It was nothing personal against South Africa, but without all those in place, we were not going to attract such investment."

At the same time there was a boom in South Africa based on low capital expenditure, the retail consumption driven boom economists refer to.

Meanwhile, following the drive to liberalise the international energy sector, the fallout of the Enron scandal and rolling blackouts across California caused a global rethink as to the viability of electricity supply as a private sector responsibility. Then the 9/11 bombings of the World Trade Centre in New York happened in 2001, and world's

biggest Independent Power Producers (IPPs), which are mainly US based companies, decided to stay at home. The EU based IPPs also did a risk assessment and stayed closer to home.

As the global increase in electricity demand trend shows, South Africa is impacted by the current boom in demand for generation capacity across the world. The gap between demand and supply for power generation plant worldwide is reflected in a six year lag between placing an order for a new generator turbine and getting one. "The same applies to renewables. When manufacturers of wind energy turbines were asked how soon they could deliver if an order was placed now, the response was five years. And it is not only manufacturers' lead times that are an issue. One has to look at the whole supply chain and take into account the time taken to obtain water and environmental permits, the time taken to organise commercial terms, the lack of financial capacity, and the shortage of skilled human capacity to make all this happen."

Statham believes the factor most strongly inhibiting the reduction in lead times for new generation plant is the lack of intellectual property protection legislation in countries like India and China. "Most of the global generation plant manufacturing capacity resides in the US and the EU and the most likely and cost effective way such companies will expand their manufacturing capacity is if they set up factories in China and India. They will only do this if those countries guarantee intellectual property protection."

All the WEC scenarios foresee no shortage of energy resources; rather the issue is the means to deliver these in a usable form to where they are needed. Coal is king, and will remain so particularly if carbon sequestration technologies can be developed. "Nuclear capacity will increase globally, particularly as the order books on new generation plant in this sector have not yet been filled. This is because people are waiting to see if the new generation nuclear technology will pass its tests."



Schneider Electric

powering alternative Energy Solutions

helping to achieve the goals for 2010 and beyond



Manual and automatic source changeover switches from 40A to 6300A



Contact Schneider Electric
+27 (0) 11 254 6400
www.schneider-electric.co.za

Schneider
Electric

As to the scope for energy efficiency in South Africa, which is oft reported as one of the world's most energy inefficient societies, Statham says it depends on who you speak with. The former CEO of AngloGold Ashanti, Bobby Godsel was sanguine about the 10% target for reduction of electricity, and suggested it should be higher, but an aluminium sector executive who claims to have focused on the efficiencies of that company's biggest cost inputs, is appalled at such a suggestion.

"To generalise, South Africans are not particularly energy aware," Statham says. "Executives don't instruct their building managers to ensure office building lights are switched off at night, a directive they would personally ensure was carried out if they were really concerned about energy efficiency. Shopping malls can cut the use of lighting significantly without any ill effects. Pump manufacturers lecture on how much electricity could be saved if only the pumps they sell were maintained adequately and the sludge that collects in these cleaned out periodically." Compare this with the EU where people switch off the lights when they leave a room and escalators have motion detectors and only activate when there is someone to convey.

"South Africa got a shock earlier this year, but there has been no real attitude change, and if someone is not energy aware at home it is unlikely he or she will be at the office or factory."

Statham does not believe the solution lies in a step change in the price of electricity, nor in compulsory load shedding. "People do not respond well to measures they see as punitive. Further, an affluent household will complain about the doubling of the unit cost of electricity to about 40c, but this will not have a material impact and change habits, while such a hike will have a crippling effect on the poorer population."

Nor does Statham believe intelligent meters, which would have to be rolled out in their millions at high cost, with potentially unattainable near term logistical constraints, are the solution.

"A solution for changing residential electricity demand behaviour already exists. It was implemented for what will be a scarcer commodity in South Africa over the longer term, water. It is the use of exponentially increasing tariffs, where the first units are cheap, and the more units used the steeper the price escalation. No demanding roll out of technology is required as existing metering systems and methods already provide the information required for implementation.

Statham says instead that the biggest threat to solving the electricity crisis in South Africa is a culture of blame. "Various groups are trying to do things in isolation rather than approach the problem as SA Incorporated.

"Unfortunately the government and Eskom have taken the approach of doing it all themselves. In reality they suffer from skill shortages and a lack of capacity, and the private sector in turn has been reluctant to come forward with solutions."

Statham refers to something a former CEO of Eskom, Ian McRae, who demonstrated leadership and foresight during his tenure at Eskom, told him. "The insecure man needs answers to all, while the secure man simply needs to know where to find the answers."

History also holds a lesson. When in the past Eskom, during a large generation capacity expansion phase, built Matla power station, few recall that it was not Eskom that provided the site management team that built that power station. It was done by an independent international contractor. "One can take it further. If there is a shortage of skills in managing a power station, why not bring in a private contractor." Companies in the mining sector bring in specialist plant operators, when they don't have the capacity or inclination to operate their own plants, and the power sector could do something similar. In addition, importing the necessary engineering skills from offshore is a lot less damaging to South Africa's overall job creation prospects than having situations ferment that sees waves of emigration."

Business should not be unwilling to offer solutions and Eskom and the government should not be too proud to accept them. **Wn**



Hassle-free CPD Credits

**GET
WITH THE
PROGRAMME**

The WATTnow CPD Programme gives its members:

- Monthly articles, published in WATTnow and validated by the SAIEE for self-study credits with appropriate questions;
- At least six live video recordings of important conferences held throughout South Africa in the course of a calendar year;
- Appropriate questions based on presentations made at each one of these events;
- A simple, quick and efficient response mechanism using your choice of SMS, e-mail or fax to submit answers for all CPD questions;
- A comprehensive administration system to ensure that every credit achieved is correctly recorded by the Engineering Council of South Africa

Open to all engineers who wish to maintain professional registration whether resident in South Africa or living overseas.

Special rates including a 55 % discount for SAIEE members.

Enroll now for the WATTnow CPD Programme by filling in the enrolment form below.

SAIEE members pay just R1000 annual subscription fee

First Name:	Surname:
Physical Address:	Postal Address (if different):
.....
.....
E-mail Address:	
SAIEE Membership Number:	
Preferred Payment Method:	
Amount due:	R1 000 for SAIEE members R2 400 annual subscription (non-SAIEE members)
Electronic Funds Transfer to	
Crown Publications Standard Bank Bedford Gardens Branch Code: 018305 Account Number: 022-532-439	
Credit Card Payment	
Visa <input type="checkbox"/>	Mastercard <input type="checkbox"/>
Name of Card Holder:	
Credit Card Number:	
Please debit my credit card with (amount)	
Signature	

Please fax completed form to Crown Publications 011-615-6108 or e-mail this form to cpd@crow.co.za



WATTnow launches CPD programme for engineers

WATTnow in conjunction with the South African Institute of Electrical Engineers (SAIEE) has launched an impressive programme for engineers who need to meet their professional development commitment by securing Continuing Professional Development (CPD) credits. In terms of the renewal of registration requirements, all professional electrical engineers must earn five CPD credits a year. Failure to certify CPD credits, could jeopardise renewal of their registration

According to Jenny Warwick, managing member of Crown Publications and the publisher of WATTnow, the programme will mean that engineers can earn the credits they need by subscribing to the WATTnow CPD Programme.

"First, WATTnow will produce a series of video broadcasts of up to six lectures annually on topics that have been validated for CPD by the SAIEE. These lectures will be filmed and edited by a WATTnow production team and then converted to either CD or DVD disks before being distributed free-of-charge to members of the WATTnow CPD Programme.

"A series of appropriate questions will be included on the CD or DVD and members of the programme can submit their answers directly to WATTnow by using a simple message system (where appropriate), by e-mail or by fax if they so choose. The filmed presentation will qualify the user to claim credits in the Category One section which makes attendance of a conference at least once a year mandatory," she says.

Warwick points out that it can be extremely difficult for working professional electrical engineers to take time off from their busy daily schedules to attend a conference simply to comply with the

requirements of the Engineering Council of South Africa (ECSA), which stipulates that engineers must acquire at least 25 CPD credits in their respective five-year cycle prior to the renewal of their registration.

She says that this is particularly relevant for engineers working in the small towns and cities around South Africa where conferences are seldom hosted. For these people attendance at a conference means that they are likely to lose at least three working days because they have to travel to the venue, attend the conference and then get back to their workplace.

"The costs for these engineers is excessive as they must foot the bill for travelling to the venue, then pay all the accommodation costs – usually for at least two nights – and then pick up the tab for the conference registration fees too," she says.

SAIEE's director, Stan Bridgens – who has worked with the WATTnow team to set up this programme – says that the initiative will mean that engineers throughout the country will be able to improve their own professional development by gaining access to many more lectures than they would normally attend and being able to watch all the published material in their own time and at their own pace.

"The advantage of the WATTnow CPD Programme is that engineers have a choice of topics relating to their own professional development. Essentially every engineer will have access to all the filmed material that is presented over a 12 month period. Perhaps one lecture is sufficient to provide the credit they need but now they can watch all the material and this is undoubtedly going to add to their own knowledge and understanding of engineering in a broad or a specific context," he adds.

"This means, really, that the level of personal professional development should be higher among members of the WATTnow CPD Programme because they can watch and absorb all the material available to them from all conferences held around the country that have been validated for CPD," he says.

Added to the DVD and CD offerings, WATTnow will be publishing articles in each monthly issue that will also qualify readers for Category One CPD credits which require engineers to respond to in depth questions posed on the articles that are specially designed and validated to provide CPD. It is envisaged for engineers using the system will accumulate between 0.1 and 0.3 CPD credits if all the questions are answered correctly. Furthermore at least ten such articles will be published annually so that at least one CPD credit could be obtained by this method.





Take a big bite out of energy costs.

OSRAM offers a tasty low-cost alternative to old-fashioned conventional control gear.

The QUICKTRONIC® WARM START.

The advantages of using OSRAM QTIS electronic control gear:

- Up to 25% energy savings
- Compliant to EU directive on Hazardous substances
- Starting time within 0.3 seconds
- Low harmonic content (THD<15%)
- Reliable starting down to -15°C
- Life - 50,000h with 10% failure at Tc=60°C
- Conforms to IEC Standards



The articles in WATTnow will be independently validated by the SAIEE, which will determine the exact value of each credit applicable to each issue of the magazine. Questions relating to the published material will be included in each issue of the magazine. For ease of use a special CPD logo will identify articles that have been validated for credit. Participants in the WATTnow CPD Programme will be able to SMS their answers directly to Crown or to submit the answers to WATTnow by e-mail or fax.

“As an added service to members, WATTnow will provide a complete and comprehensive administration system for those credits gained by each member. This administration service will run independently of the Engineering Council of South Africa service and will mean that should there be any queries about a member of his or her CPD status, WATTnow will be able to provide detailed records of every CPD event that a member has participated in during the year.

“Overseas and local research into the implementation of the CPD programme have proved that it’s essential to keep an independent record of all submissions so that when a query does arise it can quickly be resolved,” says Warwick.

The SAIEE will issue each member with an official certificate recording the exact number of credits gained by each individual in any given year.

“WATTnow and the SAIEE have put together an impressive offering for professional engineers predominantly working in the electrical engineering field,” says Bridgens. “Members of the SAIEE who elect to participate in the WATTnow CPD Programme will receive a discount of about 55 percent of the normal fees,” he says.

The WATTnow CPD Programme is based on a subscription service which will cost non-members of the SAIEE R2 400 a year while members of the institute will pay an annual subscription fee of R1 000. The administration fees include:

- Complete administration and submission to ECSA of all CPD material completed by each member. Members of the programme will be able to log-in to a secure WATTnow server at any time to check their own CPD status as well as examine their own individual records;
- WATTnow will, on behalf of members, keep a detailed record of individual submissions by each member from the time that they join the programme. WATTnow’s records will provide an accurate audit trail to resolve any queries that members may have.
- WATTnow will provide filmed presentations (on CD or DVD disks) of up to six events or conferences that have been validated


by the SAIEE for CPD credits. WATTnow and the SAIEE will keep an archive of all filmed material so that in the event of a query at a later stage this material will be readily for independent examination.

- Receiving one copy of WATTnow with all its self-study content every month.
- Compilation and maintenance of a secure database containing the records of each member including the individual answers submitted by the member to each CPD question posed and answered. WATTnow will keep an accurate log of all answers submitted by the member.
- An annual certificate of CPD compliance recording the number credits gained by each member during a given year will be issued by the SAIEE.

“We are offering all members of the WATTnow CPD Programme a one-stop-shop to participate in and comply with the professional development criteria laid down by ECSA and ensure that all professional engineers can maintain their status without having to search around for sufficient credits to meet the ECSA requirements,” says Warwick.

“In time and based on demand from members, we will extend the WATTnow CPD Programme to cover even more events and ensure that we keep abreast of the many changes that occur in the professional environment. Right now, though, we have created a compelling offer for members who must fulfill ECSA’s CPD criteria to maintain professional registration. We have done so in a way that makes it simple and easy for every engineer locally or internationally to maintain their professional registration,” she adds.





Smart houses could reduce electricity consumption dramatically

Smart houses that use a computer network and infrastructure to monitor the electricity consumption at all electrical outlets, and then adjust it accordingly to ensure minimum consumption, could be a solution to South Africa's electricity consumption woes.

This is the view of Dr Mohammad Shahidehpour, the Carl Bodine distinguished professor and chairman of electrical and computer engineering at the Illinois Institute of Technology.

In recent lectures to members of the South African Institute of Electrical Engineers in Johannesburg and Cape Town, he outlined the true value of using smart grids and communication technology in the distribution and control of electricity resources.

He says that in most countries around the world the power distribution systems are largely based on technology developed and deployed in the 1950s and the excessive strains on the systems are particularly evident in a digital age where computer and information technology systems play a crucial role in process controls.

"Here in South Africa – and in many other parts of the world for that matter – consumers know little about the actual electricity costs. They do see that their electricity bills are higher in the cold months and slightly lower in the warmer summer months but that's about it.

"Few consumers realise that the true price of electricity varies continuously in response to the supply and demand and that electricity bill are mostly calculated on an average price based on the number of units used.

"Because electricity is priced on an average most consumer are actually using much more power than they need to and paying more for it than they have to," says Shahidehpour.

He believes that by installing smart grids, the existing distribution infrastructure can be used more efficiently, can reduce the need for additional power plants or for building costly redundant systems that operate only during periods of peak demand.





Shahidehpour says that the term smart grid applies to the optimisation of the distribution infrastructure which can be achieved by using a wide range of information technologies that analyse complex energy systems on a minute-by-minute basis and optimise the electricity usage in a cost-effective way.

In explaining the concept Shahidehpour says that demand-response (DR) is the best example of how an effective smart grid operates. "People in South Africa, for instance, are asked to reduce power consumption at peak times and I've even seen announcements on television requesting viewers to switch-off unnecessary lights and appliances because power consumption was reaching critical levels.

"What smart grids do is control consumption using different technologies to reduce power usage when the consumption is at a peak."

He says that demand-response mechanisms could substantially reduce the billions of rands invested in power generation by cutting the need for costly peak power infrastructure to keep the electricity supply constant.

"Consider that about ten percent of infrastructure costs are spent to meet peak demand that occurs less than one percent of the time so it's evident that grid operators have a good reason to reduce the peaks," he adds.

Referring to statistics in the United States, Shahidehpour says that commercial and industrial buildings represent about 40 percent of the US energy use and homes account for about 30 percent. This means that demand-response technologies could provide a significant opportunity to conserve energy.

Explaining how the smart grid works, Shahidehpour says that today's electrical wall sockets are the power equivalent of a dumb terminal connected to a mainframe computer. Each access point – or wallsocket – can be identified in much the same way as a computer device has an address on the Internet.



**A frequency inverter that delivers just what you require...
And that's what makes it so affordable!**



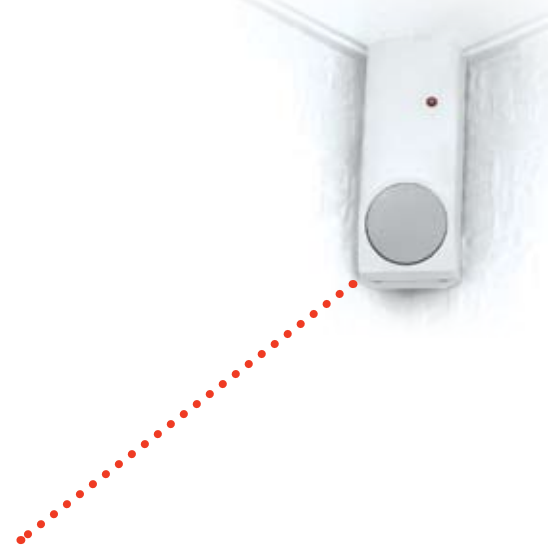
The new exceptionally compact MOVITRAC[®]LT frequency inverter is now available. It offers an ideal and uncomplicated form of motor control. Effective and reliable! You can use MOVITRAC[®]LT to realise a number of applications quickly, easily, and in a cost effective way. The MOVITRAC[®]LT is suitable for applications including fan and ventilation systems (HVAC), pumps, as well as motor control in tool manufacturing and metalworking, conveying, machining and materials handling systems.

Available in two sizes, MOVITRAC[®]LT covers a power range from 0.37 to 2.2 kW and for operation on 1-phase (220 - 240 V), 50/60 Hz power supply systems. MOVITRAC[®]LT offers the perfect balance between functionality and cost-effectiveness. With its 14 standard parameters and user-friendly interface, MOVITRAC[®]LT can be started up quickly and easily on-site. "Plug in and drive": Startup doesn't require cost-intensive and time-consuming support services.

SEW-Eurodrive with leading, innovative drive solutions for all industries and each application.

Johannesburg: Tel (011) 248-7000
Nelspruit: Tel (013) 752-8007
Cape Town: Tel (021) 552-9820
Port Elizabeth: Tel (041) 453-0303
Pinetown: Tel (031) 700-3451
Richards Bay: Tel (035) 797-3805

www.sew.co.za



The key to smart grids is to use an Internet protocol that communicates with home devices and shuttles information back and forth between the utility and the customer.

“With a smart, two-way communication mechanism operating between a power consumer and a provider, both parties can exercise far more control over the actual consumption of electrical power,” he says.

The existing power lines would carry a combination of power and information to identify the exact status of the line in real time. Using digital communication the grid sensors gather information from every centimetre of the grid to establish how much power is flowing through the grid and how reliable that supply is.

“Data can then be transmitted directly to household appliances which will respond by using power when the energy consumption – and the price – is lower. For instance an automatic washing machine could be switched on via the grid to start its cycle at say 02h30 and run for 30 minutes at a time when power demand was low. The user would simply wake up in the morning and find the washing cycle complete,” he says.

By using smart digital controls it is possible for the power provider to anticipate and respond to grid malfunctions because if a sensor finds that a power line is congested the controller will be able to re-route the power in real time before the grid malfunctions and a power failure occurs.

Shahidehpour believes that an Advanced Meter Infrastructure (AMI) or smart meter should be installed at the customer’s premises to allow for continuous two-way communications that can be controlled and managed by software systems running on remote computers.

The smart meter measures, monitors and helps to manage the actual energy used at the premises via two-way communication links that include cellular networks, satellite and radio frequency networks.. this means, too, that electricity outages can be detected and restored rapidly by the power providers because the exact nature of the fault – and it’s precise location – can be identified immediately and rectified. Shahidehpour points out that a new technology, known as Zig Bee has been developed as a global wireless language that allows dramatically different devices to work together and communicate seamlessly.

“ZigBee is a single standard used to set up communication with devices on a home area network which links the power utility to the customer using a two-way open communication network. This technology allows appliances to be controlled and monitored at all times in real time.

“The technology was developed by the ZigBee Alliance, a world-wide working group that developed software application standard that

would run on top of the wireless standards defined by the Institute of Electrical and Electronic Engineers,” he says.

Already in the US the results of the ZigBee system are providing some astonishing results with one industrial manufacturing concern saving as much as 37 percent of their average monthly consumption by using the smart metering systems and the ZigBee technology.

In the US the markets for ZigBee include: building automation, industrial control systems, energy management, personal healthcare, telecommunication services, home control and automation, consumer electronics and computers.

As Shahidehpour points out not all appliances in a home need to be used concurrently. There’s no reason that a pool pump must run during the day and be switched off at night just as there’s no reason to keep a microwave in standby mode all the time.

“Convenience is the key factor for appliances being left on or pool pumps operating during daylight hours,” says Shahidehpour. “If the pool pump came on by itself in the middle of the night when power consumption is low it would keep the pool water just as clean as it does when running during the day.”

Referring to the affordability of the smart grid Shahidehpour says that grid modernisation costs are equivalent to one pizza per household per month spread over a period of between ten and 15 years.

“If done correctly grid modernisation will be less expensive in the long run than replacement of damaged or poorly maintained grids. Smart grids will mean fewer blackouts and greatly reduced local interruptions with the concomitant savings from reduced congestion or needing to build expensive generation plants that work only at peak times,” he says.

“Smart grid upgrades will allow electricity providers to ease congestion on power lines and send between 50 percent and 300 percent more electricity through the existing corridors. In fact statistics compiled in the US indicate that smart grid technologies would reduce power disturbance costs to the US economy by \$49-billion a year and would also reduce the need for infrastructure expansion investment by about \$100-billion over the next 20 years.

“By allowing users to control electricity expenditure the smart grid technology would add between \$5- to \$7-billion back into the US economy by 2015 and between \$15- and \$20-billion per year by 2020,” he adds.

Given the fact that South Africa needs to spend about R25-billion on essential repairs and maintenance to the existing electricity distribution infrastructure it seems that perhaps the authorities should carefully consider deploying smart grid technologies now in an effort to reduce wastage of electricity in South Africa. **Wn**

Now you can build an entire machine on a microchip - and it works

By Peter Middleton

Micro-electro-mechanical systems or MEMS — also known as micromachines in Japan or micro systems technology (MST) in Europe — uses minute components, typically between one and one hundred microns for devices that range from twenty microns to one millimetre.

MEMS is the integration of mechanical elements, sensors, actuators, and electronics onto a common silicon substrate through modern micro-manufacturing. The technology — based on the technology developed for integrated circuits (ICs) — places moving mechanical mechanisms on the same chips and on the same scale as their electronic controllers. It is a way of making complex electromechanical systems using batch fabrication methods similar to those used for ICs, but merging the electromechanical elements with the electronics.

MEMS accelerometers are quickly replacing the conventional bulky devices used for air-bag systems in motorcars — because they are much smaller, more functional, lighter, more reliable, and are produced at a fraction of the cost. They are used for communications devices, electrical components such as inductors and tunable capacitors and mechanical micro-switches, which have huge potential in various microwave circuits. MEMS biochips are also being used for the detection of hazardous chemical and biological agents and in micro-systems for high-throughput drug screening and selection.

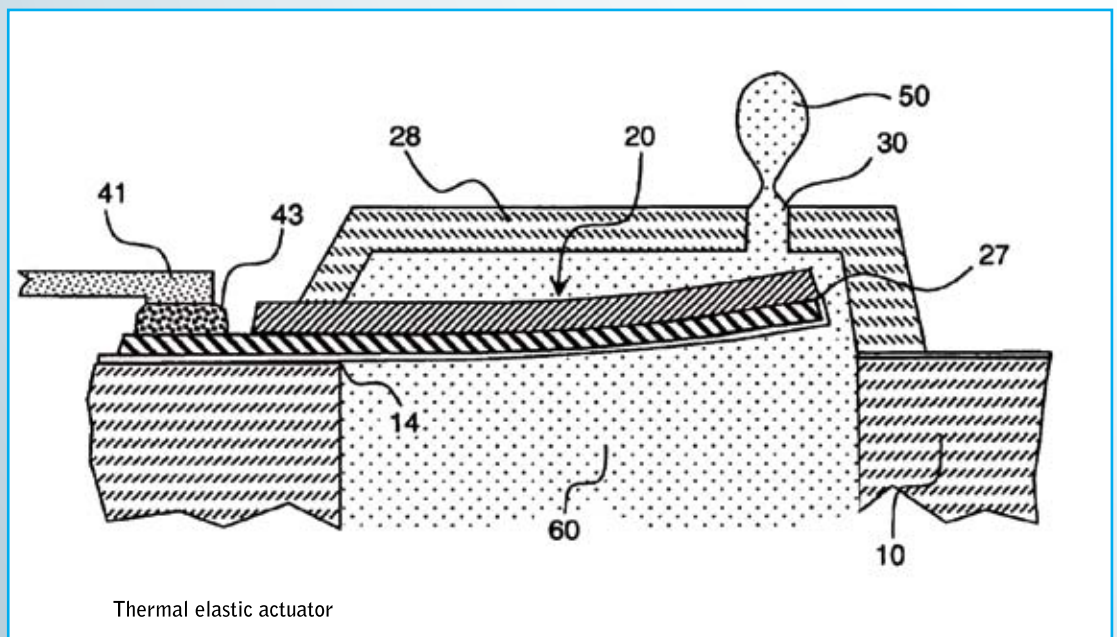
In a paper presented at the recent 9th international tribology conference held in Pretoria, Professor John Williams of the Cambridge University Engineering Department, described one of the more spectacular MEMS applications, The Texas

Instrument Digital Micro-mirror Device. It consists of an array of microscopically small, square aluminium mirrors — totalling more than half a million — in an area of about 1,5 square centimetres.

Each mirror is approximately 20 μm by 20 μm and corresponds to a single pixel on a projected display: Each can be individually addressed and rotated about one or other of its diagonals through an angle of about 20° at a frequency of more than 100 kHz. These are now routinely used in data-projectors.

Williams went on to describe the range of micro-actuators for the conversion of electrical energy into mechanical movement. Electrostatic comb motors, the standard prime-movers in MEMS machines, have a set of fixed combs or 'fingers' interwoven with second set, which is able to move. By applying an AC-voltage across the two capacitive elements, reciprocating motion is achieved at very high conversion efficiencies.

He also described a thermo-elastic actuator consisting of two linked miniature cantilevers of greatly differing cross-section. When a



current flows between the two anchor points, both limbs of the device experience resistive heating. Because of the very large difference in cross-section however, the temperature rise in the narrower element is much greater than that in the broader, which results in differential thermal expansion and motion of the linked tips. When the current is removed the actuator returns elastically to its rest state. At the MEMS scale, the actuators can reciprocate at the rate of kilohertz.

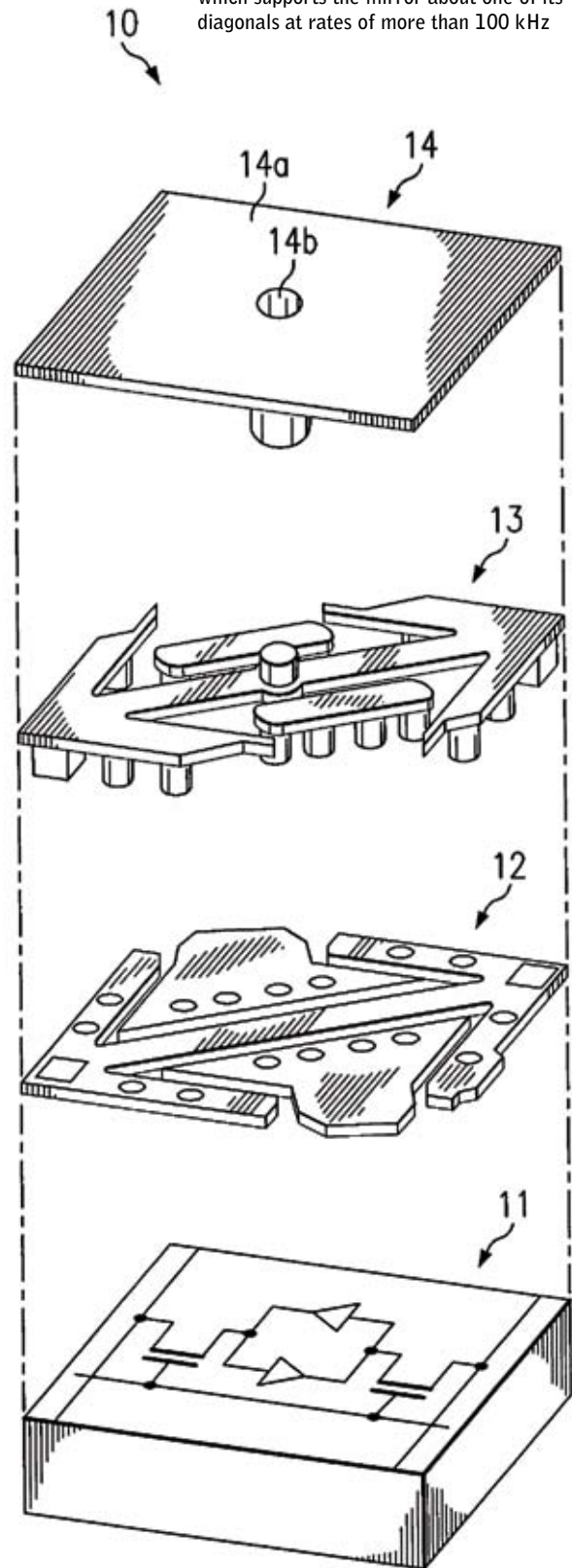
Williams' paper — which addressed friction, wear and lubrication challenges facing micro-systems technology — speaks volumes about just how established this technology is. He introduced his paper by stating: "The component masses and inertias (of miniaturised machines) rapidly become small as size decreases, whereas surface and tribological effects, which often depend on area, become increasingly important."

In South Africa, the CSIR has established a micro-manufacturing capability within the Material Science and Manufacturing unit, with a key focus on the field of micro-fluidics — the science of designing, manufacturing and formulating MEMS devices that deal with volumes of fluid in the order of nanolitres or picolitres. "A nanolitre is 10^{-9} litres — it is the volume contained in a cube with sides of 100 microns, a tenth of a millimetre," says Kevin Land — senior researcher in digital and micro-manufacturing at the CSIR.

Land's research aims to put a whole biochemical laboratory on a single chip — lab-on-chip — for HIV/AIDS diagnosis or malaria detection, for example. The CSIR's micro-manufacturing laboratory is used mostly to model, design and fabricate the biochips, working closely with CSIR's biosciences research teams who specify each lab-on-chip test.

Other applications of micro-fluidics include high throughput biomedical screening and compound profiling such as DNA analysis, and lab automation; clinical diagnostics and point-of-care testing; inkjet printing and printer applications such as biochip production, flat panel displays and printable electronics; chemical analysis and synthesis; medical applications such as drug delivery and blood cell separation; proteomics and chromatography; micro-sensors for the automatic detection of viruses, bacteria and toxic chemicals; dispensing; and environmental management such as temperature control, water quality monitoring, fire detection and the stabilisation

The Texas instrument digital micro-mirror device consists of more than 500 000 individually movable $20\ \mu\text{m}$ square mirrors, each representing one pixel of a projected image. Electrostatic forces deflect the beam which supports the mirror about one of its diagonals at rates of more than 100 kHz



of human waste. Added to this list are new and exciting applications such as electronic cooling, fuel cells and fuel processors and food quality testers.

“The micro-fluidic platform offers unique benefits in the biomedical field,” says Land. “It eliminates the need for sample preparation so it streamlines the whole process. It also minimises reagent use and reduces labour time and cost. It provides real-time answers that are easy to interface to different technologies, and it is flexible, scalable and suited to rapid prototyping.”

Significant parts of the MEMS manufacturing technology have been adopted from IC technology: almost all devices are built on wafers of silicon, like ICs; the structures are built in thin films of materials, like ICs; and they are patterned using photolithography, like ICs.

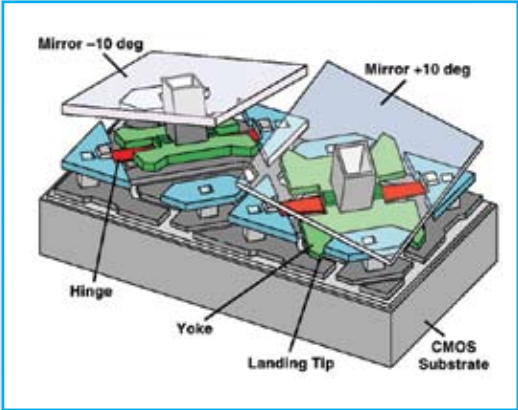
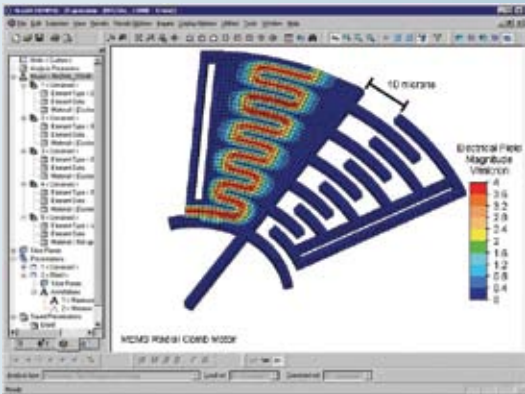
This technology currently involves three key processes, deposition, lithography and etching. Thin films of material are first deposited onto a substrate and a patterned mask is applied on top of the films using photolithography. The films are then selectively micro-etched to the mask leaving behind one layer of the device structure. The whole device is built up in layers by repeating this basic loop.

Micro-manufacturing is changing, however, as the technology continues to grow. For microfluidics devices, for example, a modern cheaper route has emerged, called soft-lithography. Land describes it for us: “Soft-lithography is an exciting new field that uses polymer based materials. One such polymer is PDMS, Polydimethylsiloxane — a silicon based organic polymer.” First, a master pattern is made using photolithography, a micro-milling machine or a laser. Then PDMS is cast over the pattern and you let it harden for 24 hours, or place it in an oven for quicker curing. It comes out rubbery. Peel it off and you have fluidic channels in your PDMS.

MEMS could significantly affect every category of commercial and military product. They are already used for tasks ranging from in-dwelling blood pressure monitoring to active suspension systems for automobiles. The blurring of the distinction between mechanical systems and ICs and the incorporation onto microchips, of sensors

and actuators — historically the most costly and unreliable parts of a control system — could result in a more pervasive technology that even ICs.

Micro-manufacturing — using high volume batch fabrication techniques — further adds to the appeal, decreasing the cost and increasing the reliability of devices to match those previously only available to the electronics industry. **Wn**



Dear Sir,

First of all, I would like to compliment you and your team on a great magazine. I always make time in my schedule to read it from cover to cover.

I am writing to comment further on your recent (January 2008) editorial dealing with the South Africa as a potential nuclear nation. You make the point that, in your opinion, nuclear power generation is the only viable option in light of the current electricity shortage in the country it is an accepted fact that the Demand for electricity from household, industry and business in our growing economy, exceeds the ability of the current energy supplied to meet the needs of the country. The result? Ongoing blackouts and load shedding.

Alternatives to nuclear energy include renewable energy sources such as wind energy and hydro-electricity. Projects which research and construct these alternatives deserve more support than they get at present because they have the potential to supplement the traditional electrical power which is under pressure.

It is quite true that hydro – electric projects are expensive to construct, but once they are established, they do not need to use the ever – diminishing supplies of natural resources that are necessary for the generation of electricity by other means.

In addition, these projects do not pollute the environment and have low running costs.

Apart from the need to construct and introduce renewable energy sources, it is vital that all users of energy be educated about the need to use electricity responsibly and sparingly. If both of these factors are achieved, then shortages and blackouts will be a thing of the past.

It is vital that the “powers” that be plan carefully for the future to avoid the sort of crisis situation in which we currently find ourselves. The construction of renewable energy sources would certainly take care of the future needs of our country and are

Surely worth considering more seriously that they are at present.

Yours sincerely

G.Jules LURAKWA, SAIEE

Dear Paddy,

I see that I haven't written to you since last November! Believe it or not, I am still “sniffing around” with this Free Energy thing! I started making a few notes for you.

I will be VERY interested to hear (or rather read) your reaction.

I prefer to be open-minded, but the scales do seem to be coming down rather heavily on the side of free energy.

There seems to be a determined effort on the part of government, petroleum companies and other big organisations to suppress free energy devices at all costs.

Some startling evidence is contained in a book by John Bedini entitled Free Energy Generation: Circuits and Diagrams and it appears to be irrefutable. Anyone with a knowledge of electronics and a small workshop should be able to reproduce some of the ideas presented quite easily

For example, Shawnee Baughman, a 10 year old student who won

the top award at a Science Fair in North Idaho designed a battery charging device that extends battery life almost indefinitely. The design was by Bedini and it was constructed from matchboxes, corks, and bits of plastic among other things. Press reporter Jeane Manning reported that “The device drove her Science Teachers nuts when they examined the circuit and saw the little motor happily running on an open circuit, having no return path. When a steel coat-hanger, pushed through a coil, was held just above the motor, the coil even produced a small, measured electrical output. Shawnee claimed that free negative energy was the driving force, which was being extracted from the atmosphere.

On a radio talk show hosted by Bill Jenkins, in front of a large audience in Baltimore Bedini and Steven Worth demonstrated a Gravity Field Generator that gave a measured output of 180% and was powered by a battery requiring no recharging.

The Internet has thousands of links to free energy devices, case studies and apparently working models. Details on free energy are available on www.cheniery.org or www.ultracapacitors.org for details (and splendid pictures). of Maxwell Technologies' super capacitors and at www.dispatchesfromthefuture.com

Is there any truth to these reports?

Howard Davies

P.S. I really do enjoy reading WattNow

[Letter shortened. Anyone out there like to respond? Editor]

Dear Paddy,

In your last two editorials you refer to Tshwane as a place. May I remind you that Tshwane is the name of a Council, the City Council of Tshwane. The name of the place you refer to is Pretoria, and has been so since 1855. It was named after Andries Pretorius, commander, inter alia, of the voortrekker commando during the battle Blood river, and also a resident of Prteoria. The name Tshwane has no historical connection with the place called Pretoria. To this day the name Pretoria has not been changed because the proper consultative process has not been followed. The SABC and the City Council of Tshwane are trying hard to change the name by stealth and usage, despite various court injunctions.

I find your editorials both informative and refreshing. Please keep it up.

Nic Wessels

Dear Nic,

Thank you for your comments regarding Tshwane (believe it or not I live there).

What the final resolution of the irritating Tshwane issue amounted to is that the greater area of what we used to know as Pretoria is now Tshwane. Pretoria itself applies purely to the central area.

So Pretoria exists but not as the geographic municipal area that it used to represent in the days gone by.

Dear Sir,

I am a civil/structural engineer who happens to have seen the May issue of Wattnow. I noticed that there was a letter about that old chestnut, switching off geysers. It is very disappointing to see though that you allowed such a misleading letter to be printed and you did not respond to it as you did to the letter by another structural engineer casting aspersions on his electrical engineering colleagues.

The letter suggested that it uses more power if you switch your geyser off during the day. It is true that for a geyser with a functioning thermostat and good insulation, the losses are relatively small but it is engineering nonsense to say that you use more electricity by switching it off when it is not being used.

It is obvious that electricity use must be greater if you are maintaining a geyser at 70 degrees all the time than if you only require that 70 degrees at certain times during the day. In fact the losses to the environment vary with the temperature difference so if you keep the geyser at 70 degrees all the time the losses are greater than if you only bring it to 70 degrees when you need it. Please ask other services engineers to confirm this if you do not believe a structural engineer.

Regards, Carl Bauer
PrEng CEng MICE MIstructE

[Below is another response from another reader: Ed]

Dear Sir

There is much qualitative comment on switching geysers on and off but few quantitative calculations seem to have been made in this regard, at least in the literature which I read.

I have a guest room geyser of 100l capacity which cools from 70C set point to 20C in 3 days when switched off. This is a loss of about 2 kwh per day (see calculation below). My average daily usage of electrical energy is approximately 40 kwh so the losses are about 5% of energy consumed. I doubt that a geyser blanket will significantly reduce the losses, but I have no figures to substantiate this conjecture.

In the calculation below I have used the 15 degree gm calorie.

100l=100kg=100000g

heat lost in three days = 100000x50x1 cal
(temp diff = 50, sp heat of water = 1)
= 5x4.2x10⁶ J
(1cal = 4.2 Joules = 4.2 watt-sec)
= 5x4.2x10⁶ watt-sec
= (5x4.2x10⁶)/(3600x1000) kwh
= 5.8 kwh
heat lost in one day = 5.8/3
= 2 kwh (approx)

Roger Irons Pr. Eng. (retired)

Professor Ian Shaw responds to Carl Bauer:

Dear Sir,

I stand by my previous statements, as follows;

1. Let us assume that the geyser uses the conventional thermostatic regulator. If you don't use any hot water from the geyser, the regulator sits around the set point. The current consumption is small because the temperature and the concomitant electricity usage fluctuates in a very narrow range due to the actions of the regulator. Let us assume, for the moment, (subject to further considerations below), that the geyser has an efficient insulating cover, so that the environmental losses are minimal. The environmental losses will vary indeed with the set point temperature, but because of the narrow range of regulation, the electricity requirements to compensate are still low. The purpose of the regulator scheme is precisely to compensate for environmental (external) as well as water (internal) temperature fluctuations. Because of the efficient control system, the fluctuations of temperature allowed by the regulator and the corresponding electric compensatory current) are still low. Of course, electricity would still be needed to maintain the set point against environmental temperature fluctuations, but the amount required is low. It is a fallacy that disconnecting the geyser for, say, all day, in order to get rid of this small electricity requirement, would have electricity, without taking into consideration the consequences outlined below in more detail. .
2. If you use some water out of the geyser, this hot water is replaced by cold water, which will be heated up to the set point. During this time, considerably more electric power is used. However, after having reached the set point, the situation becomes the same as in paragraph 1. In other words, small fluctuations would occur to compensate for any variation in environmental or water temperature.
3. If you switch off the geyser for an extended period of time, then its entire contents eventually reach the ambient temperature which, for example, in winter, may be quite low. If after a long time you were to switch on the geyser, it is obvious that a lot more water needs to be heated to the setpoint than if you just took some hot water out for a bath. Assume that a typical bath takes say, 40 litres of hot water, whose temperature needs to be driven back to set point. However, if the entire geyser's contents, say, 150-200 litres need to be heated to set point from a very low temperature, then it obviously needs much more electricity than in the previous case, when temperature fluctuations were kept small by the regulator (i.e. the temperature differential is larger) ...

4. Let us take larger environmental losses into consideration. In a system without any or minimal environmental losses, the regulator can easily keep the set point nearly constant against temperature fluctuations. However, if the geyser is not adequately insulated and the environmental losses are very high, then the regulator is unable to keep the setpoint nearly constant. Electrical engineers include environmental losses in terms of an equivalent added thermal load resistance when designing a regulator. However, every regulator works only within its design range and if environmental conditions (and thus the equivalent thermal load due to inadequate thermal insulation of the geyser) exceed the designed capabilities of the regulator, then we are essentially confronted with an unregulated system. In such a case, I do agree that it is best to disconnect the geyser in order to save electricity.
5. I did not say anything about the actual setting of the thermostat. It is true that one can save some electricity by setting the thermostat to a temperature lower than 70 degrees C, such as 55- to 60 degrees C. If the set point is lower, then the temperature differential to be traversed from a low ambient is smaller, hence the electricity consumption is somewhat lower, but only whenever I take hot water out of the geyser which needs to be re-heated to set point. I have done so in my own house. Incidentally, my geyser has a factory-installed insulating cover and I also have an additional Aerolite glass fibre cover

Best regards,
Prof. Ian Shaw
Pr Eng Prof Ian Shaw, Dipl.Ing.(Elect Eng (Bpest), MA Psych (California), Dr Eng (RAU).

[Professor Shaw then adds to the debate]

Dear Paddy,

Here is an independent opinion by one of my best students (MSc (RAU) cum laude). He's an absolute genius of an engineer working in the UK.

Ian Shaw

.....

Dear Ian

The only way you are going to stand any chance of convincing these chaps is by doing a comparative worked numerical example for each case, making reasonable assumptions for all variables. The key value is what the thermal losses to the environment are, and I am sure that even the civil engineers would agree that for a zero loss system it's more efficient to leave the geyser on all the time. I said to you before that the key issue is how efficient the thermal insulation of the geyser is. You ought to be able to derive this value by an experiment: Leave your geyser to heat up to nominal value and then switch it off and measure the water temperature decrease at regular time intervals at a tap closest to the geyser. Draw a graph of temperature vs time and use this as the input to a little thermostat simulation program you can write - or do it in a spreadsheet. You might find the results quite surprising, for I'm not that convinced that geysers are that effectively insulated, but then the last time I looked at a geyser in SA was 30 years ago and it was hardly insulated at all. Geysers here in UK are called 'hot water cylinders' and are generally smaller than SA geysers. They usually are made of copper or fibreglass and have a layer of hard foam about 50 mm thick (or a woolly anorak thingy...) around them for insulation. Let me know the outcome. Don't get too wet or scald yourself!

Cheers
John

.....

[I think this is probably the time to end this debate. After all is said and done, I would like to know: Does switching off your geyser for a few hours a day save electricity. Yes or No. So far the only answer seems to be "Maybe". I asked one of my colleagues at the office to read these pieces and she said: "I really don't know what all the fuss is about." I asked her why and she said the answer is so simple: "Why not just turn down the meter." I shook my head but didn't try to explain. Editor]

Stay ahead with T5 Lighting

What is T5 Lighting?

T5 is a new type of fluorescent lighting system. It is based on a new slim fluorescent lamp that's just 16mm in diameter instead of the conventional 26mm (T8) or 38mm (T12) lamps. T5 lamps are designed for exclusive use with High Frequency control gear so they always illuminate in an instant without any flicker whatsoever. Also, even though the lamp is 40% smaller than conventional T8 lamps, its superior performance means more lumens per watt. The miniaturised T5 lamp has enabled luminaire manufacturers to create slimmer, more decorative luminaires, which offer highly accurate, controlled beam spreads. The result is exceptionally stylish, energy-efficient and comfortable lighting.

Why is T5 better?

- Energy efficiency

T5 lamp and gear systems consume up to 22% less energy than T8 or T12 systems operated on conventional control gear. And, when used in combination with High Frequency lighting controls, even higher energy savings can be achieved.

- Miniaturisation

With miniature luminaires, lighting specifiers have more design freedom such as narrower light lines. Miniaturisation also opens up new opportunities such as recessed lighting in low ceiling voids, sign lighting and furniture lighting. The original MASTER 'TL5 lamp (at just 16mm diameter), has opened a new world of slim design opportunity for luminaire designers. More room for elegance, understatement and modernity.

- Environment-friendly

In addition to being energy-efficient, T5 lamps have very low mercury content and use less glass in the tube, less metal in the base, and less material in the packing. They're also almost 100% recyclable.

Why original?

Philips invented the T5 concept and Philips MASTER 'TL5 lamps are considered by the lighting community as the original T5 lamps. They are tried, tested and proven – they also represent the largest selection of T5 lamps anywhere. So to ensure that your requirements will always be met exactly, make certain your chosen T5 luminaires come with an original Philips MASTER 'TL5 lamp. They come exclusively in triphosphor coatings (not the poorer-performing halophosphate powders), which is one of the reasons why they offer:

- Excellent light output – up to 104 lm/W
- Choice of 80 colours or 90 colours phosphors
- Low lumen depreciation
- A wide choice - High Output (HO), High Efficiency (HE) and circular lamps
- 20,000 hrs average rated life

MASTER 'TL5 High Efficiency (HE) lamps

MASTER 'TL5 High Efficiency lamps combine maximum energy efficiency with good light output. They are ideal for efficient direct lighting in areas such as offices, schools and hospitals.

- Luminous efficacy of up to 104 lm/W
- HE lamps are up to 10% more efficient than HO lamps

MASTER 'TL5 High Output (HO) lamps

MASTER 'TL5 High Output lamps combine maximum light output with good energy efficiency. They are ideal for areas requiring high lighting levels, or indirect lighting such as wall-washing or for areas with high ceilings, such as shops, industry and public buildings.

- Up to 60% higher light output than HE lamps, so fewer luminaires are needed
- Ideal where a lot of light is required from a short lamp length. For example, the 4ft long HO 54 W generates the same number of lumens as a conventional 5ft 58 W lamp, even though it is shorter and consumes less energy



The green cap is the symbol of the most environment-friendly fluorescent lamps in the world. The Philips MASTER 'TL5 lamp can be recycled almost entirely.



asimpleswitch.com

'TL5 High Output Ra 90 lamps

'TL5 High Output lamps are now also available in the 90 colours, offering excellent colour rendering for those areas which are particularly colour critical, such as hospital treatment rooms, print shops, colour inspection areas, museums and certain shops. They are, however, less efficient than 'TL5 HE and HO lamps.

- Colour rendering greater than Ra 90
- Only available in the HO wattages
- Choice of colour temperatures

Why electronic?

One of the reasons why T5 luminaires offer such massive operational cost savings is that the lamps run exclusively on electronic gear. Using electronic gear not only reduces energy consumption by up to 22% (and up to 70% with lighting controls such as daylight linking and dimming) it also results in the following benefits:

Reduced costs

- Up to 50% extension of the lamp life
- Reduced maintenance costs due to increased lamp life

Improved comfort

- Smooth and rapid starting without flicker
- No stroboscopic effects due to the high frequency at which the lamps operate
- No flicker at the end of lamp life, the lamp is automatically switched off

Improved safety

- Over-voltage detection
- Protected control of the mains voltage input
- Noticeably lower operating temperature

Enhanced flexibility

- Rooms and areas can now be dimmed when a regulating ballast is selected, allowing for adjustment of lighting levels to personal preferences
- Additional savings on energy via daylight-linked lighting control and/or presence detection
- Also, digital control coded input according to 'Digital Addressable Lighting Interface' protocol (only on DALI regulating ballasts)

Perfectly tuned to each other

By using Philips 'TL5 electronic gear, you not only benefit from the improvements listed left, you can also be sure that the lamp and gear work perfectly together, because Philips is one of the few manufacturers that offers both lamps and electronic gear. Which means that you can be certain your T5 installation will be 100% perfect from day one.

Choose from a complete range of electronic gear

The Philips range of electronic gear provides solutions whatever lamp your lighting system requires. No matter which MASTER 'TL5 lamp you select, there is an electronic ballast available in standard HF-Performer and dimmable HF-Regulator for 1-10V as well as DALI controlled.

MASTER 'TL5 28W lamp		TL-D 36W lamp	
Efficacy	104 lm/W	Efficacy	92 lm/W
System efficiency with 2 x 28W ballast, electronic control gear	94 lm/W	System efficiency with 2 x 36W conventional ballast	94 lm/W
System efficiency Energy Usage	12% higher 22% lower		

Example of MASTER 'TL5 lamp and gear efficiency increase 4ft (1200mm) HE 28W compared with 4ft (1200mm) TL-D 36W

	Diameter mm	Wattage W	Lumens (at 25°C)	Efficacy (at 35°C) lm/W	
TL Standard	T12	38	40	2850	71
TL-D Super 80	T8	26	36	3350	93
TL-D Super 80 HF	T8	26	32	3200	100
MASTER 'TL5 HE	T5	16	28	2600	104

Performance comparison of different 4ft (1200mm) fluorescent lamps



Just what you'd expect from the original...

As the originators of the T5 concept, Philips MASTER TL'5 lamps represent the broadest range anywhere. So you can enjoy even more lighting layout freedom than ever before. There's a choice of lamp colours, including warm white, neutral white and daylight. In addition to a selection of High Efficiency and High Output lamps there's also a choice of innovative circular lamps. All of which means that with Philips, you'll never need to compromise your ideas and you can always achieve the exact effect you're looking for!

www.lighting.philips.com

PHILIPS
sense and simplicity



*510,000,000 KM, 380,000 SIMULATIONS
AND ZERO TEST FLIGHTS LATER.*


THAT'S MODEL-BASED DESIGN.

After simulating the final descent of the Mars Rovers under thousands of atmospheric disturbances, the engineering team developed and verified a fully redundant retro firing system to ensure a safe touchdown. The result—two successful autonomous landings that went exactly as simulated. To learn more, go to mathworks.com/mbd

**MATLAB®
& SIMULINK®**

Kimberley turns itself on before anyone else

By Paddy Hartdegen



For the first six months of this year Eskom has come in for extensive criticism because it hasn't been able to supply enough electricity to consumers throughout the country. But despite the rationing of power, street lights have kept burning day and night in some areas.

There has been much debate, finger-pointing and blame levelled against Eskom and against the municipalities as well. Be that as it may, whatever the merits and de-merits of the allegations are that is not my concern right now.

Instead, I thought it would be interesting to look at the early development of electrical power generation and distribution in South Africa and when electricity became an integral part of our lives.

I'm sure many electrical boffins have some idea of the background to South Africa's electricity supply even though many other ordinary people have no idea about how it came about.

Surprisingly, South Africa's first electricity supply was not in one of the main centres, (although the diamond diggings were pretty important then) but in Kimberley when that city was at the height of its diamond boom and gemstones were being plucked from the ground at will.

Cecil Rhodes was running around town buying up claims with wads of cash without even soiling his hands or toiling under the hot, dry, unforgiving Kimberley sun. Perhaps, though, he would have attended the public meeting held towards the end of 1881 when the residents of the town were asked to vote on whether or not to light Kimberley's dark streets.

The city itself was a dangerous place after dark, as marauders, gangsters or small-time hoodlums held-up anyone who might be carrying a diamond or the

licence to a claim. The residents who turned out for that meeting were unanimous: Kimberley needed light at night to make it a safer place and the option seemed simple enough. Build an electrical power station that could give residents street lights and make their journey back to a bunkhouse less perilous.

Responding promptly, Kimberley's 'city fathers' negotiated a contract with a firm calling itself the Cape Electric Light and Telephone Company who undertook to install and maintain 32 street lamps of 2 000 candle power at a cost of £7 000 a year.

By February of 1882 street lights had been installed and the 'big switch-on' was eagerly awaited by those people who were sick of wending their way home – loaded with liquor or loot – in total darkness. The results were dismal. A light or two blinked, spluttered and then failed. The 'big switch-on' was a damp squib, loudly condemned as a failure.

What residents didn't know or understand was that many of the lamps had been damaged in transit – carried as they were by ox-wagon from the shores of Cape Town – and worse still, some of the wiring was faulty as well. Another public meeting was held and while 133 people voted for cancelling the contract, 162 chose to press ahead. I'd love to know just how much lobbying had been done prior to the vote but that's a story that will never be told.

The Cape Electric Light and Telephone Company continued to work on the project as they tried to provide light to the people of a dark, night-time Kimberley. Eventually the company did get some of the street lights working and one or two buildings (most probably belonging to either Rhodes or Barney Barnato or both) were illuminated as well although most of Kimberley remained in unashamedly in the dark.

Remember though that diamond miners are a rugged lot – even if they're impatient – and the residents of Kimberley doggedly clung to the ideal of having safer streets to walk in when the sun had set over the distant Colesburg Kopje – now more of a mound than a kopje thanks to all the mining activity.

Finally, on 1 September of 1882 the street lights of Kimberley were switched on and lo and behold the whole city (village really)

innovation.infrastructure.implemented

Consulting

Distribution

Building Services

Demand Side Management
Instrumentation & Control

Training*

Health & Safety Rep

SHE Plan Development

Environmental Management

Project Management

Project Managers

Project Co-ordinators

Clerk of Works



ISO 9001:2000



ITHEMBALETHU
CONSULTING SERVICES (PTY) LTD

www.ithembalethu.com

011 802 4075



Everything was electrically powered – except the hardened hands of the diggers or the nefarious deals of Cecil John Rhodes

Of course by the early 1890s Johannesburg was thriving on its gold fields when none other than J Hubert Davies addressed the inaugural meeting of the South African Association of Engineers and Architects held in the city in 1892.

The subject of Davies' address was the *Electrical Transmission of Power* and he told delegates that the reliance on coal would soon be outweighed by the use of electrical power.

He had to explain how electricity could be used and he did so rather simplistically (and with a strict time-limit for speakers) by saying: "A dynamo machine is driven by a water-wheel, steam-engine, or other source of power and generates electric current; this is carried by wires to an electric motor which turns and delivers power when the current passes through it. The elementary principles of action of a dynamo are easily understood." (Pity we can't get Eskom to understand this – it's not too difficult.

He continues: "If the wire is moved downwards between the poles the current will be produced in one direction, and, if moved upwards, in the other direction. The amount of current that will pass will depend directly upon the electromotive force and inversely on the whole resistance to its passage in the complete circuit.

"The moving of a thin wire with the ends unconnected through the the magnetic field is unaccompanied with any exertion; but if the ends are connected together, so that a current passes, there will be an appreciable resistance to the motion of the wire, and this resistance to motion will be directly proportional to the current that passes." (Some engineers might have understood).

What a quaint explanation.

He went on to say that water-or steam-power can produce electric current at one central spot that is sufficient for driving a number of motors distributed over a considerable area.

He said that if steam is employed, large engines of the most economical type can be used. Coal is only required at one point and the "dirt and trouble of several steam plants and the attendant labour is avoided and no small or uneconomical engines are required."

It wasn't much later that Johannesburg, no doubt having heeded Hubert Davies' comments, switched to electrical power and relied on it until 2008 when someone or something else decided otherwise. **Wn**

was illuminated. Kimberley 'turned on' just three days after Thomas Edison demonstrated the value of electric light at night in Menlo Park in the United States of America.

Better still, Kimberley switched on its city power three days before the New York City commissioned its Park Street Power Station.

Shareholders, brokers and inventive entrepreneurs in Britain – so closely linked to the Cape Colony while exploiting the diamond reserves of South Africa – didn't get electric street lights for some years to come and the British still dependent on gas when Kimberley's streets lit up.

To provide the light, the Cape Electric Light and Telephone company erected four belt-driven dynamos powered by 70 horsepower Robey engines to generate the electricity need for the street lights. It was the very first power station in Africa and it generated power to 16 Brush arc lamps of 2 000 candlepower each.

What a blessing for the starry-eyed prospectors who hit pay-dirt by pulling a gem from the dust. At least they'd know who tried to rob them because they could see the person. They could accuse them, have them arrested and flung in jail and keep the gem they'd earned from their toils.

Electricity proved so invaluable to the city of Kimberley that within the space of a few years the local authorities commissioned the first municipal reticulation system to provide electricity to buildings, industrial concerns, street lamps and even homes.

But this new system was considerably more elaborate than the first dynamo and Robey engines. To feed the city, two steam-powered generators capable of generating 150 kiloWatts each were commissioned and Kimberley came alive with electric current.



WATTnow

— a magazine to keep you enlightened, informed and intrigued

WATTnow is published monthly by Crown Publications and the South African Institute of Electrical Engineers and it provides a fascinating insight into:

- Technology
- Energy and Electronics
- Science and Research and Development
- New products and interesting gadgets

In addition, WATTnow gives its readers extensive and in-depth coverage on a number of topical issues such as the energy crisis facing South Africa or government's plans to extend the roads network around Gauteng and toll motorists using it.

WATTnow also offers its readers a monthly in-depth article on one of the many fascinating aspects of engineering, ranging from the development of South Africa's nuclear energy capacity to the use of coloured lenses to correct dyslexia.

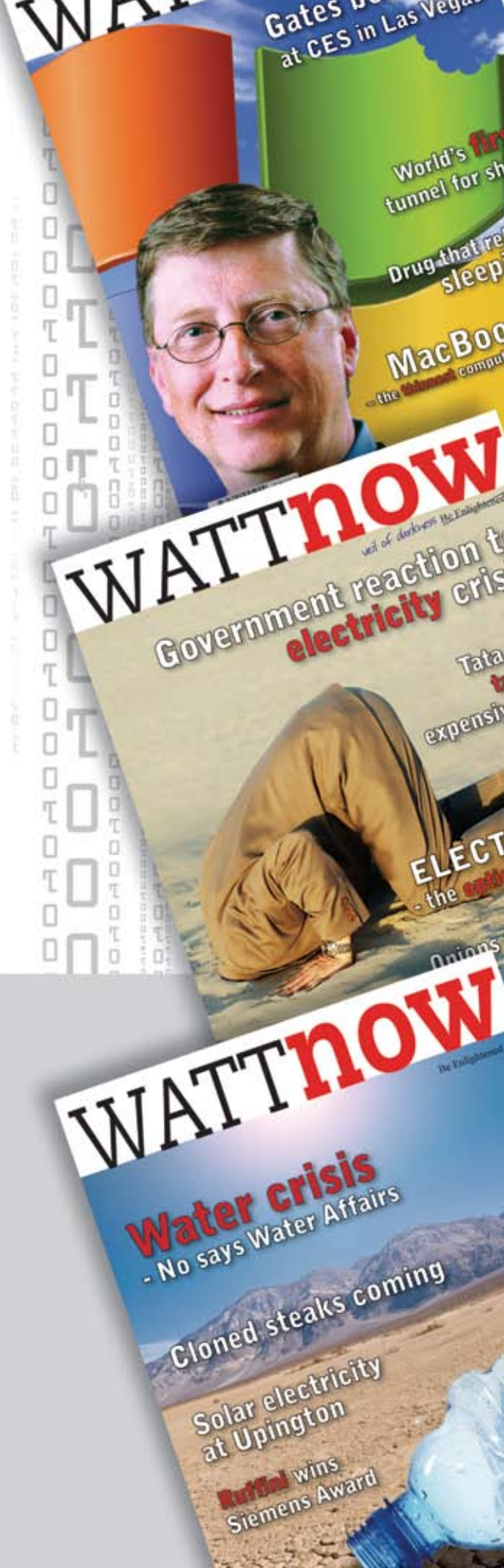
It is the official magazine of the South African Institute of Electrical Engineers and is distributed to members of the Institute. It is also sold by retail outlets in all nine provinces.

Please book me a one-year subscription to WattNow.
R199 per annum incl. VAT in RSA. Postage extra outside RSA.

Title _____ Initials _____ Name _____
Surname _____
Company _____ Department _____
Position _____ E-mail _____
Postal Address _____ Postal Code _____
Province _____ Country _____
Phone Code _____ Number _____
Fax Code _____ Number _____
Signature _____

New subscriber Renewal Tax invoice required

Contact Norma Massey, E-mail: normam@crowns.co.za
Tel: +27 (11) 622 4770
Fax: +27 (11) 615 6108





BRAIN BUSTERS

Here are some more brain busters to exercise your grey cells. To gain the maximum effect you should attempt to answer them before looking at the answers, which will be available on our website, www.crown.co.za/wattnow

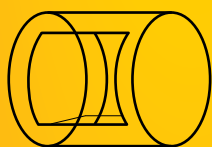
Question One

A man went into a bank with exactly R1000, all in one rand coins. He gave the money to a cashier and said, "Put this money into ten bags in such a way that if I call and ask for a certain number of rands, you can hand me one or more bags, giving me the exact amount called for, without having to open any of the bags." How was the cashier able to do this?

Question Two

Two views of a certain object are shown in orthographic projection above. Try to sketch the right view and oblique view of this object.

From Dr. Tom Cleaver is a University of Louisville professor of electrical engineering and former author of the Brain Busters column in the Louisville Times.



OBLIQUE VIEW



RIGHT VIEW

Question Three

One day, a person went to horse racing area, Instead of counting the number of human and horses, he instead counted 74 heads and 196 legs. Yet he knew the number of humans and horses there. How did he

CDs will save us from climate change

Scientists are trying out a new strategy for tackling climate change that involves redundant DVDs and CDs being used to tile rooftops and pave roads. Not only does this make them look nice and shiny, say the scientists, it causes the sun's light to be reflected back into the atmosphere and away from the Earth.

Several leading climate experts have pointed out that this is a preposterous, not to mention hugely scientifically flawed, scheme. But the researchers refuse to let the 700,000 unsold copies of Shrek III they have obtained for the purpose get into the hands of the general public. (from The Journal of Unlikely Science: www.null-hypothesis.co.uk)

Global warming floods could flood roads

Ingenious scientists working in America have determined that should global warming cause sea levels to rise then the coastal areas including the roads would be flooded.

The scientists are so certain of their findings that they have now urged the transport departments (rail and road) to take heed of their warning particularly for low-lying roads and rail links. Perhaps there are some still some idiots left somewhere in the world who haven't yet worked out that if water levels rise, roads will flood.

Exactly what reasoning is behind the notion that roads and railway lines would be immune from flooding is completely unknown but Henry Schwartz Jnr, the chairman of the committee that wrote a report on climate change warned: "The time has come for transportation professionals to acknowledge and confront the challenges posed by climate change and to incorporate the most current scientific knowledge into the planning of transportation systems."

Evidently he was referring to the 'scientific knowledge' that proves that low-lying roads and railway lines will be flooded if the level of the sea rises. Is this what real scientists do for a living?

Drug abusers abuse drugs

In an astonishing study of 3 500 college students in America, researchers have found that people who use prescription medications without getting a prescription are likely to have a drug abuse problem.

The researchers found that there was a high correlation between taking un-prescribed drugs and experiencing symptoms of drug abuse. Those students who only took medications when and as prescribed did not suffer from problems of drug abuse.

So students who are taking prescription drugs without a prescription must beware because the scientists have proved that if they do so they are abusing drugs. What a startling finding from a team of researchers with so little to do that they can interview 3 500 students to prove what everyone already knows.

Drug abuse is taking prescribed (or banned) substances without a qualifying medical condition. Ask any addict.



Neotel offering 700 kbs Internet access

Neotel's NeoConnect combined voice and data services is available at prices ranging between R299 and R999 a month and it is hoping to connect between 50 000 and 60 000 users within the next nine months according to company chief executive Ajay Pandey.

Five 'converged' packages are available and the top-of-range offering includes 2 000 free on-network minutes (between Neotel phones), 120 free minutes to Telkom users, text messaging and high-speed Internet and e-mail services.

The company says users can expect average speeds of between 300 and 700 kilobits-per-second with a 2,5 gigabyte limit for entry level offerings and unlimited access for the top level. NeoConnect is offering ad hoc purchases of additional Internet capacity at just eight cents per megabyte or R8,00 per GB which is a fraction of the top-price charged by other Internet Service Providers.

Neotel says that it will "soon have" a presence in Soweto, Durban and Cape Town while cities such as Port Elizabeth, East London, Bloemfontein and Kimberley will take a little while longer to receive service.



Safari bug has serious implications

Apple's Safari browser has a bug that could allow computer hackers to litter a victim's desktop with executable files in an attack known as 'carpet-bombing'. It can be exploited in combination with a second bug that will allow unauthorised software to run on a victim's computer according to Aviv Raff, a senior security researcher.

Raff sent demonstration attack code to IDG News Service and it demonstrated that a victim must first run a maliciously crafted web page with the Safari browser which will in turn trigger a carpet bombing attack that exploits a flaw in Internet Explorer.

According to Raff, both the Safari and Internet Explorer bugs are "moderate vulnerabilities" that when combined produce a critical flaw which allows remote code execution. Microsoft is taking the issue seriously and it has released a security advisory on the problem. The company hopes to have a patch for the Internet Explorer flaw soon.

Microsoft has recommended in its security advisory that Safari users restrict the use of Apple's browser until an appropriate update is available from either Microsoft or Apple. The attack affects all versions of Windows XP and Windows Vista.

According to Raff unless Apple fixes the bug in Safari, more attacks like the one executed through Internet Explorer are like to be developed. Apple has not commented on the flaw or given any indication of whether or not it will fix the bug.



Bright boys 'programmed' for Egypt

Four young South African computer programmers – selected from more than 34 000 entrants – will be taking part in the International Olympiad in Informatics in Egypt later this year. Over the past 17 years, South African teams have won four gold, 13 silver and 18 bronze medals at the International Olympiad.

The four-person team consists of brothers Saadiq Moolla, 18, who is studying an MBChB at the University of Cape Town (UCT) and Haroon Moolla, 17, who is a Grade 12 pupil at Rondebosch Boys' High. Both brothers have participated in the science and maths Olympiads in the past.

The other two members are Mark Danoher of Port Elizabeth who is studying computer science at UCT and won a gold medal at last year's Computer Olympiad and Schalk-Willem Kruger who is a Grade 11 pupil at Ferdinand Postma High in Potchefstroom. Kruger won a bronze medal at last year's Computer Olympiad.

About 80 countries are expected to send teams to compete in the International Olympiad in Informatics.

Super-cable for Africa by 2010

The \$510-million African West Coast Cable (AWCC) linking South Africa with Britain via the west coast of Africa will allow for the deployment of a 3 840-gigabits-a-second super cable that will start in Cape Town and terminate in London. It will have 10 branching units allowing connections from other African countries to link into the cable and share the bandwidth.

The 13 000 kilometre cable will be significantly larger than the 120-gigabits-a-second existing SAT3/West Coast Submarine Cable that currently connects South Africa with Europe. It will take until 2010 for the cable to be functioning and even then it will have a capacity of just 320-gigabits-a-second.

State-owned communications infrastructure company Broadband Infracore holds 26 percent of the equity in the project and the balance is split between various telecommunications companies including Neotel and Telkom. Namibia is believed to be one of the first countries likely to build a landing station for the cable as it does not have access to the SAT-3 cable.

Once the various cable projects are complete South Africa will have a combined total of 6010-gigabits-a-second connectivity available to it. The other cable projects include: Safe; Eassy; Seacom.

The more controversial Uhurunet system that will eventually encircle the whole of Africa and which has the backing of the New Partnership for Africa's Development, has yet to get the go-ahead but if it does this project would make a significant amount of additional bandwidth available to South African companies.



Voluntary recall of 970 000 NEC computers

NEC Corporation of Japan is recalling – on a voluntary basis – 970 000 of its Lavie and VersaPro computers made between 2003 and 2006 because they could start emitting smoke and giving off an unpleasant odour similar to that of melting plastic.

The company has received over 260 complaints about a smell of melting plastic or smoke that comes from the computers and the company says that while the complaints are real there is no danger that the computers will suddenly burst into flames as the models are made from flame-resistant materials.

It is offering to repair the computers free of charge. The problem is caused by wiring that has been installed too close to the main mother board and while it may affect the display it is unlikely to affect the computer itself. However, the company says that people who own the NEC models affected by the problem can have them sorted out for nothing.

The models include the Lavie L and F models, made between 2003 and 2004 and the VersaPro models made between 2003 and 2006.



Curved TV displays provide exceptional clarity

A convex-curved display technology that will boost colour performance and image quality on LCD television screens or computer displays has been developed by Taiwanese company AU Optronics. It is the world's second largest manufacturer of thin-film transistor liquid crystal display panels.

The specially designed curved backlit unit maintains a uniformity of brightness and contrast on the convex surface and this contributes to much greater colour and clarity of the images. The curved radius is 100 millimetres with the TFT-LCD process on the glass substrate.

The technology is likely to be applied to new applications including watches and dashboards in motor vehicles.

PlayStations guzzle power even in standby mode

An Australian consumer agency has found that plasma flat-screen television sets and video game consoles guzzle enormous amounts of electricity. Research by Choice in Australia said that Sony's PlayStation 3, Microsoft's Xbox 360 and any plasma television consumed the most power out of 16 electronic devices tested. These units consumed power even when in standby mode.

The results of the test showed that a plasma TV consumed four times more power than an analogue set and leaving a PlayStation 3 on all the time would take five times more power than it takes to run a refrigerator. The full results of the study are available online at www.choice.com.au

The report advises all consumers to switch off electronic appliances at source rather than by using the remote control as this puts the television set or electronic device into standby mode that continues to use up electricity.

South African consumers have repeatedly been warned to switch off electronic devices at the wall socket when not in use and the research by Choice emphasises this point. Given the repeated power cuts that occur in South Africa some sensitive electronic devices can be damaged when power shuts off and this is yet another reason to switch off the appliance entirely rather than leaving it in a standby mode.



Waterless washing machines coming?

A British-based company, Xeros, plans to start selling next year a washing machine that will use just one cup of water and a fraction of the energy used by a conventional washing machine. The machine uses plastic chips to remove dirt and stains from clothes or other fabrics leaving them dry at the end of the washing cycle.

Xeros has already got an investment of £500 000 to develop and market the new washing technology. The machines are likely to be priced at much the same level as conventional washing machines the company claims.

Statistics show that washing machine usage has increased by about 23 percent in the last 15 years with the average household using about 20 litres of water a day to keep clothes clean. A typical washing machine uses 35 kilograms of water per kilogram of washing. In addition power is needed to heat the water and to dry the clothes.

Currently about 2-million new washing machines valued at about £1-billion are sold in the UK every year which will probably surprise many people who travel to that country and have to endure the odours that emanate from the British people on a busy underground at peak time.



Centimetre chip can hold 70 W of electrical power

Scientists at IBM have managed to capture 230 Watts of energy on a centimetre square solar cell using a technology that is called concentrator photovoltaics (CPV). The energy is converted into 70 Watts of usable electrical power which is about five times the electrical power density generated by cells on solar energy farms.

Using a lower number of photovoltaic cells and using larger lenses to concentrate more light onto each cell allows significant costs savings to be achieved the scientists claim.

According to Dr Supratik Guha who is leading the photovoltaics research team at IBM the 'trick' lies in being able to cool the tiny solar cell. He says that concentrating the equivalent of 2 000 suns (on 'sun' is a measurement equal to the solar power at noon on a clear day) onto a square centimetre generates enough heat to melt stainless steel.

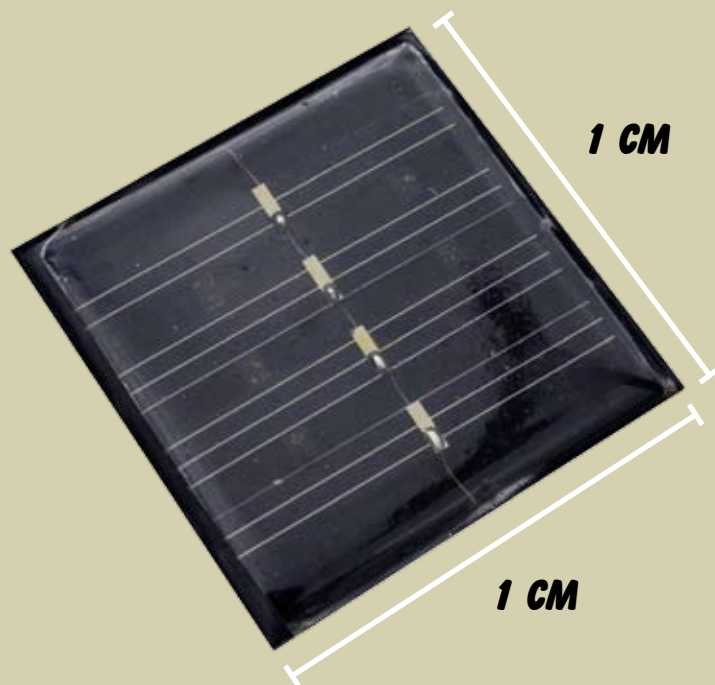
However, by using innovations used to cooldown computer chips the team was able to reduce the heat from 1 600 degrees Celsius to just 85 degrees Celsius. This is achieved through a liquid metal cooling interface which transfers heat from the solar cell to a copper cooling plate.

IBM says the team used a thin layer of liquid metal made from a gallium and indium compound that was applied between the chip and a cooling block. These thermal interface layers transfer heat to the cooling block to keep the chip cool.

IBM is concentrating its photovoltaic research on using existing technologies to develop cheaper and more efficient solar cells, develop and manufacture new thin-film photovoltaic devices, create

new concentrator photovoltaic systems and devise new photovoltaic architectures based on nanostructures such as semi-conductor quantum dots and nanowires.

IBM says that it is seeking to develop efficient photovoltaic structures that would reduce costs, minimise complexity and improve flexibility of solar electric power.



Drilling causes massive mud leak

A volcano that has been spewing boiling mud for the past two years and has already displaced 50 000 people on the Indonesian island of Java was caused by a gas exploration well and not by an earthquake as originally thought.

Records from the gas and oil exploration company Lapino Brantas show that the incident at the Banjar-Panji-1 well started after a huge 'kick' was triggered by the drilling, allowing an influx of fluid and gas into the wellbore.

According to a team of British, American, Indonesian and Australian scientists the pressurised fluid fractured the surrounding rock and mud spurted out of cracks in the earth's crust rather than from the wellhead itself. The scientists believe that there is now no way of stopping the mud from spewing through the cracks

because if they block one crack it will simply flow around it and through another one.

The Lusi mud volcano is an unnatural disaster which has already caused millions of dollars worth of damage. The mud is flowing at a rate of 100 000 cubic metres a day. The mining company has blamed the Yogyakarta earthquake – with a magnitude of 6,3 on the Richter scale – for the eruption. The quake occurred 300 kilometres from the Lusi site but left some 6000 people dead and more than 1,5-million homeless.

The scientists have tested this argument and found that the pressure underground due to the quake was far too small to cause the mud volcano. These types of volcanoes occur naturally when a mix of mud, water and gas forms underground and is forced to the surface. There are several thousand mud volcanoes around the world.



Sounds and colours enhance food flavours

Scientists have found that the sounds that diners hear when eating their food actually changes the way they think it tastes. Moreover, by changing the colour of the food so the diners believe that it tastes different too. Food manufacturers are hoping to exploit these findings in a bid to make their products more appealing but not necessarily more appetising.

According to Professor Charles Spence, a sensory psychologist at Oxford University it was thought that taste and smell were the only senses to influence the way that flavour is experienced. He has found that by changing the sound that food makes while it is being eaten can actually make it seem crunchier or softer when chewed.

By playing sounds of the seaside while diners are eating can make the taste of seafood flavours more intense. He found the same results occurred when diners eating chicken heard sounds of clucking or when the sizzling sound of bacon was used the egg and bacon flavours seemed more intense.

He also found that by changing the colour of a drink to a deep red diners thought that it was about 12 percent sweeter. According to Spence this is because red has a strong association with ripening of fruit and the sweetness that comes with that.

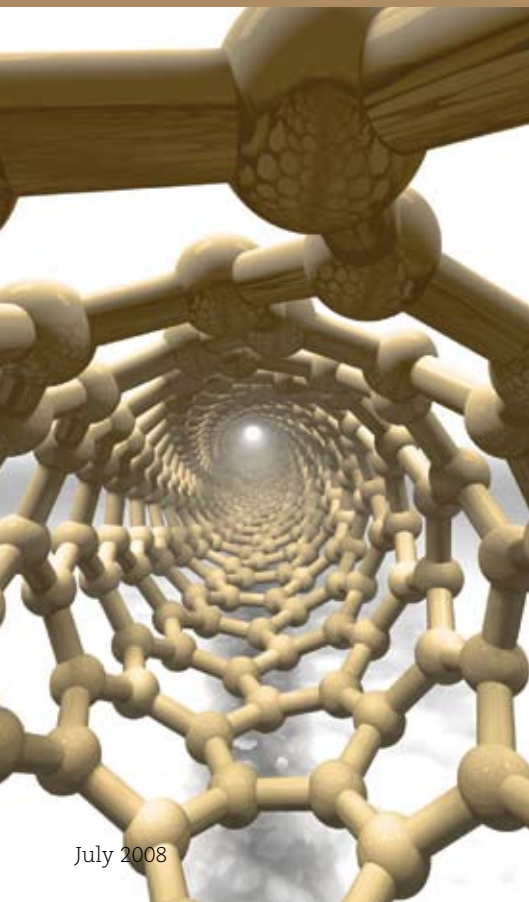


Spence says that for some foods, sound is particularly important so carbonated drinks must sound fizzy, crisps and biscuits should have a higher frequency so they sound crunchier while foods that are naturally soft should have a lower frequency implying that they are soft.

Spence is currently working with a number of international food companies including Nestle and Unilever to find new ways of using frequencies and sounds to enhance flavour.

Of course the cynic in me says that a piece of raw liver is a deep red colour and I certainly don't think that I'd take a bite and find it sweet and appetising no matter how many live cattle were lowing in the pastures outside.

Gas sensors that last 'forever'?



MIT chemical engineers have built the world's most sensitive electronic gas detector using carbon nanotubes. The super-sensitive, small detector is capable of detecting the nerve agent sarin as well as mustard gas, ammonia, the VX nerve agent and many others. It is small enough to be carried in a pocket.

According to Michael Strano, associate professor of chemical engineering at MIT says the sensor has exhibited "record sensitivity" and can detect minute quantities of molecules equivalent to 25 parts per trillion. He says that currently no other sensor made anywhere in the world is able to demonstrate this level of sensitivity.

To build the detector Strano and his team used an array of carbon nanotubes aligned across micro-electrodes. Each tube has a single-layer lattice of carbon atoms rolled into a long cylinder with a diameter about 1/50000th of a human hair.

The nanotube sensors require just 0,0003 watts of power and this means that a single sensor would run 'forever' on a standard

torch battery. When a gas molecule binds to the carbon nanotube the tube's electricity conductivity changes allow each gas to be identified by the conductivity change.

According to Strano, new levels of sensitivity were achieved by coupling the nanotubes with a miniature gas-chromatography column etched onto a silicon chip small than a five rand coin. The column rapidly separates different gases before feeding them into the nanotubes.

It is the first nanotube sensor that is passively reversible and to achieve this the team needed to decrease how strongly the nanotube sensor binds different gas molecules on its surface. By doing this the sensor is able to detect a series of gas exposures in rapid succession.

This is done by coating the nanotubes with amine-type molecules which 'donate' an extra pair of electrons to the nanotubes. The coating allows the gas molecules to bind to nanotubes but detach a few milliseconds later allowing another molecule from the column to occupy its space. A network of these reversible sensors would allow gas to be tracked as it spreads across a large area.

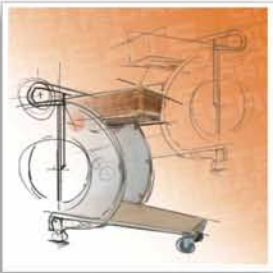


AT YOUR SERVICE

With offices in Durban, Johannesburg and Cape Town; and selected international partnerships, CREATE is strategically positioned to offer full design, manufacturing and logistical support, both nationally and internationally.

CREATIVE CLARITY

Your vision and objective is our starting point. We assist you in clearly defining your particular needs and create a model for the development of your Point of Purchase solution.



DESIGN

Our design team; specialists in the fields of graphic design, architecture and mechanical/industrial design ensure that your ideas are considered from every perspective. Our creative team will develop your vision through the latest 3D technology.

CREATIVE SOLUTIONS

Creating harmony and synergy between all facets of your paramount. Our strategic approach and proactive service ensures seamless intergration of your project from design through to delivery.



CUSTOMIZED PRODUCT SOLUTIONS

- Point of Purchase Displays
- Shop Fittings & Fixtures
- Shop Systems & Layout
- Visual Display Solutions

VISUAL DISPLAY RANGE

- Non-Illuminated
- Illuminated
- Leading Edge



WIRE SYSTEMS RANGE

- Trendsheff Range
- Stack Baskets
- Dump Bins
- Shelving



MATERIALS HANDLING RANGE

- Shopping Trolleys
- Mini Shoppers
- Merchandising Trolleys
- Rolltainers (Security Cages)

Humpback whale inspires new blade designs

The fins of a Humpback whale have been used as a basis to design serrated fan-blades that use 20 percent less energy than flat-bladed models. Frank Fish (note the name) saw a picture of a Humpback whale and noticed that its fins were serrated like teeth on a saw. It was these serrations that gave it astonishing agility in the sea.

According to Fish, the serrations or tubercles on a whale's fin allowed drag to occur at a much steeper angle than on a smooth fin as each tubercle redirects and channels the air (or water) creating a whirling vortex that improves lift.

Fish, a biology professor at West Chester University in Pennsylvania tested the Humpback whale's fin in a wind tunnel and compared the results with a smooth, sleek fin from another species. His results proved that these tubercles gave the Humpback was more powerful, agile and had greater manoeuvrability than any other smooth-finned species.

Fish says the findings can now be adapted to a range of different applications where fans are used. He has now teamed-up with a

Canadian businessman to form WhalePower that will market this technology.

Already the US Naval Academy has expressed its interest in using the technology for building ship and submarine rudders. Canada's largest industrial ceiling-fan manufacturer, Envira-North is making a new range of products that company chief executive Monica Bowdeen says use 20 percent less energy, reduce noise and increase the even distribution of air.

Envira-North will start shipping the new fans – up to 7 metres in diameter – in October this year.

WhalePower says that while it has not actively started marketing the new technology it has already received enquiries from a host of different companies including computer manufacturers.

The company has set up an experimental wind turbine with 11 metre serrated blades at Canada's Wind Energy Institute testing site at Prince Edward Island on the Atlantic coast. The full test results will be released later this year but already Fish says the blades provide more energy from less wind than conventional blades.



Natural curves: Industrial designers are studying the serrated fins of humpback whales for clues to create energy-efficient blades, such as retrofitted turbines at the Wind Energy Institute of Canada in North Cape, Prince Edward Island. COURTESY OF WHALEPOWER

Really hot, really short, sharp blast

Scientists at the Rutherford Appleton Laboratory have used a laser to heat matter to 10-million degrees Celsius, hotter than the surface of the sun. The Vulcan laser concentrated power, equivalent to more than 100 times the world's total electricity production, onto a tiny spot for a fraction of a second to create this heat.

Scientists are hoping that this experiment will allow them to explore in miniature many of the astronomical phenomena that occur in events such as supernovas. The Vulcan laser focused one petawatt of energy (about one thousand million million Watts) onto a spot that's just one tenth the size of a human hair.

The laser blast lasted for one picosecond (one millionth of a millionth of a second). This tiny blast heated materials above their normal melting point similar to those found in supernova explosions, white dwarfs and neutron star atmospheres.

According to Professor Peter Norreys of Rutherford and Imperial College in London, the laser's power gives researchers a new tool to study really hot, dense matter. The scientists are hoping to use lasers to fuse isotopes of hydrogen, deuterium and tritium to release vast amounts of energy.

This process occurs naturally in the core of the sun where gravitational pressure allows this to happen at temperatures of about 10-million degrees Celsius.

The Paradox:

Security is a full-time job.

Running your business is a full-time job.

The Answer: Proven security.

Anti-Virus

Anti-Spyware

Anti-Spam

Intrusion Prevention

E-Mail & Web Security

With McAfee®, you get the confidence of having a full-time security staff, without having to hire any staff. Simply download and install the required McAfee software and we do the rest—from maintenance, to updates, to reports, and more. Our on-call experts provide always-on, always-up-to-date protection across your desktops, servers, and network, using the same McAfee technology that blocked or contained 100% of the top attacks in 2004. You're protected from virus outbreaks, spyware/adware, spam, unauthorized desktop access, intrusion attempts, and more, all without the hassle and cost of doing it yourself. Discover a proven way to secure your business at www.mcafee.com/managed

McAfee
Proven Security™

It would have been a café to die for

A group of Ukrainian idiots came up with a novel idea to start a coffee shop or roadside café inside a disused helicopter. They found the helicopter they needed, loaded it onto a flat-bed trailer and were merrily transporting it to an unnamed city in the Ukraine when they were stopped by the elite SBU Special Services.

The helicopter was a Russian Mi-8, capable of carrying 28 soldiers and while not being used, it was still in mint condition. One problem, though, it was laced with radioactive material and was emitting more than 30 times the legal limit of radiation.

The helicopter had been used to douse flames when the Chernobyl nuclear melt-down occurred and it had been left at the site of the tragedy because its pilot – along with many other pilots – had been exposed to 100 times the radiation levels of the atom bombs dropped on Nagasaki and Hiroshima.

Most of the pilots who flew more than 2 000 sorties over Chernobyl died from lethal doses of radiation.

The helicopters used to fight the fires at the nuclear plant were left to rot inside the 35 kilometre exclusion zone surrounding Chernobyl because of the high radiation levels they contained.

That is until the enterprising Ukrainian fools popped up and helped themselves.

After their arrests the men confirmed that they wanted to set up a roadside diner or theme café using the helicopter (they say they didn't know it was radioactive) as a centre-piece. Fortunately for them, they were arrested and turfed in jail, the helicopter was returned to the exclusion zone and the radioactive theme café remained an idiotic dream.



Pisa's 'scoliosis' reduced by 37cm

A major restoration project on the Leaning Tower of Pisa has been straightened by 37 centimetres since 1999 at a cost of £20-million and it is now leaning just four metres off centre. According to Turin-based engineer, Michele Jamiolkowski, the tower is safe for the "next 300 years". The tower has been leaning since shortly after work began on it in 1173. It was closed to the public in 1990 but has since been re-opened.

Jamiolkowski says that a secret room – which was closed in 1935 – allowed visitors to enter the tower from a side door and look up through the seven storeys to the sky above. However, as the tower leaned over the view was blocked by an attic that kept instruments to measure how far off centre the tower was. The Pisa engineers will not to remove the attic to once again allow sightseers to look through the building and up to the sky above.

The tower was re-opened to the public in 2001 after 70 tons of soil was removed from its north side, away from the direction in which it leans and cement was injected into the ground beneath to relieve pressure on the walls and foundations. While this operation was underway, cables and lead counterweights with a mass of about 870 tons were attached to the tower to stop it from toppling over.

All the grime and pollution that accumulated on the marble exterior has now been removed as part of the restoration project, which will be completed in three months.

In 1372 Galileo Galilei is believed to have dropped canon balls from the tower in his gravity experiments.



SONY

Network Surveillance and Security Solutions

Sony is the first & last word in corporate & retail security world wide. Sony offers scalable end-to-end solutions that fit your budget & your environment perfectly. Our systems run over existing networks & therefore require no initial investment in a new infrastructure. View our wide range of options to capture, monitor, transmit, store & access video images within the security & surveillance portfolio.

NETWORK SURVEILLANCE

- Network Video Camera's
- Network Video Recorders & Servers
- Network Video Software & Peripherals
- Video Network Stations



IPELA



For the complete range of Surveillance Solutions by Sony:

Visit us on: www.sony.co.za or
Contact Will Klopper on: 011-690-3312

like.no.other™

500 MW wind-power generating plant approved

Hong Kong Energy is to build and operate a 500 MW wind power project at a cost of about HK\$540-million. It will be funded by the company's internal revenues and bank loans. The project has been approved by the Development and Reform Commission of Siziwang Qi.

The company will purchase 33 wind turbines and turbine towers at a total cost of HK\$393-million. It is the first major wind power contract in Hong Kong although several other projects are awaiting approval. Hong Kong has not suffered the extreme power shortages that have faced mainland China over the last few years.

Hong Kong Energy was established in May this year and the company's chief executive Eric Oei says that it is gratifying to see that new projects can be approved so quickly and so efficiently. The company plans to introduce other renewable energy projects to ensure that Hong Kong has sufficient available electricity to keep the region globally competitive.

China is investing heavily in nuclear power stations to augment the existing mainly coal-fired generating plants that provide enormous quantities of electricity in an attempt to keep pace with the rapid economic growth that has consistently been above ten percent a year for the last few years.



Private sector urged to generate power

South Africa has been urged to encourage private sector participation in the electricity sector by the chief executive of Business Unity South Africa, Jerry Vilakazi, who says the government must create an environment that is "conducive to investment".

Eskom is currently responsible for generating 95 percent of all electricity used in South Africa and private companies have been reluctant to invest in the energy sector because the low prices charged per unit of electrical power make it difficult to justify the enormous investments required to generate power.

The government has been accused of deliberately keeping electricity prices artificially low to benefit the poorer people. Vilakazi points out that the rationing of power by Eskom earlier this year resulted in a 22 percent decrease in mining production alone. He says the economic consequences of a shortage of power are debilitating for industrial manufacturers and for commercial operations in South Africa which have lost millions in turnover because of the power cuts.

In a separate development, deputy president Phumzile Mlambo-Ngcuka confirmed that government would be forced to re-think its growth targets and re-evaluate its poverty-alleviation goals if the power crisis is not resolved.

She says that the country's continued economic growth has placed further strains on the supply of power making it more difficult for Eskom to meet the demand among industrial users who have been asked to cut electricity consumption by at least ten percent.

The electricity problems facing South Africa are exacerbated by the maintenance backlog in the distribution network which needs about R25-billion just to cope with the essential repairs according to Amos Masondo, chairman of the South African Local Government Association.

He says the main challenge is the restoration of the distribution networks to an "acceptable level" will be a mammoth task as very little money has been allocated to maintaining the distribution infrastructure.



25% premium for Cape Town's 'darling'

The City of Cape Town is to buy – at a 25 percent premium – all the electricity generated by the newly-operational Darling Wind Farm on the west coast of South Africa. The R75-million wind farm is one of the first renewable energy projects in the country.

The wind farm will generate 5,2 MW from four turbines and will contribute to the government's target of generating 15 percent of South Africa's energy requirement from renewable sources by 2014. The wind farm at Darling was first mooted in 2000 but it has taken eight years to start generating electricity.

Darling Wind Power chief executive, Hermann Oelsner claims that wind farms in Germany – which has some 18 000 wind turbines – generate 22 000 MW from renewable resources for that country. He says that given the extensive coastline around the country, South Africa has the capacity to meet all of its electricity needs using wind power alone.

A consortium comprising the government of Denmark, the Darling Independent Power Producer, the state-owned Central Energy Fund and the Development Bank of South Africa were responsible for developing and funding the project.

'Hybrid' technology for cell phones?

French scientists have developed a miniature hydrogen fuel-cell – about the size of a cigarette lighter – that is capable of supplying back-up power for mobile phones or similar gadgets. STMicroelectronics has been perfecting the hydrogen fuel-cell since 2005 but says it is unlikely to be available on the market before 2010.

Of course whether anyone needs this technology is a question that seem to have eluded the scientists. STMicroelectronics or Bic which is better-known for making pens, lighters and razors than back-up hydrogen fuel-cells.

Apparently the hydrogen fuel-cell is part of a 'hybrid' system for phones and other gadgets which first draw power from the conventional

battery and then sucks power from the hydrogen fuel-cell when needed. Each hydrogen fuel-cell cartridge gives the equivalent of three to five recharges of a conventional lithium-ion battery.

Of course scientists haven't answered some critical questions. For instance, certain faulty lithium-ion batteries have exploded before now. Exactly what would happen if a faulty hydrogen fuel-cell exploded on the Paris Metro at peak-hour is a question that has yet to be answered.

Would you be prepared to wander around with a mini-bomb strapped to your belt just so you can have some back-up power? It's not quite the same thing as a Bic lighter popping-off in your pocket.

Jordan to build nuclear reactor

France has agreed to help Jordan to develop a nuclear power plant after an agreement was signed by the French Foreign Minister, Bernard Kouchner and his Jordanian counterpart Salaheddine al-Bashir. France will help Jordan create nuclear reactors to generate electricity and desalinate water.

France has undertaken to train Jordan's nuclear scientists and to help them with uranium extraction which is abundant in this desert country. Several other countries in the Gulf region have announced plans to build nuclear reactors including Egypt and Turkey.

Some observers are sceptical about the potential proliferation of nuclear reactors in the Gulf region fearing that the technology could be adapted to make nuclear weapons in the volatile Middle East.

Battery car for SA from SA in SA

A locally designed, battery-powered, six-seater passenger car and a separate three-seater utility vehicle are likely to be available on the South African market in 2010. A prototype of the passenger car will be shown to the public later this year or early in 2009.

The passenger car will apparently have a range of between 100 and 400 kilometres depending on the speed at which it is driven. Solar panels in the roof will help to charge the vehicle when it is parked in the sun or when Eskom rations power through load-shedding.

Both vehicles are designed to be plugged into a mains power outlet at night to recharge the batteries. Money to develop the prototype has come from the government's Innovation Fund.

According to Dr Boni Mehlomakulu, group executive of the Department of Science and Technology's research, development and innovation programme about R300-million will be needed to build a factory that will be capable of producing about 4 000 units a year.

She says the government has agreed to buy an undisclosed number of vehicles for its fleet in order to give the investors in the project an entry-point into the local car market. She has refused to release pictures or design sketches of the vehicles and says that no pricing model for the range has yet been established.



Abu Dhabi to make thin-film solar cells

Masdar will invest \$2-billion in a manufacturing plant for thin-film solar cells and this initiative is expected to reduce the cost of solar cells as it uses less material than traditional silicon cells.

Analysts believe the new thin-film cells – which can be made from a variety of different materials – will increase competition in the solar energy market forcing down prices.

Worldwide demand for solar panels has increased dramatically and manufacturers are urgently trying to increase production to cope with demands. South Africa has already stipulated that solar power geysers must be used in new houses being built in this country, pushing up demand for solar panels locally.

Abu Dhabi is trying to move away from its reliance on oil to meet its energy requirements and is investing billion of dollars in building two solar energy generating plants that will initially generate 210 MW of solar power annually.

The country hopes to produce 1 GW of electricity from renewable solar energy power plants by 2014. Abu Dhabi has ordered its solar plant from Germany at a cost of \$600-million and it is expected to start generating electricity sometime next year.



Technological
Such bliss

You booked your whole holiday over the Internet. Flew on the latest jet that almost flew itself. During the flight you caught a movie, called home from the plane's on-board telephone and put your seat back.

When you go up to your room later today, you'll swipe your key-card, enter your air-conditioned suite, turn on the

television (because you can), and check through the satellite channels – just in case you missed something.

Isn't it amazing what electrical engineering has done for you. Want to learn more?

Available monthly at leading newsagents.

WATTnow
Engineering Tomorrow



Running out of petrol – grow your own

Sapphire Energy based in San Diego, California says that it has raised capital of \$50-million to allow it to produce the chemical equivalent of petrol from algae. The company claims that its fuel has been given a 91 octane rating using 'green crude' which uses algae as a feedstock.

The company says that its process can grow algae from waste water and this can be used to produce the fuel needed to drive millions of cars around the world. Sapphire claims that it developed the algae process so as to prevent land that could be used to grow food rather than the raw materials for biofuels.

Sapphire has hired Brian Goodall who led the team of engineers that successfully developed an algae-based fuel that was used for a cross-Atlantic flight earlier this year. Algae fuels are still developmental at this stage although a number of different companies are attempting to create or grow hydrocarbons from plants.

The fuel that is grown from algae can apparently be used to run vehicles and aircraft without being modified.

Water from dirty oil sludge

Drilling for oil or gas produces a foul-smelling by-product of sludgy water which costs the energy sector billions of dollars each year to remove. Now a company based in New Mexico is working on a hydrothermal system that will turn the ancient groundwater into clean drinking water.

The company, Altela says that its system uses less energy than any other desalination methods such as carbon filtration which rely on pumps to move the water through the filtering system. Statistics show that in the United States for every 50 litres of liquid extracted during the oil and gas production 45 litres are salty, mineralised water that is thought to be between 30-million and 60-million years old.

In the Middle East the figures are slightly different with one litre of oil being extracted from three litres of liquid but in 1993 when figures were last compiled, the energy industry produced more than 5-trillion litres of water enough to flow over the Niagara Falls for nine days.

The onus is on oil companies to separate the water from the oil and then treat the water or dump it down a deep hole at a safe disposal site. For the offshore oil rigs, operators must ensure that the produced water is diluted to 29 parts per million equivalent to an eyedropper of oil-produced-water in a 25 litre drum before it can be dumped back into the Gulf of Mexico.

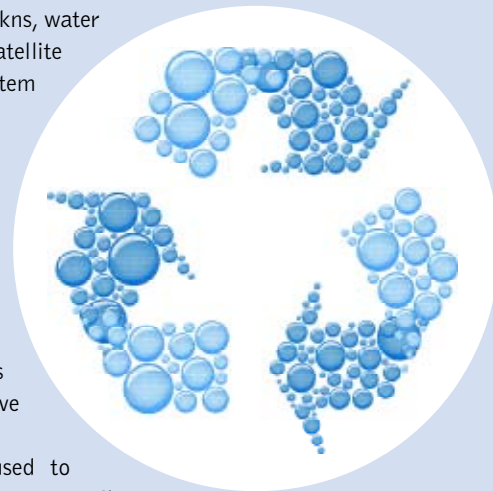
Altela claims that it can remove 90 percent of the produced water from oil and transform it into clean, potable water than can be freely used. The system, which is about as big as a residential water heater,

includes boilers, holding tanks, water treatment towers and a satellite based communications system for remote monitoring.

Altela uses its own thermal distillation process to clean the water. A system is installed at the well site and the methane that is normally vented off into the atmosphere when extracting the oil is used to make steam to drive the desalination process.

The company has refused to provide full details of its process until all the patents have been granted and the trademarks registered. What is known is the system is made from low-cost plastic components and the system is light enough to be taken to a well site in shipping containers.

According to Altela, the business model they are using means that energy companies will pay a per-gallon or per barrel conversion fee which it claims cost about 120 times less than using trucks to carry away the water to a treatment plant or a disposal site.





Aberdare, **cable** you can trust

Aberdare Cables manufactures a wide range of state of the art products with customer specific adaptation, design capabilities and technical back-up service. This and their extensive project experience make them the supplier of choice for cable, related accessories and special cable projects.

42 Main Road, Eastleigh, Edenvale, Gauteng P.O. Box 1679, Edenvale, Gauteng 1610, South Africa
Tel +27 (0)11 456 4200 Fax +27 (0)11 609 5934 www.aberdare.co.za

ABERDARE
CABLES

Driven by Powertech 

The South African Institute of Electrical Engineers

“Dedicated to the interest of professional
Electrical and Electronic Engineering in South Africa”

KEYNOTE SPEECH by Mrs Danai Magugumela

Prize Giving of the Faculty of Engineering and the Built Environment, Wits University. 7 May 2008



A very good evening to the Executive Dean, Professor Lacquet; members of the Faculty; parents and families; and to all the students present here tonight. It gives me great honour to have been invited to address this momentous gathering today. I wholeheartedly congratulate all of you here on having been identified as outstanding performers.

An institution such as Wits University undoubtedly enjoys a fine legacy of being amongst the most prestigious institutions of higher education in South Africa and also on the African continent. So to be enrolled in the Engineering and Built Environment programme of the University is an achievement in itself. But to be recognised for sterling and superior achievement amongst your peers, is a great affirmation of your abilities.

When I was invited by your Dean to be your guest speaker tonight, I knew then that being here would stir up a few good memories from my past. Like you in this room tonight, some 17 years ago I recall sitting in one of our lecture auditoriums in Texas USA attending a prize-giving hosted by the Texas Society of Professional Engineers, and thrilled to be recognised two years in a row, as the top 3rd year student and later the top final year student in Civil Engineering. For many years thereafter, even after obtaining my undergraduate and master’s degrees, it was always imperative that I listed my student awards on my CV as part of my personal best achievements. I encourage all of you to do the same after today.

One thing I find interesting when I look back to my youth and try to draw connections between my success then versus my achievements in the present, is that I realize now that despite being on “top of my game” then, no curriculum of engineering, architecture, planning, or quantity surveying would ever match the complexity of the curriculum of real life. By that I mean that that subjects like “Advanced

Differential Equations” or “Mechanics of Materials” or “Network Theory” or “Stochastic Analysis of Water Resources” which really gave you a hiding but miraculously you managed to ace them, are only partial measures of the success you will pursue in your professional life ahead.

My message to you is this: To whom much is given, much is expected. By virtue of your gifts of high aptitude and tenacity to excel the way you do, we as a society shall expect much of you. You will no doubt have what it takes to graduate. Some of you will leave academia, take your B degree and go into private sector and eventually be led into management. Or environmental activism. Or site work. Or urban planning. Some will go into the public sector and become experts the policies, funding and legalities affecting the built environment and its people. Some of you will earn post graduate qualifications from here and even overseas, and go on to become respected academics. Some will become design consultants, and others will become world-class scientists and technocrats in research and development, shaping the future of construction; mining; energy (alternative energy in particular); aviation and even global warming - in a very competitive environment. You will not be able to invent the wheel (because someone else beat us all to it), but you will perhaps be challenged in new ways – perhaps to invent a more fire-proof, theft-proof, weather-proof, or a green (environmentally correct) wheel! Each and every one of you here is a prime asset, especially to the African continent. The profession is waiting anxiously for you to step up and make your contribution. The only caution to you is that there is no more room for thinking small. The SIZE of your success will be a function of the SIZE of your thinking – so make sure you think BIG.

The times we are in are indeed great. There is an infrastructure boom worldwide, a boom which locally we often associate with “2010”. According to statistics quoted by the SA Federation of Civil Engineering Contractors and the SA Association of Consulting Engineers, the boom will last well beyond 2010, at least until 2015. Amongst the landmark projects that many of you in this room might aspire to work on are stadia for the Soccer World Cup; the Gautrain, the King Shaka International Airport outside Durban, new and refurbished power stations for Eskom, the Coega IDZ in the Eastern Cape, SASOL Oils’ expansion into Africa.

The window of opportunity is open as wide and far as the eye can see. Engineering and the Built environment are back in fashion! But the rules of the game have changed. The world is no longer big and round; it is small and flat. Which means that the engineer, technician, town planner of today are all members of the global economy. A few days ago, democracy in South Africa turned 14 years old. Thus we are squarely in the global limelight. And if we as infrastructure experts and companies are not matching international players in and from places as far as China, India and the Americas, we may soon find ourselves either sidelined by them or swallowed by them. The world

was intrigued to learn that South Africa has been displaced by China as the leading producer of gold. Maybe this means that we should step up our production and beneficiation of platinum, chromium, ferrochrome, and manganese. Therefore we need to put aside small thinking and make room for thinking BIG.

Thinking BIG means having goals. Great writers such as David Schwartz (author of "The Magic of Thinking Big") and Stephen Covey and have creatively imparted great wisdom on thinking big, knowledge respected by successful professionals the world over. Recently I read an anonymous quotation on goals. It said:

"If your goals don't scare you, you don't have goals. You have plans. Plans are essentially checklists. A plan is not a big reach. Plans are what you make to fix the car, have friends over for dinner, or visit your parents. Plans are what you know you can do.

Not goals, though. Goals are big and impossible. They challenge us to reach past the trees for something high and out of sight. You may have a goal to start up your own Group 5, or Murray & Roberts, which is much greater than simply having a plan to work for Group 5 or Murray & Roberts. Goals take blood and sweat. They woo us to great risk. The results are uncertain and the rewards can be great".

Another great mind once said, "If you have never failed, then your goals have probably never been high enough".

Thinking big for me means planning to make a personal contribution to South Africa and the rest of the world. This means maximizing your career. This means advancing from your first diploma or degree to the next level. This means challenging yourself to become registered with your professional council even when your peers think it is unimportant. This means pursuing research so that South Africa can be a leader of best practice and not a follower. This means that if you are a minority in the New South Africa, energise and transform yourself into a new form to avoid becoming redundant. This may mean finding a field of specialisation that is more rare, that differentiates you, sets you apart, and therefore makes you essential. This means having an "abundance mentality", a mentality that affirms that there is enough room here for all of us if we believe it. But if we think small we are doomed.

Thinking big means seeing your international colleagues not as threats to your advancement, but as keen competition that keeps you in shape for the jungle of multinational companies that will inevitably enter our local playground in future. Thinking big means accepting that you may be an instrument of change due to the time you are

born in to. That means that your dream to be a top notch specialist in a technical field may be derailed or deferred into a chief executive because transformation of our country needs you. Thinking big means quickly learning that to make a full contribution in the built environment you need to brush up on communication skills, marketing and client relationship skills, and human resources skills because engineering and technology have no choice but to become competitive. Imagine Coca Cola vs Pepsi; MTN vs Vodacom; Nike vs Reebok. You will soon realize that in this game called work, those that don't compete don't last.

Engineering and the Built Environment is the place to be, for those who want to be part of the solution.

When we as a nation think of creating a better life for all – we look to the Built Environment

When we think of ASGISA

– we look to the Built Environment

When we think of Job Creation

– we look to the Built Environment

When we think of Traffic congestion

– we look to the Built Environment

When we think of Sustainable Development

– we look to the Built Environment

When we think of Load Shedding

– the long term solution lies in the Built Environment!

And so ladies and gentlemen, I conclude as follows. You are all instruments of change, as a consequence of the generation you are born in to. Instruments of change think big and are adaptable to change. Instruments of change fit in South Africa and in any other part of the world. Instruments of change are neither derailed by the entry of international colleagues, nor by the entry of international competitors. Instruments of change are generally part of the solution, and not part of the problem.

Ladies and gentlemen, I challenge you to step out into the wide window of opportunity in 2010, in infrastructure, in BEE and in globalisation. Remember, as in the words of David Schwartz, written back in 1959: "The size of your thinking determines the size of your success."

And be reminded, as in my own words: the window of opportunity is so wide open, that there is no more room for thinking small.

I thank you.

The Impact of Distributed Generation on Electricity Restructuring and the Security of Power Systems

The SAIEE and the American Institute of Electrical and Electronics Engineers Inc. (IEEE) have a Mutual Cooperation Agreement which results in joint lectures of the sort reported on here. This lecture was held at the

University of the Witwatersrand on 26 May 2008 and was presented by an eminent electrical engineer Professor Mohammad Shahidehpour

Dr Shahidehpour is a fellow of the IEEE, Carl Bodine Distinguished Professor and Chairman Electrical and Computer Engineering



Department Illinois Institute of Technology in Chicago, Illinois USA. He is past director of the Electric Power and Power Electronics Center at Illinois Institute of Technology (IIT) and is author of 300 technical papers and four books on electric power systems planning, operation, and control.

He is the recipient of 2005 IEEE/PES Best Transactions Paper Award, 2004 IEEE/PSO Best Transactions Paper Award, Edison Electric Institute's Outstanding Faculty Award, HKN's Outstanding Young Electrical Engineering Award, Sigma Xi's Outstanding Researcher Award, IIT's Outstanding Faculty Award, and University of Michigan's Outstanding Teaching Award. He is the past president of National Electrical Engineering Honor Society, and serves as the Editor of the IEEE Transactions on Power Systems.

Dr. Shahidehpour has lectured across the globe on electricity restructuring issues and has been a visiting professor at several universities. He is an editor of IEEE Transaction on Power Systems, Chair of the Power System Operation Committee of IEEE. Finally he was key note speaker at a power conference held in Cape Town on May 28-30 2008.

Prof. Shahidehpour's summary of his lecture is as follows: "The presentation reviews the impact of distributed generation on power system restructuring and the essence of competition in the operation and the planning of electric power systems. The electric power system operation is rapidly becoming market-driven in which generation, transmission, and distribution companies strive to maximize their respective revenues in a highly competitive environment. In a

competitive electricity market, Independent System Operators (ISOs) coordinate power system operation constraints with electricity market participants for satisfying hourly load demand, energy constraints, limited availability of fossil fuel and water resources, environmental constraints, and transmission security requirements. However, because of the increasingly intimate role that the electricity plays in the national economy, security remains to be the most important aspect of power system operation which cannot be compromised in a market-driven approach. The presentation discusses assumptions, functions, and calculation tools that are essential for satisfying power systems security requirements. The presentation elaborates on the impact of distributed generation on the security and economics of restructured power systems. The presentation concludes that global analyses of security options provide additional opportunities for seeking optimal and feasible schedules in competitive electricity markets."

In view of the recent load shedding that has been experienced in South Africa, it was most interesting to hear about the experiences of the American system in regard to "Rolling Blackouts" with details of the causes and results of these problems. Some of the professor's slides showed interesting night-time satellite images of the USA during blackouts. The lecture will be repeated in Cape Town and it is hoped that those responsible for the South African electricity systems will learn from the American experience. The picture shows (L to R) the President of the SAIEE Victor Wilson, Prof Shahidehpour and Prof Willie Cronje the representative of the IEEE.

From the President's Pen



Victor Wilson
President SAIEE

We congratulate Andries Tshabala-la on his election as a Vice President of the SAIEE and welcome him as an Office Bearer. Andries is an active participant in Council and its committees and the Institute is fortunate to have him in a leadership position.

The Western Cape Centre has begun a programme of introducing school learners to Electrical Engineering as a career. The events take place at the MTN Sciencentre and include meeting young Engineers, a question and answer session, and building a working (in most cases) electric motor.

Initiatives such as this and the continuing tutoring and science activities at schools in KwaZulu-Natal are an excellent way for the SAIEE and its members to be relevant to the community and I thank those who give of their time.

Council members represent the Institute at various meetings, workshops, and conferences. A number of these, not surprisingly, deal with the electricity crisis. Many of the meetings give us the opportunity to present the Engineering facts and point of view to senior businessmen, government officials, and politicians. Education and skills development continue to come to the fore in such discussions.

Please use the forum on our website www.saiee.org.za to follow and add to the discussions there. The forum is where current topics can be debated while we are still working on submissions on legislative, regulatory, or standards initiatives. There are also forums for less serious chatter. Remember that Institute members get access to additional topics not on the public page.

Members in Mpumalanga and the Vaal triangle are encouraged to make contact with and participate in the activities of the newly formed Centres there. The face to face interaction facilitated by the Centre committees is one of the significant benefits of Institute membership and I thank the committees for their enthusiasm.

Keep an eye on the website for upcoming events.

New SAIEE Centres in SASOL Territory

One of the objectives of the SAIEE that has been mentioned in the past is the establishment of SAIEE Centres around the country. The Institute Constitution allows for this and encourages their formation provided the request is submitted to the Council by a minimum of 10 Senior Members and Fellows. It happens that there are some 66 members of the Institute who are employed by Sasol. These are distributed around Sasolburg in the Vaal Triangle and Secunda in Mpumalanga. An informal meeting in 2007 decided that two Centres should be formed to cater for these members and other members from companies like Eskom. It should be noted that both Sasol and Eskom activities are located in areas where there are large coal deposits as coal is the main raw material for the manufacture of petroleum and electricity.

The main drivers for this initiative are Keven Semple from Sasolburg and Dr Grant Muller from Secunda. They organized to show DVDs of the Bernard Price Memorial Lecture on the 15th April in Sasol and 22nd April in Secunda and to collect signatures from

attendees. They were able to collect more than 10 signatures in each area from members of Senior Member and Fellow grades. These lists were submitted to the SAIEE Council on May 9th and permission was granted for the formation of two Centres in the Vaal Triangle and Mpumalanga.

This initiative has full blessing from Sasol top management and Fig 1 (bottom left) shows (L to R) Ian McKechnie (Past President SAIEE), Theuns Erasmus (Manager Electrical Function, Sasol Technology) and Keven Semple (Principal Engineer Sasol Technology) and Mike Crouch (SAIEE) on 15 April. Fig 2 (bottom right) shows Theuns Erasmus, Ian McKechnie and Dr Grant Muller (Chief Engineer, Sasol Technology) at the show on 22 April. Both shows were well attended and drinks and snacks were kindly provided after each show by Sasol.

The formation of Centre committees in these areas will now go ahead and chairmen will be elected by the committees. We wish these Centres many interesting and successful events.



University of the Witwatersrand

Faculty of Engineering and the Built Environment Prize Giving May 2008

The SAIEE presents an annual prize at Wits to the "Best third year student in electrical engineering" and I had the honour to attend the prize giving to present the prize. Quite by chance I sat on the stage next to the key note speaker, a Civil engineer called Danai Magugumela and we have included a transcript of her address which was full of really excellent advice for students and graduates. A picture of Danai, taken during her address, is included.

The SAIEE prize was won by Adam Pantanowitz and a picture of him and Mike Crouch, Marketing Director of the SAIEE, is also included. This event restores one's faith in the future of our country where these young professionals, and others like them in other tertiary institutions, are the answer to a brilliant future for South Africa.



YOUR FUTURE.



YOUR EMPLOYER.



PNEU DRIVE CHALLENGE 2008

8 UNIVERSITIES
1 PRIZE



SEW Eurodrive and **Festo** have launched a design competition for third and fourth year engineering students in the fields of mechanical, electronic and mechatronic studies.

Eight educational institutions around the country have been invited to participate.

“The hands-on experience is invaluable. We are excited about what the students are going to come up with”

Adrian Buddingh, Engineering Manager at Festo.

“Growing the young engineers in the country and providing them with opportunities and the needed skills for the workplace is of huge importance to us”

Ute Bormann, GM Sales and Marketing at SEW Eurodrive

FOR FURTHER INFORMATION OR ANY QUERIES REGARDING THE PNEU DRIVE CHALLENGE PLEASE CONTACT

**SEW
EURODRIVE**

pneudrive@sew.co.za
www.sew.co.za

pneu_drive@festo.com
www.festo.co.za

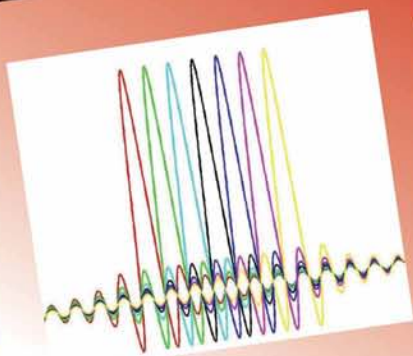
FESTO



POWER LINE COMMUNICATIONS: University of Johannesburg

Our Research Interests

Powerline Communications
Digital Communications
Coding Techniques
Information Theory
Video Communications
Networks



Our Research Partners

University of Duisburg-Essen, Germany
Technical University - Delft
University of California (Davis)
Walter Sisulu University
North-West University
University of Witwatersrand
Chinese University of Hong Kong
NRF, THRIP
Protoclea Advanced Image Engineering
Hysignal, Los Angeles

Telecommunications Research Group
Electrical and Electronic Engineering Sciences
Faculty of Engineering and the Built Environment
University of Johannesburg
P.O. Box 524
Auckland Park
2006

Phone: +27 (0)11 559 2147
Fax: +27 (0)11 559 2357
E-mail: hcferreira@uj.ac.za
pvanren@wsu.ac.za
tgswart@postgrad.uj.ac.za
ktouahada@postgrad.uj.ac.za

