# WATTnow

Be Enlightened

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## Authors say rivets sank the Titanic

# No winter power cuts Can we believe Eskom?

Official Magazine of SAIEE

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# 8 TIPS & MORE PRODUCT TECHNIQUES

## SEW EURODRIVE

1. Use a VSD on pumps or fans to reduce the motor speed in periods of low delivery demand. Reduces your power consumption by up to 20%.
2. Use the removable EPROM memory on the MDX61B to transfer programming data to a replacement drive in the unlikely event of drive failure.
3. Use a SEW servo motor for applications requiring forced cooling or encoder feedback. Competitive pricing now make this a very attractive solution with many additional benefits.
4. Use a VSD to increase the number of stop starts that an AC motor can perform. The reduced inrush current limits the heat build-up in the windings. On brake motors, the life of the brake is greatly increased.
5. For absolute motor protection, always use thermistors on VSD AC controlled motors. Motors running at low speeds can burn out due to heat build-up without tripping the drive overload.
6. Did you know that more than one AC motor can be controlled via a VSD provided that individual motor protection is used and that the sum of the motor amps is available from the VSD.
7. Use servo motors for high speed applications. The low motor inertia allows for rapid acceleration and deceleration.
8. Using a communication protocol such as Profibus, allows your integrated system to communicate with many different types of products from various manufacturers as all these products will have the same communication standard.

# 8 TIPS & MORE PRODUCT TECHNIQUES

## FESTO

1. Pneumatic tubing should be sized according to the required flow rate of the system. Under-sized tubing will cause flow restrictions and will therefore slow the system down.
2. Pneumatic fittings should be attached to valves and actuators using the prescribed torque figures. Over tightening will damage the threads while loose fittings will result in leakage.
3. Because "in-take" air is invisible and freely available, it does not mean that it is "cheap"! All leakages on your system cause loss of air pressure which in turn costs money to generate electrically via the compressor.
4. Communication cables should be screened and earthed to prevent any interference.
5. Electric Power Supplies, PLC controllers and corresponding cabling all have limitations when it comes to their current handling capability (ampere rating). Know what these limitations are and try not to exceed them.
6. Loose electrical connections will cause intermittent faults and could result in the generation of heat and therefore a potential fire hazard. Always double check every connection and make sure that the cables are terminated correctly!
7. Always use a multi-meter to test if the power has been switched off before touching live conductors! Isolate the supply to ensure that it can not be switched on accidentally!
8. If there is any doubt regarding the power supply connection, polarity or any other critical connection, ALWAYS refer to the operating manuals first before making the connections.

FOR FURTHER INFORMATION OR ANY QUERIES REGARDING THE PNEUDRIVE CHALLENGE PLEASE CONTACT

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FESTO

# Why play poker in a crooked casino?

There are pieces missing in the jigsaw puzzle that we call electricity supply in South Africa. Given the claimed transparency of our ruling party, one would hardly expect any pieces to be missing – but there are. Let's set out what we know:

- Eskom has called for expressions of interest from potential Independent Power Providers (IPPs);
- Distribution services are in urgent need of maintenance and repair but the municipalities say (who will relinquish electricity distribution to privately-owned Regional Electricity Distributors or REDs) they do not have the money to carry out the work;
- Eskom has applied for a tariff increase of between 53 and 60 percent amid resounding objections from business and labour organisations;
- The National Electricity Regulator of South Africa (Nersa) (which turned down Eskom's 18 percent tariff increase earlier this year because it was too high) is assessing public comments and is expected to give its ruling on the how much the electricity price will rise sometime early in June;
- Eskom as a private company with one shareholder (the government) is paying dividends on profits to the government, is paying taxes to the government and its tariffs are determined by a government body (Nersa). To all intents and purposes Eskom and government are as intertwined as Siamese twins.

That's what we know. What have we not been told?

Economic analysts and investment wizards say the extremely low tariffs charged for electricity mean that substantial private investment in power generation makes no economic sense. They say at the current prices it's virtually impossible for IPPs to get a return on the investment. Of course, if tariffs change the entire scenario changes.

With this in mind, I believe that the 'assessment of public comment' by Nersa is nothing more than a public relations exercise to persuade the public that Nersa has 'applied its collective mind' to the problem. The price increases are coming and that's a foregone conclusion. Not just this year, but next year and probably the year after that too.

The second 'missing piece' is that once the REDs are operating as private companies, they too will need to generate income. So consumers can expect to be lumbered with a distribution tariff or levy to finance the maintenance and operation of the privately-owned REDs. There's no other way to raise the money. So who is the main beneficiary of profits from REDs?

Rather sneakily, it's the government itself. What the government gets is a more profitable Eskom providing higher dividends and the applicable higher taxes. It gets additional taxes from IPPs and the REDs. It gets a huge capital expenditure programme financed using someone else's balance sheet. fact Trevor Manuel must be laughing all the way to the bank.

In the past electricity was regarded as a basic commodity, was charged at a minimal rate and was distributed free of charge. What faces us now?

Firstly rates and taxes won't decline because muncipalities are no longer distributing power. They'll stay the same. Secondly steep price increases – perhaps with penalties for excessive use of electricity – will hit us this year, next year and beyond. Thirdly some sort of additional levies or tariffs are likely to be charged for providing electricity to South Africa's homes.

Finally, as citizens we'll just have to pay and pay and pay. These are four of the missing pieces in our electricity jigsaw puzzle.

It's patently clear to me that the only winners in this scenario are a handful of Independent Power Producers, the privately-owned REDs companies, Eskom itself and ultimately the government. As citizens we are the losers.

It's just like playing poker in a crooked casino where the only cards dealt are those that favour the bank.

And being forced to play there too.

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WATTnow

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# WATT'S

## WATT'S HAPPENING








## 5> WATT'S NEW

Wii Strip, Wii Fit and Mario Kart from Nintendo; Ubuntu's Hardy Heron the best yet? Xbox sales rise, GTA IV launched; Dell's Precision computer range; Windows XP may get a reprieve; Plug your computer network into a wall socket; Albany subscription service for Microsoft's products; RIM partners with SAP to develop new applications.




SAIEE

**INSTITUTE PAGES**

# INSIDE






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HONDA

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# Wii Strip, Wii Fit and Mario Kart from Nintendo

Peekaboo, a company in the United States that makes temporary stripper poles for home exercise, has announced that it is developing a home stripping aerobics game for Nintendo's Wii consoles. This comes hot on the heels of Wii Fit, a new game that uses a balance board to measure a user's weight and centre of balance and instructing them on how to perform about 40 different aerobics exercises.

Wii Fit is available in South Africa and costs R1 700. The Wii Stripper pole dancing game is still being developed and there is some doubt as to whether Nintendo will actually allow the game to go into production as the company has protected its squeaky clean image.

Most of the content for Wii consoles is family-friendly. There are one or two M-rated titles for mature gamers, the most popular of which is Resident Evil 4. Nintendo has been careful to nurture its image and may outlaw the new stripping fitness game.

In a separate development, Nintendo has rolled out its new Mario Kart Wii, a racing game that uses a Wii wheel which is snapped onto the remote control and used to steer any one of the games plethora of different vehicles.

Mario Kart as the name implies is a go-kart racing game with twists and turns and the well-known turtle shells and mushrooms that pop up in unfamiliar places. Apart from having three karts to begin with each new user also has the choice of three bikes.

Single-player mode has eight cup events with four tracks although there and 16 new race-tracks and 16 classic tracks programmed into the software. The game also offers an online mode so that users can choose to race against friends or can choose to race anyone else in the world who is online.

If people don't want to race then they can participate in a team battle to pop the greatest number of balloons (Ballon Battle) or to play Coin Runners with the goal of capturing the greatest number of coins in a session.



# Ubuntu's Hardy Heron the best yet?

Canonical software has released its latest version of the Ubuntu operating system and according to Canonical's Mark Shuttleworth, the successes of the One Laptop Per Child and the Asus EEE PC have increased awareness of open source software among users.

He says that as a primary sponsor for the distribution of the Ubuntu operating system people who use open source software get a much more rewarding and compelling experience than those using commercial packages such as Windows.

He says that at this stage computers running the Ubuntu operating system are not threatened with an avalanche of viruses or spyware and are not drowning in Spam e-mail messages either.

Shuttleworth says that the Hardy Heron release of Ubuntu is the most significant version launched so far. It will be backed by a three year long-term support licence from Canonical which, according to Shuttleworth will make it an attractive alternative for the large-scale roll-out new machines using the system.

He points out that the French police are deploying 50 000 Ubuntu-powered computers to units around the country while in Spain the education authorities there are rolling out 500 000 desktop computers using the Ubuntu operating system.

Shuttleworth claims that Hardy Heron has improved support for multimedia applications including photo-editing, music sharing and playback of video material. The version can be installed under Windows without modifying the system. It can also be used on Mac OS-X machines.

Ubuntu is a general operating system based on Linux that is secure, stable and self-maintained.

## Xbox sales rise, GTA IV launched

Sales of Microsoft's Xbox 360 have doubled in Europe after the company reduced the retail price to E199,99 (R1999,00) and in South Africa sales figures have risen by 60 percent according to Cindy White, marketing lead: entertainment and devices group at Microsoft South Africa. She claims that the Xbox 360 has 51 percent of the total number of consoles used in this country.

She believes that the release of blockbuster games such as Grand Theft Auto IV and Ninja Gaiden 2 will further stimulate Xbox sales in South Africa. In a separate development, Grand Theft Auto IV has been hailed as one of the world's all time top sellers with first-week sales topping $400-million. Reviews have lavished praise on the game.

Grand Theft Auto IV is dubbed as a violent, intelligent, profane and compelling work of cultural satire disguised as fun. Based on more than a dozen reviews compiled by Metacritic, a widely-tracked aggregator of gaming reviews, the new game if played on a Sony PlayStation 3 achieved a perfect score of 100 while the Xbox 360 had a rating of 99 for the game.

Game manufacturer, Take-Two Interactive Software has seen its share price rise by one percent directly after the launch of its Grand Theft Auto IV. Electronic Arts has offered to buy Take-Two for $2-billion but may have to lift its price to persuade shareholders to accept the bid.

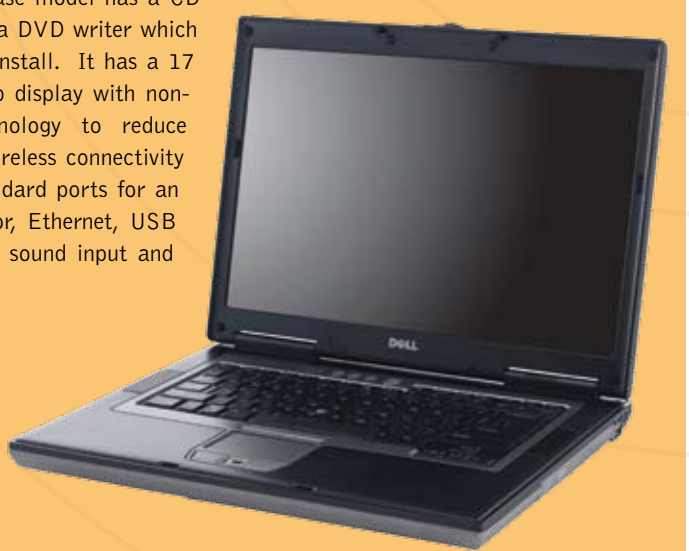

## Dell's Precision computer range

Dell has released its range of Precision laptop computers that has three different configurations: the M2300, the M4300 and the top-of-the-range M6300. The computers are aimed at business users who value a mobile computer and need sustained performance and a long battery life.

The base model M2300 sells for just over R13 000 excluding value-added tax (VAT). It's standard configuration includes Intel's Core 2 Duo T7500 running at 2,2 GHz and a Base Discrete FX360 video card. It has 1 GB of DDR2 SDRam running at 667 MHz. It is supplied with an 80 GB hard drive. It has a built in wireless connection with Bluetooth. The standard model has a 14,1 inch ultra wide aspect display.

The M4300 comes in at just under R15 000 for the base model which includes a 2,0 GHz Core 2 Duo chip with 1 GB of DDR2 SDRam and an 80 GB hard disk and a 24 speed combo drive that writes CDs although a DVD writer costs just R68 extra. It comes with a 6 cell Smart lithium-ion battery. It has Dell's 15,4 inch ultra-wide aspect display

The top-of-the-range M6300 costs just over R17 000 for the base model fitted with a Core 2 Duo running at 2,2 GHz and 1 GB of DDR2 SDRam. It has the Nvidia Quadro FX 1600 video card and a 120 GB hard disk although the base model has a CD writer and not a DVD writer which costs extra to install. It has a 17 inch ultra-sharp display with non-reflective technology to reduce glare. It has wireless connectivity along with standard ports for an external monitor, Ethernet, USB peripherals and sound input and output.



# Windows XP may get a reprieve

While Microsoft intends to withdraw sales of Windows XP software from June, Dell, HP and Lenovo are exploiting loopholes in the Microsoft licensing terms so they can continue selling the product. Dell is using a clause in the conditions for Windows Vista that lets it provide XP under the terms of a 'downgrade license' for the Business and Ultimate versions of Vista.

Essentially, this means that Dell can install Windows XP Professional free of charge on some machines in its Latitude, OptiPlex and Precision machines as these are meant for business customers rather than home users.

HP is using the same 'downgrade' option while Lenovo is selling its machines with Vista installed but providing all users with an XP recovery disk so that owners can roll back to the older software.

Microsoft claims that it has sold 140-million copies of Vista worldwide. The latest results from the company show that sales of its operating systems have fallen by 24 percent in the (US) third quarter of this year.

In a separate development, Microsoft has released Service Pack 3 (SP3) for Windows XP and Service Pack 1 (SP1) for Vista. However, a bug in SP3 that affected Microsoft's Dynamic Retail Management System application forced Microsoft to withdraw the software immediately.

It does not damage computers that are not running the retail management software but Microsoft was not taking any chances and immediately withdrew the service pack. Those users who managed to download and install SP3 before it was pulled off the site say that there is a noticeable improvement in speed.

A similar glitch in SP1 for Vista forced Microsoft to pull that software as well. SP1 for Vista is no longer available as an automatic download but it can be manually downloaded from the Microsoft site.

In another development, online magazine InfoWorld is running a Save XP campaign and has already collected more than 175 000 signatures of people who want XP to remain available. The magazine plans to present the petition to Microsoft by the end of June in an attempt to persuade the company not to take the operating system off the market.

Vista has not been readily welcomed by computer users in the US and according to figures compiled by research company Gartner, Vista was used on less than one percent of desktops and less than three percent of the portable computers in corporations around the country. The poll was based on interviews with Gartner's own corporate clients.

Influential research group Forrester Research, in a similar poll, found that just 6,3 percent of its corporate clients had deployed the Vista operating system and most of them were still using the favoured Windows XP software.

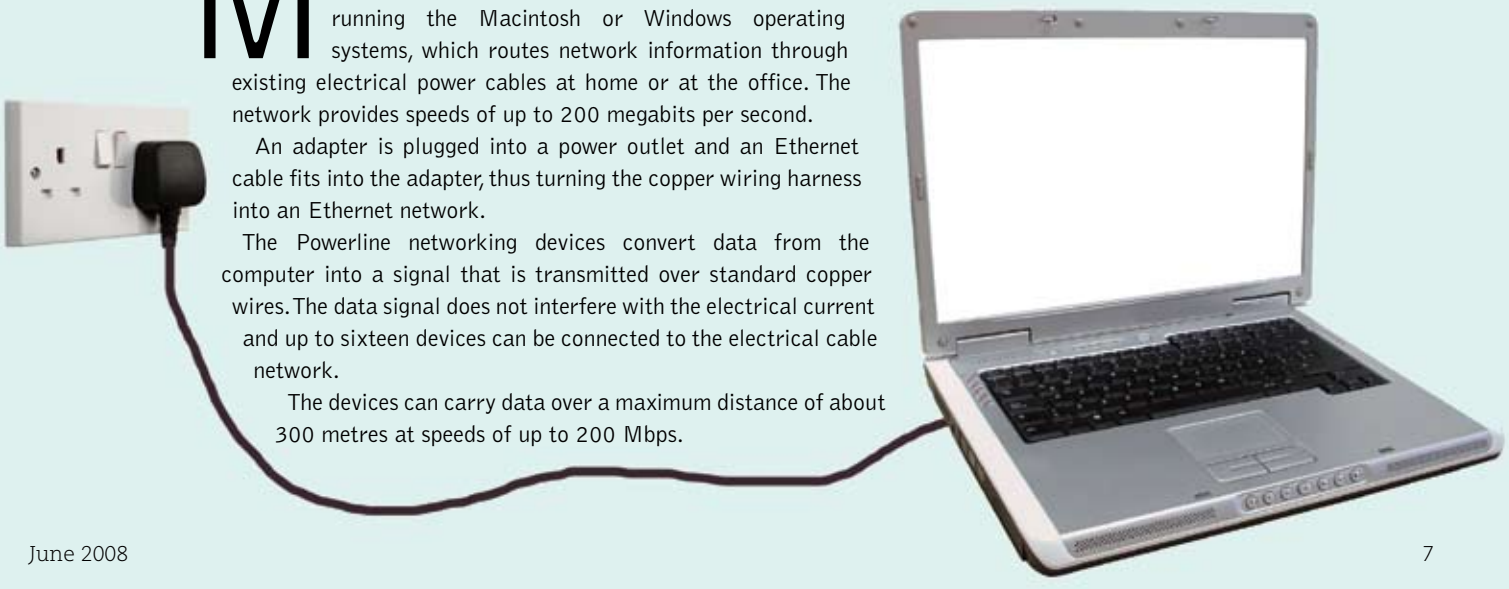

# Plug your computer network into a wall socket

MacWireless.com has developed an ultra-fast Powerline network adapter, for the computers running the Macintosh or Windows operating systems, which routes network information through existing electrical power cables at home or at the office. The network provides speeds of up to 200 megabits per second.

An adapter is plugged into a power outlet and an Ethernet cable fits into the adapter, thus turning the copper wiring harness into an Ethernet network.

The Powerline networking devices convert data from the computer into a signal that is transmitted over standard copper wires. The data signal does not interfere with the electrical current and up to sixteen devices can be connected to the electrical cable network.

The devices can carry data over a maximum distance of about 300 metres at speeds of up to 200 Mbps.



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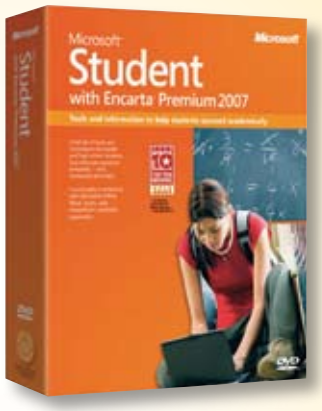
# Albany subscription service for Microsoft's products





Microsoft has started a private beta test of its planned subscription software service built around the company's Office 2007 suite. Code-named Albany, the service will provide subscribers with a copy of the Office Home and Student 2007 suite along with Microsoft's Windows Live OneCare antivirus service.

Essentially the subscription service, which is due to go live in Octorber, allows those users who don't want to download a trial version of Microsoft Office – which has a time limit of 60 days – then they can choose, instead, to pay a monthly subscription fee and use the software suite without any restrictions.

Should they at some time in the future decide to stop using the subscription service then access to Office and OneCare will be blocked but users will not lose their documents or access to any of the other free services offered by Microsoft.

Albany can be installed on up to three home computers. There's no indication of what the subscription rate will be.

# RIM partners with SAP to develop new applications


Research-in-Motion (RIM) has teamed up with enterprise software manufacturer SAP to offer enterprise mobility to customers via the BlackBerry smartphone. SAP and RIM claim that the power and productivity of SAP will enable users to have access to the SAP enterprise applications at any time of day and from anywhere in the world.

According to RIM the first application of this partnership will allow SAP users to access the Customer Relationship Management application on the BlackBerry phones. It will also allow users to receive e-mail messages, access the SAP address books and calendars.

RIM says that the mobile user platform is expected to increase from 800-million in 2007 to more than 1-billion in the next four years, equivalent to just over 30 percent of the total workforce.

RIM says that the partnership with SAP will allow BlackBerry phone users to access the suite of business applications, seamlessly and automatically synchronise data, improve communications security and provide what it calls a "low incremental cost of ownership".

The Customer Relationship Management applications have already been demonstrated at various conferences in Europe and America. So far there is no indication if Rim and SAP will provide this software to South African users.

# Electricity – is South Africa still part of

In his most recent statements Eskom's chief executive Jacob Maroga claims that power cuts – euphemistically called 'load-shedding' or more recently 'load-shifting' – are a thing of the past. He also optimistically believes that South Africa will be able to get through the coming cold spells of June, July and August without having to switch off the power.

He optimism is not shared by analysts and commentators closely associated with the electricity sector. Businesses, mining companies and manufacturing industries are deeply concerned that the power cuts will remain an integral part of the South African environment for a number of years to come. So what prompt's Maroga's optimism?

First of all, South Africans have responded to calls from government and Eskom to reduce electricity consumption. Energy efficient compact fluorescent lamps are being bought by the handful; people are switching off their geysers during the day (whether or not this actually reduces electricity demand); businesses and manufacturing industries have cut electricity consumption; mines have managed to keep producing on ten percent less electricity than in previous months.

These are all excellent signs and provide an indication that perhaps there is some hope that millions of people throughout the country will be able to keep warm this year. Those are the optimistic signs. But is this the true picture and is it likely that electricity savings can be continued?

Eskom itself says that demand-side management (DSM) programmes have been halted for the time being because it just does not have the cash to continue paying the incentives offered to electricity users. It hopes to reintroduce these sometime in June – presumably after the National Electricity Regulator of South Africa has approved a staggeringly high increase in electricity tariffs of between 53 and 60 percent.

Eskom's general manager for resources and strategy Andrew Etzinger says that all the DSM projects are being re-evaluated to realistically address the funding issue so that the impact on the organisation's cash flow can be controlled. He says that Eskom may start signing new projects sometime in June.

Etzinger, addressing delegates at a recent power generation conference, confirmed that the power utilitity had achieved savings of almost 430 MW through DSM initiatives during the 2007/08 financial year and that when 'load-shifting' savings are taken into account, a further 897 MW of power had been saved.

He says there are now 208 DSM projects underway including incentives to replace old equipment that's inefficient and unreliable with newer, more up-to-date technologies; encouraging consumers to switch from incandescent to compact fluorescent lamps, and providing incentives to all electricity users to install solar water-heaters, pumps, motors and compressors.

Etzinger also confirmed at this conference that Eskom is planning to go ahead with its new time-of-use tariffs for domestic and industrial customers, to encourage the off-peak use of electricity.

So, clearly some of the immediate steps to cut electricity consumption have helped to relieve the overall power crisis facing the country. Of course, unplanned maintenance remains a problem, particularly as many of the power stations around the country are working at almost full capacity, placing additional strain on equipment that is already relatively old and, in some cases, due for replacement.

The new power stations that are being taken out of mothballs and returned to service are taking considerably longer than initially expected. Although Eskom has denied that some of the problems relate to the fact that power stations were not mothballed but simply 'switched-off' when no longer needed, several independent contractors have confirmed that this is the case.

As a result, new components have had to be ordered and installed, resulting in delays in getting the power stations back into operation. A member of the South African Institute of Electrical Engineers who works closely with Eskom on the return-to-service projects says that, had the power stations been properly mothballed when the decision to close them down was taken the return-to-service procedure would have been much quicker.

The source, who insisted that he remain anonymous because of his connections with the power utility, told me that bearings and shafts in the turbines had been damaged and world demand for similar replacement components meant that South Africa had to 'join the back of the queue', causing significant delays in the return-to-service procedures.

Eskom has not given any detailed reasons for the delays in getting the mothballed power stations in working order although it has admitted there have been delays in sourcing replacement parts from

# the Dark Continent?

overseas suppliers. It has also not said what the additional costs implications are for replacing those components that were damaged by the shut-down procedures adopted by Eskom technicians. However, according to information received by *WATTnow* the additional costs are enormous.

It's doubtful that the South African taxpayers will ever know how much money was wasted by shutting down rather than mothballing the older power stations, Of course, once these refurbished power stations are operating at full capacity the strain on the national grid will be reduced and the new power stations being planned will make a significant contribution to relieving the power shortages.

The utility is also actively encouraging independent power producers (IPPs) to get involved in the power generating sector. In fact, Eskom has called for expressions of interest from IPPs to fill the anticipated shortage of about 2 100 MW of power South Africa needs. Up until now, very few international or local investors would enter the industry primarily because the low tariffs charged by Eskom to consumers throughout the country meant that the IPPs could not get a meaningful return on the investment.

The implications of this are evident: a major increase in electricity tariffs – perhaps as high as between 50 percent and 60 percent – must be on the cards in order to attract IPPs into the power generating sector. Investors otherwise will not come forward and put up the necessary cash to build new generating capacity, in whatever form it is.

It is interesting to note that Eskom itself says that it battling to raise funds for its 100 MW solar power demonstration power plant planned for Upington in the Northern Cape. Perhaps that's not surprising given the low tariffs charged per unit of electricity. But if these tariffs are increased dramatically investors will readily accept the financial feasibility of the project and start offering attractive terms to lend Eskom the money.

Eskom's Dr Steve Lennon concedes that investors have said that they want a "higher return than the organisation is able to offer". Eskom must raise at least R2-billion in private investment to build the demonstration plant and a further R3-billion if it is to expand it into a fully commercialised operations.

Frost & Sullivan analyst Cornelis van der Waal says that Eskom's inability to raise the capital for the solar power project is surprising because international investors have a "healthy appetite" for investing in renewable energy resources. But this healthy appetite is bound to be based on achieving a respectable return on the investment over the years.

The capital expenditure programme of R343-billion announced by Eskom is enough to make any prudent investor carefully consider whether the Eskom will be able to repay the money it borrows. So much so that top ratings agency, Standard & Poor has placed Eskom on a *CreditWatch with negative implications*.

There may be many reasons for this but one thing is certain: Given Eskom's low tariff structure coupled with its lack of generating capacity the R343-billion capital expenditure might just be too ambitious unless significantly higher tariffs are charged or the government underwrites the liabilities on Eskom's behalf.

Respected Investec economist Bernard Kantor has called on the South African government to use its own balance sheet to fund the capital expenditure programme stating that as Eskom has only one shareholder (the government) and that taxes levies and dividends go directly into government coffers then it's obvious that the government needs to take full responsibility for the loans.

In fact, if you examine his statements more closely it's clear that government is the sole beneficiary for whatever Eskom achieves because:

- Government, through the National Electricity Regulator of South Africa (Nersa), determines the price of electricity.
- Government benefits from all the relevant taxes and levies charged to a private company (which Eskom is).
- Government gets all the profits Eskom makes each year.

Despite the fact that funding details for the two mega-power stations have not been finalised, Eskom is determined to build the coal-fired Medupi and Project Bravo power stations in Limpopo and Mpumalanga respectively.

These will have a combined capacity of about 9 000 MW and many of the components have already been ordered from major industrial companies. However, simply injecting this additional power into the national grid is still not sufficient to meet South Africa's demands. Eskom says that according to its projections, an additional 4 000 MW of power will be needed once the new power stations are in operation.

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It is hoping to use some of the excess power generated by Botswana's new Mmamabula power station to cut this shortfall.

Toronto-based CIC Energy Corporation says that it is currently finalising the details of its power purchase agreements with Eskom and the Botswana Power Corporation. Construction of the first phase of the Mmamabula energy complex will comprise a 2 500 MW power station and an associated mine capable of producing 10-million tons of coal a year.

Construction will begin in the fourth quarter of this year and Mmamabula is expected to operational by 2012/13 and will cost $10-million. The second phase will see a second 2 500 MW power station being built alongside another 10-million ton coal mine. Estimates are the second power station will cost $10-million as well.

According to CIC Energy's chief operating officer Tore Horvei some of the coal from these mines will be exported via a new trans-border railway line running to the coast of west Africa and costing about $3-billion to complete.

Coal will be exported from these mines via the west coast and not via the Richard's Bay Coal Terminal.

Horvei says the company is also investigating building a coal-to-hydrocarbons facility with the capacity to produce about 57 000 barrels of fuel a day. This facility will cost a further $5-billion to build if it gets the go-ahead. It's likely that Sasol's coal-to-fuel technology will be used for this project.

According to Horvei, because the Mmamabula project is being built in Botswana, CIC Energy does not fall under the licensing obligations that apply to South African companies and the only restriction is that Eskom will need to be granted a licence by Nersa to import the electricity from Botswana.

This is just one of several cross-border projects that will allow Eskom to buy additional power from its neighbours. Additional capacity is being installed at the Cahora Bassa dam in Mozambique and a new power station is being planned for Namibia. All the excess power will be taken up by Eskom.

More importantly, perhaps, is that Presidential Priority status has been granted to the enormous Inga 3 hydro-electric project on the Congo River by the governments of South Africa and the Democratic Republic of Congo (DRC).

This project could deliver a staggering 75 000 MW of low-carbon electricity to the southern African region over the next 20 or 30 years. Power corporations from Angola, Botswana, the DRC, Namibia and South Africa – who make up the Southern African Power Pool – are actively supporting the Western Power Corridor's (Westcor) efforts to raise the estimated $6-billion that the first phase of this project will cost.

With regard to South Africa's electricity woes, a further potential crisis is developing in the distribution infrastructure and network which has rapidly deteriorated mainly because of the high costs of replacing or maintaining existing equipment used at substations around the country.

Many experts have said that the spate of explosions at various different substations are a direct result of equipment that is damaged, poorly maintained or beyond its service life. Coupled with this is the fact that Eskom's power cuts are putting additional stresses on the equipment in sub-stations, exacerbating the problems.

Frost & Sullivan's Moses Duma says that insufficient margins from electricity distribution mean that maintenance and expansion projects are difficult or virtually impossible to finance. There have been repeated calls on the municipalities to invest in the existing distribution network but there has been little action on their part to protect and maintain the existing equipment.

Clearly a significant investment is needed in the distribution network and that implies that costs of distribution will have to be paid for by the consumers – a sort of *toll-road for electricity*?

Added to this is the fact that millions of new houses need to be built around the country, placing further stresses on the distribution network and the demand for electricity from Eskom.

Absa DevCo's Sipho Mashini confirms that the company recently applied to Eskom for a bulk electricity supply for a new mixed-housing project for the low-income market, which is supposedly excluded from the current moratorium on new developments requiring more than 100 kVA. Eskom turned down AbsaDevCo's application bringing the project to a standstill.

Eskom's Andrew Etzinger admits that its policy on low-income housing developments is "sometimes misinterpreted" by Eskom managers. However, Pierre Venter of the Banking Association of South Africa says that Eskom's refusal to supply bulk to developers of new housing projects has brought the property development sector to a halt.

In summary, South Africa has achieved its initial target of saving electricity by being more energy conscious but in the longer term is this sufficient to stave off the pending crisis. Experts seem to doubt that South Africa will get through this winter without power cuts and are just dubious about the ability of the distribution network to carry the power generated by Eskom to the people who so badly need it.

Perhaps these experts are the harbingers of doom? More worryingly, perhaps, maybe they are the realists. wn


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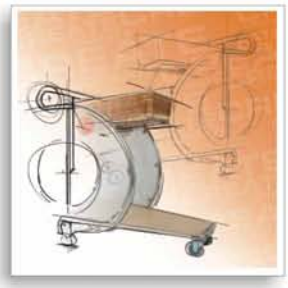

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# Meccano houses a reality in South Africa?

How would you like to build yourself a 200 square metre house in just 14 weeks and costing about R800 000 using the principles first established by the manufacturers of that magnificent children's toy, the Meccano set.

While relatively new to South Africa, the principles of steel frame construction have already been proven in various projects around the country and yet the South African population and its building community remain slow to embrace the alternative building method.

Peter Wiehahn, who runs one of the largest fabricating companies in the country, Innosteel, warns that the South African builders, engineers and architects are general slow to adopt new technologies or building methods and are particularly conservative when it comes to using them.

His company has just finished building 106 houses for Steinhoff at Ugie in the Eastern Cape. Each house will be occupied by workers – mainly from Germany – who are employed at Steinhoff's factory nearby. Each house is 174 square metres under cover and has three bedrooms, two bathrooms, lounge, dining room, family room, covered patio and kitchen. All 106 houses were completed in under a year.

There are many other examples of individual homes and factories that have been built using this method and interestingly, an engineer's role in the building process is significantly more important than the architect's role.

This is because the engineer is responsible for calculating and verifying the frame strength and its structural integrity which must be done at the design stage and checked for compliance during the construction phase.

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When building a steel frame home, an architect's designs are transformed into high-precision computer blueprints for the steel frame components used in the overall structure. The computer blueprints are the basis for computer-controlled fabrication of each piece of steel that is formed in a framing machine.

The result is that each component for each frame is made to the exact measurements and then assembled and checked in the factory before being sent to the building site for erection.

Typically the galavanised steel used to make each frame uses hot-dip galvanized steel with a thickness of 0,55 mm for single storey homes, 0,85 mm for two storey structures and 1,2 mm steel for multi-storey buildings.

Wiehahn, who now has seven fabricating machines at his factory south of Johannesburg, actually took one of these machines to the Ugie site where he quickly built a small 'factory' in two weeks. From that factory, he provided the frames which were erected by teams of trained workers. It took each team about eight to ten weeks to complete the basic structure including foundations, the steel frame, insulation and cladding and roofing.

Finishes including tiling, carpeting, kitchen and bedroom cupboards, bathroom fittings and the entire plumbing and electrical harnesss were then installed after which the houses were painted and furnished according to the client's specifications.

It's the biggest steel frame housing project undertaken in the country so far although there are many others on the drawing boards. Group Five is reportedly planning to build 3 000 affordable homes using this building method and various other major construction companies are currently investigating and testing the methods. There are now 19 fabricating machines in the country, imported from New Zealand, Europe and the United States.

Light steel frame construction has been used in the United States since the 1950s and has also been widely adopted in New Zealand and Australia where earthquakes and tremors are a regular occurrence. The flexibility of the steel frame means that these houses are particularly safe during seismic disturbances. New major projects are well underway in China, Malaysia and Indonesia while in the Middle East lightweight steel frame building is being used in Saudi Arabia, Dubai and Turkey.

Given the critical housing shortages in South Africa it might seems surprising that few of the major building companies or developers have embraced this building method. But there are apparently some good reasons for this.

According to various banks and developers one of the major stumbling blocks is that all the materials used for the light steel frame building system must meet locally approved standards. Some of the imported materials have yet to receive certification from the South African Bureau of Standards which can take up to a year to achieve.

The second issue is that the erectors need to be properly trained and must have proven ability to correctly erect a light steel frame structure. This problem is only now being properly addressed after the Tjeka Training College at Chamdor, west of Johannesburg, developed a Steel Frame Erector's training course that has been accredited by the Construction Education and Training Authority.

But the combination of a lack of trained erectors and no SABS

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certification – albeit that the products used comply with international standards – has prevented the banks and property developers from allocating funds to light steel frame housing projects. In time these restrictions will likely to fall away.

Interestingly, the National Home Builders' Registration Council has agreed to enroll houses built using this method. Moreover the South African Institute of Steel Construction has created the Southern African Light Steel Frame Building Association (SASFA). This organisation has published a comprehensive building code for light steel frame construction.

How does the new building system impact on the engineering community and on the man-in-the-street?

The engineering community can expect to get some additional work if and when this building system is implemented because each different phase of the building work must be signed-off by a registered professional engineer – usually a structural, civil or consulting engineer.

Secondly, electrical engineers need to get involved in the building process at the design stage because the wiring should be incorporated into the steel frames as they are fabricated. Specific spaces must be left for wall plugs, light switches or the distribution boards as each fitting needs to be accommodated within the frame.

In a similar fashion, the plumbing and piping must also be planned during the design phase because, if correctly built, the hot and cold water pipes are installed through pre-cut holes in the steel studs.

Where are the benefits for the man-in-the-street? Firstly from direct savings in the cost-per-square-metre which is typically between R3 000 and R5 000 compared with conventional building costs of between R6 000 and R8 000. But the real advantage is that steel frame is much, much quicker than conventional building.

For instance, a 200 square metre house built using conventional materials can take anywhere from 24 to 56 weeks to complete whereas the same house using steel frames will be finished within 10 or 14 weeks.

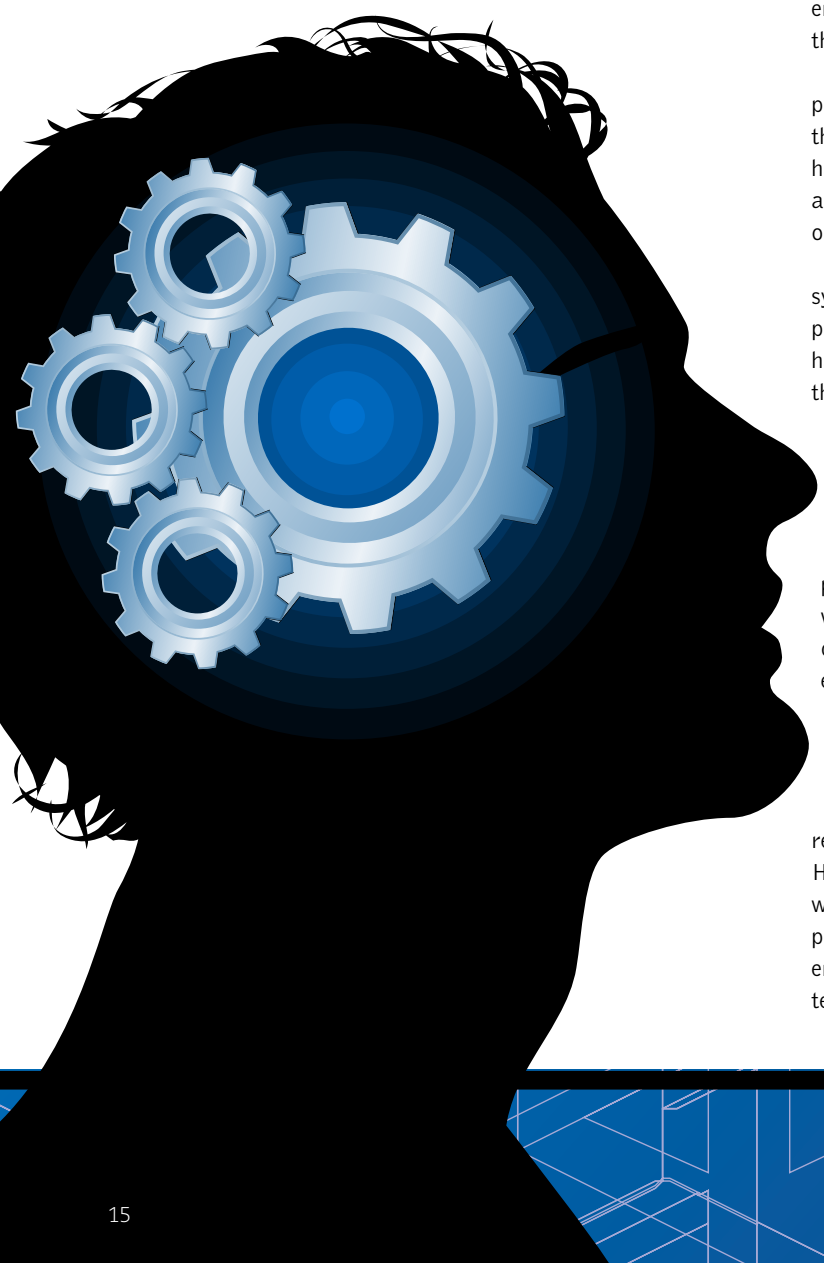
This shorter time translates into lower labour costs and provides direct and real savings. The second point is that the transportation costs are significantly lower because the materials weigh so much less than bricks, concrete and mortar. Finally, the precise fabrication of the frames means that each piece fits together perfectly resulting in rooms and walls that are square, level and plumb.

While the steel frame building process appears to offer sensible alternatives for some of South Africa's housing problems is it likely to be widely adopted? Time will tell but if the engineering community, the property developers and the banks embrace the system it may start making an impact in the housing market.

The real judge, though, is the homebuyer. If they are will to spend their money on one of these houses then acid test steel frame housing will have been passed. Time will tell. Wn

# CPD or not - that's the question

A personal review by Antonio Ruffini



From quite early my plan was to get a worthwhile professional qualification and, with that option as a backup, pursue whatever career interests I found most intriguing. I got a couple of electrical engineering degrees and then did the necessary on-the-job training to become a registered professional engineer (Pr Eng). With all that securely in place, I ceased working in the profession and followed my plan.

For the past 15 years, or the bulk of my working life, I have not practiced engineering, but at the back of my mind carried the knowledge that I could return to engineering if I wanted to. Of course it would have to be at a level commensurate with my lack of experience, in a profession where experience is very important. But I figured the option was there, devaluing over time, but there it was.

Then the compulsory Continuing Professional Development (CPD) system was introduced in South Africa. I voluntarily deregistered as a professional engineer and wondered in retrospect whether my strategy had been as sound as I always imagined. It was with some empathy that I read letters and emails where other engineers expressing frustration at what they see as steps taken to pressurise them out of the industry.

According to Engineering Council of South Africa (ECSA) figures which cover all the engineering disciplines, there are only 28 000 registered engineering practitioners, of whom 18,000 are practicing, 5,000 are candidate engineers and the remainder retired, working part time, or dormant. Of the 28,000 registered persons on the ECSA database, only 14,800 are registered as professional engineers.

The decision by the engineering profession to implement Continuining Professional Development (CPD) programmes came about as a result of legislation. Section 22 of the Engineering Professions Act requires a registered person to renew his or her registration, with ECSA to determine the details of this process. However, even without legislation, it would have been questionable whether South Africa, as a member of the Washington Accord, which provides the international accreditation criteria for professional engineering programmes, the Sydney Accord applicable to technologists and the Dublin Accord applicable to technicians, could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have justified not introducing CPD. All the other adherents to these accords have introduced CPD systems. Other professions in South Africa such as medicine have taken the lead in doing so and were the first professional body to embark on CPD programmes. South Africa's engineering profession has accepted, quite late, the CPD concept. In the UK, the Institution of Electrical Engineers (IEE) introduced CPD in 1995.

CPD gives engineers the incentive, the excuse even, to put aside time from other commitments, to develop and extend the range of their skills. It enhances the profession's image by maintaining and raising professional standards, and lets the public know that registered professional engineers have up-to-date knowledge and technical competence.

Johan Pienaar, manager: registration at ECSA, which represents the nine professional engineering disciplines, Electrical, Mechanical, Mining, Chemical, Metallurgical, Civil, Agricultural, Aeronautical, and the Industrial engineering says ECSA originally considered implementing CPD on a voluntary basis but decided that the way to instil a culture of CPD was to link it to the Act.

Engineering, long established in South Africa with representative bodies, resides in a sub-continental context that is still in the early stages of formalising institutional requirements. South Africa, which only recognises engineering qualifications endorsed by ECSA, is the only country in sub-Saharan Africa to participate in the Washington, Sydney and Dublin accords. That means people with engineering qualifications from other African countries are not automatically accepted, due to uncertainty as to the quality of their qualifications. "Their degrees are not easily transferable, and in many cases they would be called in for an interview to determine the level of competence their degrees engendered," says Pienaar

CPD is primarily about engineers keeping up to date in their profession and undertaking activities to develop the profession, which is something practicing engineers should do as matter of course.

The process involves registered professional engineers obtaining five CPD credits every year. ECSA looked to achieve a balance in the ways credits are obtained, including membership of voluntary associations (if you are a member of the SAIEE you get a credit), work experience, and developmental activity which involves attending courses and seminars.

However, CPD had deeper implications than simply making what should be an almost natural process bureaucratic, and bolstering the short course industry. While not yet introduced, the identification and reservation of engineering work is in the pipeline, and that has supported the formalisation of the CPD system.

Pienaar says ECSA looked to make the system as flexible as possible, but also had to evolve a system whose administration is manageable. "One cannot underestimate the difficulties of administering the process."

The CPD system was implemented on the 1st of January 2006. The actual monitoring of the CPD of the first registered persons due for renewal of registration started from January 2007 with people who had registered as engineers in years following the sequence 2002, 1997, 1992 ... falling due for renewal in 2007.

"With this first round we encountered teething problems. A lot of people claimed that they were not fully aware of the requirement of the one compulsory developmental activity and as a result have not attended any such activities. Consequently Council decided to exempt persons who were not able to comply with this requirement in their first CPD cycle ending in 2007 or 2008. Those registered persons who have already got the developmental category credits, can carry them over to their next full five year cycle."

There are three categories, and CPD credits must be obtained in two out of three of these. The work based activities category is straightforward and two credits can be obtained each year by putting in 800 hours of engineering work. An additional credit can be achieved each year through 50 hours of mentoring of candidate practitioners.

The individual activities category, as mentioned before includes a credit for membership of a body such as the SAIEE, and up to three credits a year can be achieved at 10 hours of voluntary work apiece related to furthering the aims of the engineering profession.

The final category, that of developmental activities, has proven to be the most contentious; one can achieve four credits a year at 10 hours/credit for attending courses, conferences and seminars that help further the attendant's development as an engineer. And at least

five credits in a five year cycle must come from such developmental activities.

Pienaar says there has been some misunderstanding of the goals of CPD and people have focused on the developmental activities category, with concerns over the costs of attending courses and conventions. At the same time it does provide another arrow for employers in attracting and keeping employees if as part of the package they offer access to validated CPD courses.

"What people have not always realised is the wide scope of development courses they can opt for. There was a misconception that engineers had to find courses within their own fields of practice. In fact it means an electrical engineer can do courses ranging from financial management and legal training to project management or exploration of a different field of technology. Those all fall within the CPD philosophy and accreditation practice." Pienaar says.

However, this is where administration becomes important. Though almost 1,000 courses have been accredited as meeting the requirements of CPD, the infrastructure still needs to fully come into place. Not all courses that may be of value have been accredited, and someone who attends a course that fulfils a CPD role would have to motivate for that course to be validated if that person wanted the credit to count. If someone wants to attend an international conference or course, one accredited by the Accord country engineering institutions would be accepted for CPD. If that is not the case one would have to send the documentation to ECSA and make the application for the credit.

ECSA is looking to provide solutions to remotely located engineers who would otherwise face the additional burden of travel time and expenses to attend courses. The solution takes the form of course material provided through TV/DVD or other electronic formats. The person would have to answer questions provided at the end of the material and send those through to an adjudicator. A system is envisaged where after watching an hour long DVD, one can SMS the answers to five related questions provided at the end to earn 0.1 of a credit.

What shows the balance ECSA is trying to achieve, is that a practicing engineer who is a paid member of a voluntary association will still have to do something else to earn CPDs; attend a course, do some voluntary work and mentoring. Non-practicing engineers are catered for, in that they can earn the necessary CPD credits through voluntary activity promoting the profession and coursework to keep current with some field relevant to professional development.

"We are certainly not trying to find ways to exclude engineers," Pienaar says. And in the event of engineers deregistering or being deregistered through this process, it does not mean the doors are permanently closed to practicing engineering.

Any person whose registration has lapsed or has been cancelled, and who wishes to be re-registered must submit a duly completed and signed (attested) application form, as well as a résumé of engineering work performed by the applicant covering the period from the date on which the applicant's registration was cancelled to the date of application for re-registration (i.e. if one's registration was cancelled on 1 March 1998, the résumé must cover the period 1 March 1998 to the date of application).

In addition a recommendation by a registered person, acting as a referee, in which such person expresses an opinion as to the nature and appropriateness of the applicant's engineering work performed during the period of cancellation referred to above, has to be submitted.

Obviously the prescribed application fee and any outstanding arrear annual fees which remain outstanding from the date on which the original registration was cancelled (to be obtained from ECSA's Accounts Department) has to be paid.

The registration certificate originally issued to him/her in respect of the cancelled registration, if this has not previously been returned to the Council, also has to be submitted. The final requirement is that proof of CPD activities during the period of cancellation specifically since January 2006, has to be included in the re-registration application. A minimum of 3 credits will be required for re-registration.

Pienaar says about 50 people have voluntarily deregistered because they are not prepared to be subject to CPD. Most of the complaints received have been from people in their late 50s and 60s, those well established in their careers who see no value in being subject to the process. "Many could be in management or other non-technical roles, and see the process as an inconvenient burden; others could have high levels of expertise in their field, more so than any likely CPD adjudicating committee, and may resent the distraction some of the CPD requirements represent," he adds.

Other feedback has been positive with the Agricultural division having hosted a seminar on biofuels. The feedback was that people were willing to attend and the discussion provided a collegiate atmosphere in which an interesting topic was discussed.

CPD is what one makes of it. It can be a waste of time, with people registering for conferences and then playing golf while the sessions take place, or it can be of great benefit. No one can force an individual to learn, or expand their expertise, and ECSA's hope is that engineers will embrace CPD in the spirit it is intended.

I chose to deregister, in spite of avenues provided by the system to remain registered, because I have taken the view that the CPD process highlights that one should not spend the bulk of one's career not practising engineering and yet remain a registered professional engineer. In my case it makes little or no sense. wn

# Watt's Says

Hi, Paddy,

Herewith three items for the correspondence column of *WATTnow*. By the way, how about a regular, formally designated Reader's Views column in WATTnow?

With regard to the electricity issues contained in the Reader's Views in May I am afraid that in fine detail, Prof. Shaw's physics is faulty. A body of hot water (a heated geyser tank) continuously loses heat to its surroundings, and its temperature drops. The rate of heat loss depends on the temperature differential, and reduces as the temperature falls. The make-up energy to keep the geyser hot, naturally just balances this loss. Because the heat loss occurs at a progressively slowing rate, the total energy used in make-up after an extended switch-off period will then be less than if this energy were supplied quasi-continuously under control of a thermostat.

This being said, in my experience the total amount of heat lost from a domectic geyser during a 10-hour switch-off period (e.g. 8:00 am to 6:00 pm) is quite small if no hot water is drawn off in this time, so the discrepancy will be small. The major import of Prof. Shaw's letter is really that this difference is substantially negligible. There is, however one further point: if the energy-loss replenishment is deferred to the early evening, this does help to reduce the daytime loading on the network, giving some benefit.

The "Editor's reply", to correspondent John Fourie, is also highly relevant to correspondent Pierre Ballot's remarks. The Eskom problem is basically political in origin, rather than technical or managerial. To expect that Eskom management will "fall on their swords" to defend their political masters seems out of place, however ineptly they and their PR facilities handled (and continue to handle) the current crisis. To expect such action in turn from the politicians is just at variance with The nature of the beast. I fear that the Welcome to Africa conclusion still stands.

With regard to the use of photo-voltaic devices I continue to be flabbergasted at the ongoing attention being paid to the use of Solar Cells (photo-voltaics, PVs) as a practical solution to the current electricity crisis. Arguably, PV is just about the most expensive means of electricity generation ever devised. Although the input "fuel" (solar energy) is free of cost, the resulting output energy is not. As a matter of elementary economics, the cost of electricity, from whatever source, is made up from various components:

Fuel costs
Equipment capital-related costs (interest and depreciation)
Equipment maintenance costs
Administrative overheads

For a stand-alone PV installation, the fuel cost falls away, and the administrative costs are largely concerned with the maintenance requirements. The major items are then capital and maintenance costs.

Of the capital costs, the principal element is the interest on the capital, since PV devices are expensive. Depreciation is largely a matter of eventual obsolescence, rather than any mechanical or electronic wear-out phenomena. Cost reductions from improved manufacturing methods for PVs always seem to be somewhere "just beyond the horizon". The cost factor is not helped by the continued low conversion efficiencies of PV devices, necessitating larger devices than may otherwise seem desirable. (Anything with a solar conversion efficiency of better than 20% seems to remain just a laboratory curiosity.)

Because of the intermittent nature of sunlight (around 12 hours in every 24, with also a large hour-to-hour peaking effect), the PV device must be used primarily to charge a battery. The cost of the battery adds to the overall capital cost, and also adds considerably to the maintenance costs, since battery life is limited (2 - 5 years, compared to a probable 20-year obsolescence cycle for the PV devices.)

The PV system costs seem to make out a case for a simple mains-charged battery-based system. If needed, the battery charger could be equipped with a time-switch to allow charging only during the night-time, when there is essentially no energy shortage.

The "green" credentials of the PV devices also seem to leave a lot to be desired, considering the complex (and energy-intensive) refining processes for silicon to reach semi-conductor grade. In addition there are the additional chemicals used to manufacture the PV cells, with their preparation issues, and the disposal of noxious waste-products.

I remain puzzled: Why photo-voltaics?

In terms of the article on toll roads ( *WATTnow*, May, 2008) I feel sympathetic to the views expressed in the editorial on road tolls. I spent the last 8 years before retiring commuting daily between Boksburg and Irene, a distance of 55 km each way. Of this about 40 km was on the R21 freeway. At that time, congestion was not an issue, but today this road has reached parking lot condition in peak hours. The toll cost at 50c per km is easy (although depressing) to work out, and I am thankful to now be out of that loop. You may have noticed that petrol is also not very cheap these days!

It seems as if the roads situation is almost as dire as that at Eskom, with an accumulated lack of construction and maintenance. Somewhere in the early 1980s, the then government imposed a surcharge levy on the petrol price "to pay for road construction and

maintenance". It seems that it became embarrassing to government to have such a specific description, so it was decided to roll the levy into "general taxation" and to pay for road construction and maintenance out of general state funds. As usual, the first change (in favour of government) was implemented, but the second (in favour of the taxpayer) was ignored. Now we have the proposal of toll fees, which will mainly pay for the running expenses and profits of the administrators, while if there is anything left over, a little perfunctory road maintenance may be done.

To view the Gautrain as a potential solution is, I think, largely wishful thinking. Little has been said of expected fare levels, but a report some time ago speculated on a Joburg to Pretoria single fare of around R70. I shudder to think how much this will escalate by about 2012, when the line finally opens. With regard to Gautrain costs, the original scheme was sold to the public, around 2000, at an estimated price of about R7-billion for construction. The latest estimates seem to quote a figure of about R3-billion, although that does include an estimate of the operating losses of a probably white-elephant project.

**Tony Fisher, Member SAIEE**

Hi Paddy,

Thank you for your article on Mandriva Linux in the April 2008 *WATTnow* edition.

Just would like to point out that it's Mandriva 2008.1 release candidate which is ready for download and not Mandriva 2008. I would also not recommend an average user to download any Linux distro, unless they have a lot of bandwidth to play with as I have many clients who come to me with failed downloads. Mandriva PowerPack can be purchased from the Mandriva store.

The One edition is available on CD only.

Beta and release candidates are not recommended for the average user and will probably give them an unpleasant experience.

Hope to hear more of Linux in future editions.

**Marek Pawinski**
**AMPPOL IT Linux CD's & DVD's cc**

Dear Paddy,

Bravo for your editorials and bravissimo for your bold attitude. Was it Dr McCrae who said: "Keep the politicians out of the engine room"?

Well, they're now in every conceivable engine room, from ESKOM to rugby, hospitals to roads, rivers to cricket etc.

Quick to change the name plate. And of course the driver's seat to something soft and cosy. Forget about the fuel tank and oil level. Maintenance is a foreign (colonial?) word! Keep it up.

**P. du Preez**
**PR ENG.**

Sir,

I was mildly amused by the irony of the article on Max Clarke ( *WATTnow*, April 2008), SAIEE Historical Section Chairman 2008 and past Town Electrical Engineer, Randburg from '79 to '91.

Max described how he set up an effective load management system in Randburg for reducing peak power demand by cutting off domestic geysers (colloquially referred to as "ripple control"). I decided to test the unit installed at my home. I found it to be electrically functional but there appeared to be no incoming signal to activate it. When I reported this to City Power I was told that Randburg no longer operated this system!

The ripple control system used in the '80s would have been ideal for lopping the peak power demands of today and possibly even avoiding the need for some of our power outages. When Eskom eventually get around to launching their programmable, digital power management system I would bet that it will cost quadruple the price of the old analogue system and require an electrician, a technician and a computer programmer to set it up!

As Chairman of the Historical Section of the SAIEE I think Max is in an ideal position to teach our younger engineers that despite the advancements in high-tech devices in the 21st century we don't necessarily make much progress in the application of our engineering discipline!

**Regards,**
**Chris Hughes**

# Wheelbarrow Patterson, Pilgrim's Rest and Electrical Power

By Paddy Hartdegen


South Africa has relied on gold as a major source of income for more than 100 years since it discovered the richest gold reef in the world in 1886. Indeed, it has remained a source of riches for the gold mining companies who have access to the gold reefs that extend deep into the Free State.

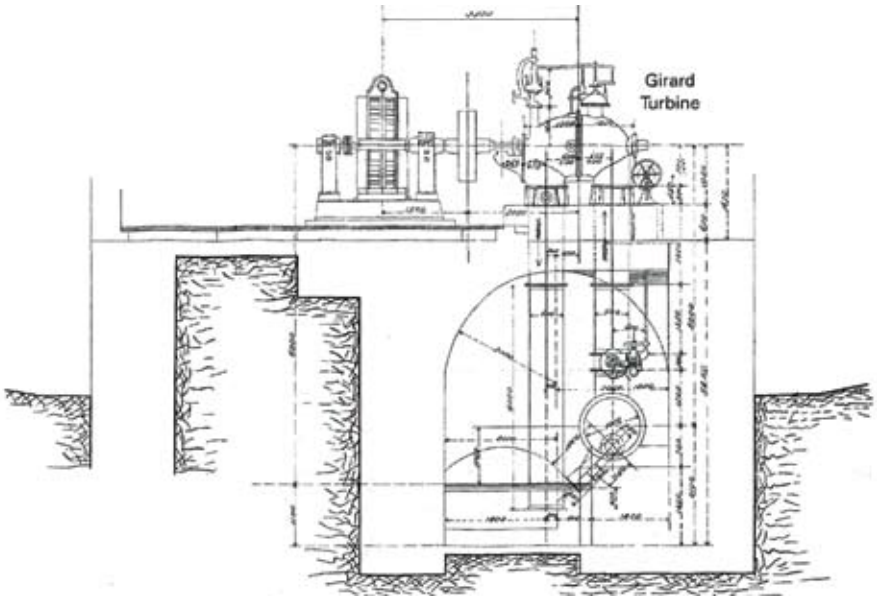
Of course South Africa's gold mining industry can be traced back beyond the Witwatersrand reef to diggings in the former Eastern Transvaal (Mpumalanga) at Barberton, Sheba's Reef, Bray's Golden Quarry, French Bob's Reef and many more. In fact gold was all over the lowveld.

Wheelbarrow Alec Patterson is believed to be the first man to find gold in the valley of Pilgrim's Rest. He'd been panning for gold at the Mac Mac Diggings near Graskop and as more and more diggers swarmed onto the diggings, Wheelbarrow Patterson moved on.

He was very much a 'loner' and as soon as a tract of land or a mountain stream attracted hundreds of others he left. Travelling was easy for him: he loaded his spades, shovels, a sluice box and his tent and provision into his wheelbarrow and trudged away, pushing it in front of him.

It's believed that Wheelbarrow Patterson pushed his wheelbarrow and equipment all the way from Kimberley but that has never really been confirmed. As a loner he would appear at one or other of the diggings, try his hand at finding gold and, soon after would leave.

As he was making his way along a spur of mountains that lead north-west from Graskop he spotted a small stream that gently wound its way through a deep valley below. He dragged, cajoled and no doubt cursed his loaded wheelbarrow as he descended the steep mountain side to the Blyde River about 650 metres below.




In this creek, Wheelbarrow Patterson pitched his tent close to one of the many peach trees that grew along the banks of the stream and almost immediately started panning for alluvial gold. Within minutes he'd found a bright 'tail' in the residue of dirt.

He set up his sluice box and began digging and as he washed the gravel away he found bright traces of gold in the residue left behind. This was in 1873, 13 years before the incredible gold strike on the Widow Oosthuizen's farm at Randjeslaagte just south of Johannesburg's central business district of today.

Wheelbarrow Patterson, nestled all alone in his camp on the banks of the Blyde River in a deep valley below Graskop, had finally found peace. He'd found a source of untold wealth in the alluvial and surface gold he kept finding. 'His' valley was beautiful, the weather was pleasant, he had a constant, flowing stream to wash his gravel and he was the only one working the area. Or at least that's what he thought.

Meanwhile, another digger, William Trafford had also left Mac Mac Diggings several months after Patterson and had taken the same trail along the mountain ridge. He'd also spotted the stream below and climbed down to it. He, too, came up with a 'tail' of gold as soon as he panned the stream and he also thought that he'd found his Eldorado.

Legend has it that after finding the gold he shouted to the mountains: "The pilgrim is at rest" and the cry came back, clear, resonant and loud "Pilgrim's at rest. . .rest' . . . rest . . . until it faded out. That, says the legend, is how Pilgrim's Rest got its name.

Trafford, unlike loner Wheelbarrow Patterson, immediately left the valley, walked to the Gold Commissioner's office in Lydenburg and registered his claim. He used the gold panned from Blyde River to pay the fees for his licence and then, with his claim registered he went to the nearest bar to celebrate and promptly told everyone what he'd found.

News of the gold strike spread fast and the results exceeded Wheelbarrow's Patterson's most forlorn expectations. Within days, 200 diggers had arrived and were soon spread out all along either side of the stream. And all the diggers were finding what they wanted so badly: alluvial gold and nuggets of all shapes and sizes, some so badly weathered that they might have been filigreed.

Soon Pilgrim's Rest was populated by many colourful characters with 'shovel' names like The Bosun, Wild Bill Leathern, French Bob, Sailor Harry, German George, Charlie the Reefer, Wheelbarrow Patterson and many more.

Pilgrim's Rest was giving them what they'd sought at diggings around the lowveld. Valuable gold nuggets such as the119 ounce Lilley, the 214 ounce Breda found at Peach Tree Creek and another unnamed 208 ounce nugget that sold for £750.

However, it was only when gold was found at Barberton that wealthy miners on the Rand took an interest in the goldfields of the lowveld. Both Alfred Beit and Lionel Phillips inspected the Barberton fields and bought an interest in one or two of the newly floated mining companies.

Given the huge sources of gold found on the Witwatersrand in 1886 it's hardly surprising that it was not until 1894 that mines in Pilgrims Rest came to the attention of the Randlord's of Lionel Phillips, Alfred Beit, Abe Bailey, Percy FitzPatrick, JB Taylor and others. In fact under Percy FitzPatrick's guidance, and with Phillips and Beit's blessing, the Transvaal Gold Mining Estates company was formed and it was to continue mining prosperously in Pilgrim's Rest for the next 85 years.

A Mr G Wertheman was appointed by TGME's as the mine's first consulting engineer and he advised the directors that if they wanted to get gold out of the ground at affordable rates it was necessary to build an up-to-date 60-stamp battery. He wanted the mill to be built in a central position so that the ore from the producing mines of Jubilee, Clewer, Beta and Theta could be treated in one process.

To get ore to the mill he proposed building a 10 kilometre miniature electric tramway, with a gauge of 75 centimetres. Branch lines would connect each of the mines to the main line so that ore could be transported by electric tram to the mill.

Thus it was that in 1896 a new power station was built near the site of the old Brown's Hill mill using the existing four-kilometre long Farmer's water race to channel water through a waterwheel to spin the turbine and generate electricity.

The water, with a 36 metre head, drove two Escher Wyss Girrad impulse turbines coupled to a 160 kW 3 000 volt three-phase Siemens alternator.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At the same time – and on Wertheman's recommendation – a second completely new power station was being built just north of the planned central reduction works. Water to drive the new power station would come from the Blyde River just after Joubert Bridge. It flowed along a 2 km earth ditch delivering water at the rate of 1,2 cubic metres per second.

The 12,6 metre head was enough to drive a 135 kW Escher Wyss Francis turbine coupled to a Siemens 150 kVA 3000 V three-phase alternator. The three alternators, two at Brown's Hill, and the new one at Jubilee (so named in honour of Queen Victoria's 60 years on the throne) provided Pilgrim's Rest with enough electric power to drive the central reduction works, the electric tramway and even provide electric light to the houses around the town.

A Mr W Elsdon-Dew, a founder member and fourth president of the SAIEE, arrived in Pilgrim's Rest at about this time and he was responsible for the installation and running of the two new power stations.

The total cost of the reduction works and the power stations was £117 000 and electricity from the power stations continued to flow for the next 15 years virtually uninterrupted until a larger generating plant was built at Belvedere in 1911.

But the miniature electric tramway was Wertheman's real stroke of genius as it ran in almost all weather and permitted extensions to the line for new workings as they were developed.

The cocopans ran up and down the hillside to various working adits and delivered ore to the tram termini. Electric locomotives then hauled the 'trains' of trucks filled with ore to the mill on an almost continuous basis.

That was not the only value of the trains, though, as each morning one of the trains was used to carry the children of Pilgrim's Rest to a nearby school built by the community to educate the growing number of children in the village.

Pilgrim's Rest's tramway was in use just a few months after Johannesburg had electrified its horse trams and remained in service, with some improvements, for more than 85 years.

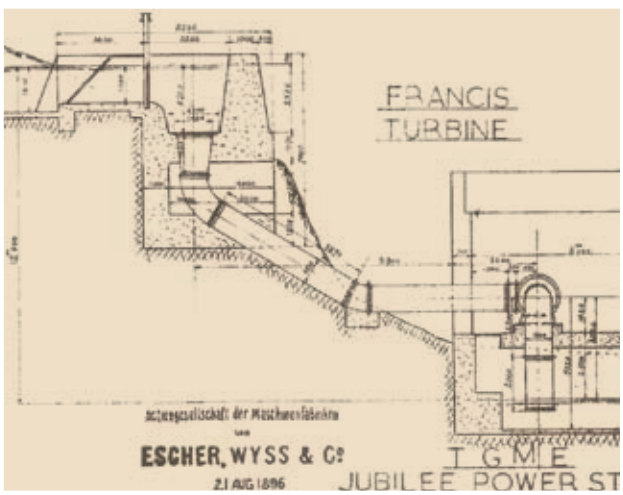
Furthermore, Wertheman estimated that the cost of hauling ore to the mill by ox-carts was seven-shillings-and-sixpence a ton while the electric tramway reduced this cost to just one-shilling-and-eightpence.

This electric tramway kept the gold mines of Pilgrim's Rest profitable and allowed shareholders in Johannesburg and London to be paid handsome dividends by the mining companies at least once a year, almost every year.

The tramway was a significant investment and a tribute to Mr Wertheman's engineering vision in the last days of the 19th Century. But it was not a vision that Wheelbarrow Patterson was to share: for one morning in 1873, having found the Pilgrim's Rest gold, Wheelbarrow Patterson once again packed his belongings into his wheelbarrow and trudged away leaving his claims and his gold behind him.

He was never heard of again. Wn

**Sources: Valley of Gold by A P Cartwright published in 1961 by Howard Timmins and Sparkling Achievements, edited by Michael A Crouch and published in 2001 by Chris van Rensburg Publications.**

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# Copyright infringement – Beijing man jailed

China appears to be taking copyright protection more seriously as a Beijing court has handed down the first jail sentence for copyright infringement in the city. Beijing is flooded with pirated DVDs, software products and fake copies of designer clothing, shoes and handbags.

The United States and the European Union have been pressurising China to change its lax attitude to copyright infringement, through which billions of dollars in royalties and sales are lost annually.

According to the Xinhuua News Agency, Zhou Cheng was jailed for one year and fined 10 000 yuan (about R11 000) by the Chaoyang District People's Court. He was arrested in December for selling DVDs at 15 yuan each; he had about 11 000 pirated DVDs in his store.

# Subscribe to Skype's cheaper call option

Skype is offering unlimited calls to overseas phone numbers and landlines in 34 countries at a cost of just $9,95 a month. Countries include most of those in Europe as well as Canada, Australia, New Zealand, Chile, China, Singapore, Taiwan, Japan, Korea and even Malaysia.

Calls to domestic land lines and mobile phones are included in Skype's service for Canada, China, Hong Kong and Singapore while in other countries cell phone calls from the Skype service are prohibited.

Subscribers to the Skype service have an option to call a local number from any ordinary phone or cell phone and will be connected to international numbers that fall into the service but instead of paying international rates will pay a local call rate only.

Skype says that subscribers spent a combined 1,7-billion minutes on the phone in the first three months of this year compared with 14,2 billion minutes using the computer-to-computer service in the same period. The voice-over-Internet calls on computer are free.

# Getting rid of loitering teens

A device that emits a shrill, piercing noise that can only be heard by teens and young adults has been effective in dispersing groups of youngsters. Known as the Mosquito, the high-frequency sound has been likened to fingernails being dragged across a blackboard. Teens and young adults can hear the sound because the sensitive hairs in their inner ears are still intact.

Marketed by a company called Kids be Gone, the $1 500 device is being used with some success around the United States. More than 1 000 Mosquitoes have been sold and are being used mainly at malls around the country to disperse skateboarders. They are also being used at schools to stop kids loitering between classes or gathering in parking lots once schools close.

The device was installed at an apartment block in Queens and according to Carmen Ramirez, superintendent of the building, young men use to loiter outside the block, bothering people in the block and involving themselves in illegal activities. However, once the Mosquito was installed the kids gathered elsewhere.

"It was miraculous," Ramirez says. "One day we had these thugs hanging around and the next day they were gone."

The device is causing outrage among civil liberties groups in England, Australia and Scotland, and England's Children's Commission has called on government to ban it.

# Electronic vision

Two blind people in Britain are the first patients to receive bionic eyes – electronic devices implanted into the back of the eyes to allow patients to distinguish objects as pictures made up of spots of light.

Each electronic device has a tiny camera mounted in a pair of glasses that transmits a wireless signal to a receiver and from there to a panel of electrodes at the back of the eye in patients who have lost their sight through Retinitis Pigmentosa.

According to the consultant retinal surgeon, Lyndon da Cruz, who performed the operation the procedure could be used for anyone who has extremely poor vision but an intact optic nerve. He concedes that at this stage the vision is not particularly good quality but as technology develops he believes the results will get better.

The wireless signal transmitted to the receiver that is implanted in the eye stimulates electrodes and the retinal nerves, allowing the signal to pass along the optic nerve to the brain. The brain then perceives patterns of light and dark spots that correspond with the electrodes stimulated.

The devices are made by Second Sight in California.

# Rock Phish Gang has struck again

The notorious Russian-based Rock Phish Gang which is known for its prolific phishing operations by rigging its software with a drive-by download that infects the computer with malicious software within any interaction from or instructions to the computer users.

Described as a one-two punch the software does not require users to provide any personal details but sxploits software vulnerabilities to install and load the Zeus Trojan onto a particular computer. The Zeus Trojan is particularly malicious as it collects data from forms, takes screen shots, pilfers passwords wherever they are used.

It can be set to remotely control the infected computer from another site. The Zeus Trojan has at least 150 flavours. Worse still, phising kits are now being sold for $700 and these kits use a binary generator to create a new Zeus file for every kit.

By creating new binaries the malicious Trojan prevents popular antivirus software from detecting it and because the binary generators can change all the time this makes it virtually impossible for current antivirus software to disinfect the files.


# Call to unblock those pesky 087 numbers

South African company Electronic Communications Network (ECN) has embarked on a campaign to get the 087 numbers unblocked by PABX vendors so that voice-over-Internet services can be provided by privately owned value-added network services (VANS). The 087 numbers were allocated to VANS by the Independent Communications Authority of South Africa (ICASA).

According to John Holdsworth of ECN the 087 numbers were used in the 1980s and 1990s for what were called 'premium-rated telephone services'. Companies chose to outlaw calls to 087 numbers and as a result most of the PABX systems in use – including many of the new ones supplied – still automatically block those numbers.

ECN has apparently raised the issue with ICASA and this organization says that it will support ECN's bid to get PABX suppliers to comply with the new allocation of the 087 number for voice-over-Internet services. Holdsworth claims that ICASA has indicated that it will "deal with the matter expeditiously" if the PABX suppliers refuse to comply with the instruction.

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# Transistor that's just 10 atoms big

Scientists at the University of Manchester have a made a transistor that is a little bigger than a single molecule and is made from the world's thinnest material, graphene which has carbon atoms just one layer thick arranged in an hexagonal pattern like chicken wire mesh.

The transistor made by scientists at the university is just 10 atoms big and according to Professor Andre Geim who led the team of researchers this tiny transistor could spark the development of super-fast computer chips.

Over the years, chip manufacturers have managed to cram more and more components onto microchips allowing the number of transistors per unit area to double every two years.

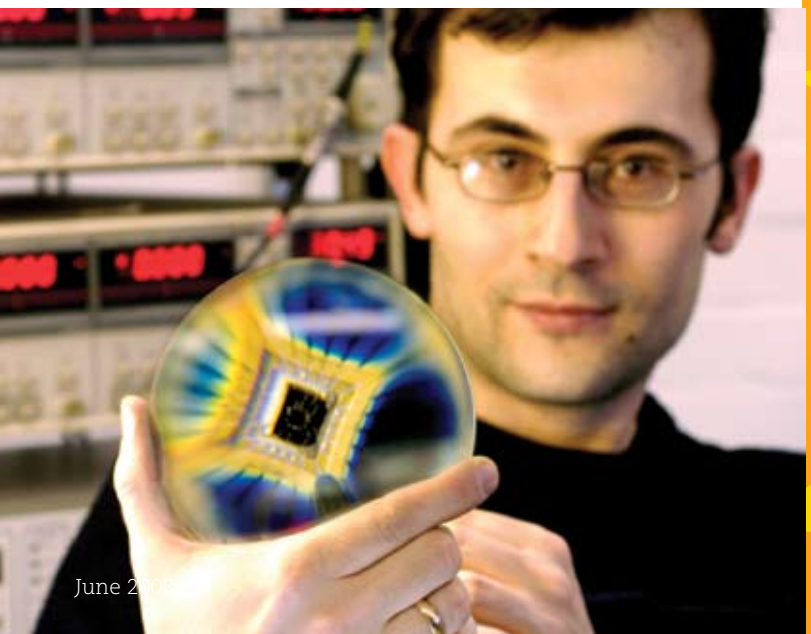
Geim says that the problem with building components on a nanoscale is that materials like silicon react with oxygen, changing the silicon's properties and make it move like drops of water on a very hot stove plate.

He says that grapheme has unusual properties which allow electrical current to be transformed from electrons into charged particles with no mass at all. This, he believes, is bringing scientists closer to making a so called ballistic transistor which will be faster than any current technology because electrons shoot through them without colliding with any of the component's atoms.

Transistors made from grapheme offer scientists real advantages at sizes below 10 nanometres equivalent to the miniaturization limit at which ordinary silicon-based technology is predicted to fail.

Professor Geim says that there is unlikely to be any commercial application of these minute transistors before 2025 but he emphasises that graphene technology will probably be the only viable way to shrink microelectronics once the silicon era ends.

**Dr Leonid Ponomarenko, postdoctoral associate involved in the research, with a nanotransistor.**



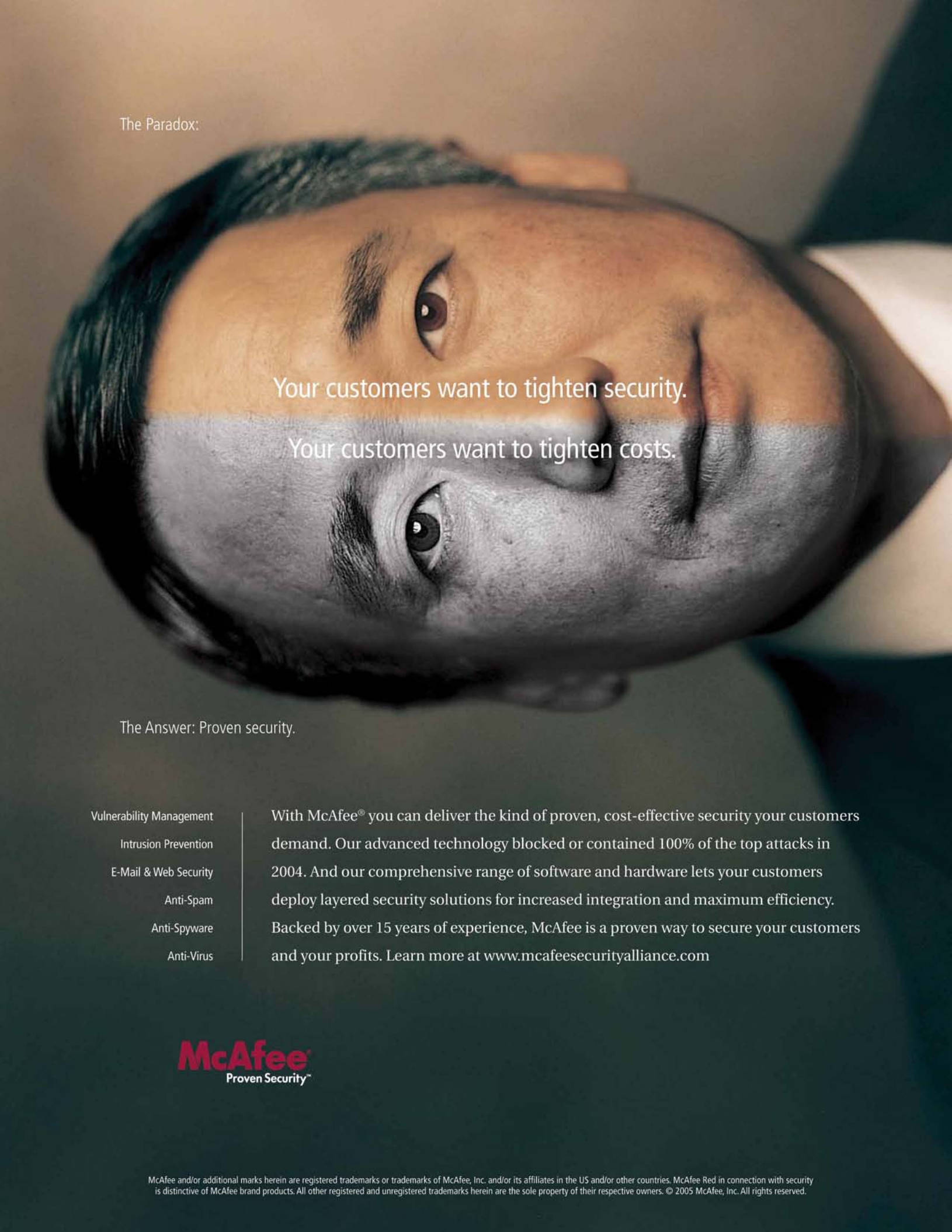
# Recipes for bombs outlawed in the EU

The online publication of recipes to manufacture bombs from ordinary household chemicals that are freely available from pharmacies around the world will soon be a criminal offence in Europe after the justice ministers in the European Union agreed that such information should not be readily available on the Internet.

As a result the countries in the European Union are now formulating appropriate prison sentences for those people who provoke others to commit terrorist attacks or who try to recruit terrorists into their ranks. Training for terrorist will also be a punishable offence.

The draft legislation will mean that law-enforcement agencies will be able to force Internet Service Providers to hand over details that will allow the individuals involved to be positively identified. All offending material will have to be taken offline and removed from the respective servers.

As long ago as 2002 the European Union's member states agreed on common rules for combating terrorism but those rules did not include Internet-based calls to commit acts of terror.



# Injury-proof car being built by Volvo

Volvo is planning to make an injury-proof car by 2020 that will be able to steer itself, brake and detect difficult-to-see obstacles on the road ahead. In even the most serious accidents the driver and passengers would escape unhurt. At least that's Volvo contention.

The company is not alone in trying to perfect an injury-proof car to that will prevent 1,2-million deaths on the world's roads each year and would reduce the estimated 50-million injuries caused by road accidents annually.

Volvo – which is now owned by Ford – has set 2020 as the target date to develop and release a commercially viable injury proof vehicle. Tests are underway at the Gothenburg crash facility which has been specially equipped with rotating tunnels that can reverse and shoot a car out of its cavity into a rock face or pond at the centre.

Crash researchers can simulate everything from a head-on collision into a bus-stop to a 90 degree vehicle-to-vehicle smash. There are at least 400 collisions studied by researchers at Gothenburg every year and the data from each event is collated and stored for computer simulation purposes prior to physical testing crash resistance.

Each event is also filmed from all angles including from a glass-topped pit below the test car while sensors and rulers provide accurate measurements of the car as it smashes into a 850-ton steel encased concrete block at a speed of at least 70 kilometres an hour.

Volvo's car of the future will include radar, sonar and other sensing devices which extend into the 'deformation zone' which acts like a huge electronic bumper on all sides of the care and gathers information that is fed back into a central, miniaturized computer.

In a crash situation the vehicle will steer and brake on it's own, reducing the pre-impact speed to less than 15 kilometres an hour. This alone would probably halve the number of road deaths and serious injuries.


# What you'd do with a 500 000 GB iPod?

Ingenious researchers at Glasgow University have developed a molecular switch that can dramatically increase storage capacity of electronic devices and may make it possible to store up to 500 000 gigabytes of data on an MP3 player such as an iPod.

Professor Lee Cronin and Dr Malcolm Kadodwala predicted that 500 000 GB could be squeezed into an area of just one square inch. Furthermore, the scientists believe that the number of transistors per chip would rise from the current limit of about 200 million to well over a billion.

The Glasgow scientific team has designed a cluster of molybdenum oxide-based molecules measuring just a billionth of a metre across to form a switching device that can easily access information stored in cluster of emory molecules on a gold or carbon surface.

The scientists used powerful X-rays to study the switches in operation. These switches would probably replace transistors in the future.


# Biofuels no answer to energy issues

According to Royal Dutch Shell's chief executive Jeroen van der Veer, biofuels may contribute to reducing the world's reliance on petrol and diesel but will certainly not solve the escalating energy crisis that has seen crude oil prices rise to more than $116 a barrel.

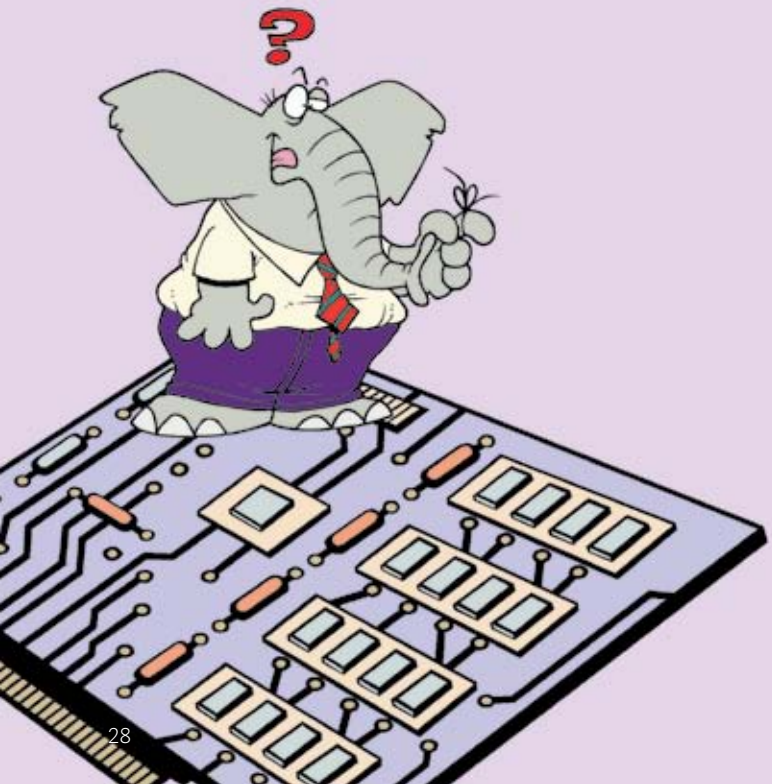
The European Union has agreed that it will work towards having at least 10 percent of all transport using biofuels by 2020. However, the increased production of biofuels is being blamed for high food prices that have led to rioting and protests in Haiti, Cameroon, Niger, Indonesia and South Africa.

The biofuels being produced today are made from crops such as wheat, maize, sugar or vegetable oils. Second generation biofuels seek to use non-food products such as straw or waste timber, but production methods for these fuels have to be improved before they will be commercially available.

According to the International Energy Agency's deputy executive director, William Ramsay, it is not just biofuels that are to blame for the higher food prices. He says that a combination of droughts and floods in various parts of the world and an increasing demand for energy intensive foods have contributed to price rises and food shortages.

# Electrical circuits can 'remember'

For about 40 years, scientists have speculated that electrical circuits have an ability to 'remember' once power is switched off. Researchers at Hewlett-Packard have now finally proven this notion.



A newly discovered circuit element, called a memristor, could mean that cell phones could work for weeks without needing to be charged or that computers could start-up instantly. Laptops could even retain session information long after the battery dies.

Because the memristor can retain information when the power is switched off, it could even challenge flash memory. In fact, researchers say that chips could be faster, use less power and take up less space than flash memory.

Wolfgang Porod, Professor of Electrical Engineering at the University of Notre Dame, and the director of the university's Centre for Nano Science and Technology says that the research looks promising and could mean that memristors will be between 100 and 1000 times faster than flash memory.

The memristor, built by HP Laboratories researchers, is made from a layer of titanium dioxide sandwiched between two metal electrodes. The researchers discovered that the amount of resistance it exerts depends on how much electric charge has previously passed through it.

This characteristic gives the memristor an ability to 'remember' the amount of charge that has flowed through it long after the power goes off. This in turn means that the circuit itself can be built with a memory function baked into it.

According to Stan Williams, a senior fellow at HP Laboratories, he and his team were able to identify the behavior and build a structure to harness its power because the effect gets stronger as the wiring in the circuit gets smaller.

# Millions of tons of carbon dioxide stored under the sea

More than ten million tons of greenhouse gases are being stored beneath the seabed at the Sleipner gas field off the coast of Norway according to StatoilHydro which first started pumping carbon dioxide into the gas field in 1996. The company says there are no signs of leaks from the porous rocks surrounding the gas field.

The natural gas at Sleipner has unusually high levels of carbon dioxide and as a result, Statiol decided to pump the gas back into the ground when Norway imposed a tax on companies emitting greenhouse gases.

About 2 800 tons of carbon dioxide a day are being pumped below the seabed and according to the Statoil's head of health, safety and environment, Rolf Haakon Holmboe storing carbon dioxide in this way is both safe and feasible.

The company is now looking at several new projects to transport carbon dioxide from other sources on the mainland and pump it into the seabed where it can be safely stored.

The United Nations Climate Panel believes that capturing and burying carbon dioxide from coal-fired power stations or from factories could contribute to combatting global warming.

# X Prizes worth millions for innovations in new fuels

The X Prize Foundation has set aside $100-million to be used for grants and awards for innovations in the production of biofuels or other alternative forms of energy. X Prize Foundation chief executive, Peter Diamandis says that innovations are "taking too long to develop" and may not even be concentrated in the right areas.

He believes that rapid innovation and viable solutions to the world's dependence on fossil fuels will be found. Full details of the new prizes have yet to be revealed but Foundation president Tom Vander Ark has confirmed that the prizes for biofuel innovation will be launched later this year with prizes for the other categories coming over the next two years.

The biofuels prize will be worth at least $10-million. Among the rules announced so far is the stipulation that biofuels must be made using non-agricultural plants as biological raw material. The plants must be suitable for small scale farming and must be easy to grow.

In sketching some of the other likely categories Vander Ark says that one prize will be for innovations in providing water, broadband communication and clean electricity to villages in the developing world. Other categories are likely to be energy transmission and energy-efficient building methods and systems.

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# The Isetta electric

BMW is considering the option of re-introducing the once iconic Isetta vehicle that looked a bit like a three-wheeler and had a front door that opened like a fridge. The new model – if it gets the go-ahead – will look nothing like the original and will probably run on electric power.

Tough new regulations in California and 12 other states require car manufacturers to sell somewhere between a few hundred and a few thousand Zero Emissions Vehicles (ZEVs) every year from 2012. The regulations are likely to be tightened up in the near future so that exact targets for ZEVs can be set and monitored.

BMW's chief executive Norbert Reithofer says that the company is looking at a number of options that will allow it to comply with the American regulations. He says the company could also introduce a range of city cars using BMW motorcycle engines that would meet the requirements of new emissions legislation.

BMW is said to be seriously considering basing the new Isetta on a small, zero-emissions concept car developed by Austrian company Magna Steyr, which already builds the BMW X3 and the Aston Martin Rapide.

The Californian regulations stipulate that ZEVs can either be powered by a fuel cell or battery power but must have a range of 200 miles (320 kms) or can be an Advanced Technology Partial Zero-Emission Vehicle using a hybrid motor, a compressed natural gas fuel cell or even a methanol fuel cell.

# Would you buy a light bulb for R800?

Light emitting diodes (LEDs) are about to hit the consumer market in the United States as an alternative to incandescent or compact fluorescent lights. The LED lights have been around for some years now but the high price of these bulbs has prevented them from being widely used.

According to Zach Gibler, chief business development officer at Lighting Science Group, the company has developed a range of LED replacement bulbs which perform well on a warmth and colour rendering index and he claims that the blue now looks blue, yellow looks yellow and so forth. The bulbs have a long life cycle and consumer about 80 percent less energy than incandescent bulbs.

In the US incandescent bulbs will no longer be available or sold after 2012 so the market for other more energy efficient bulbs is enormous in that country. The LED bulbs made by Lighting Science Group are expensive ranging from $40 to $110 per bulb.

According to the company the LED bulb will last for at least 50 000 hours or about 30 years hours compared with ordinary incandescent bulbs that last between 750 and 3 000 hours. The company is confident that it will be able to radically cut the price if the bulbs prove popular in the US.

# Building of a 181 turbine wind farm halted

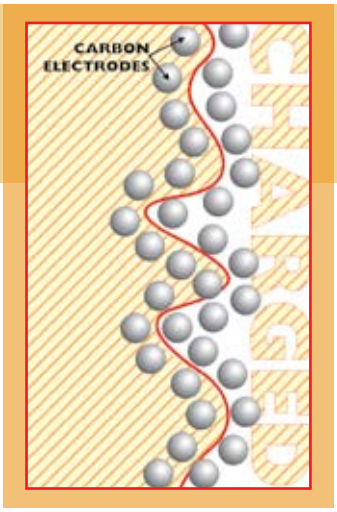
Scottish authorities have turned down plans to build one of the world's largest wind farms on the Western Isles because it will contravene Europe's laws from protecting sensitive environments. While the scheme had the backing of the local authorities and many businesses there were 11 000 objections lodged to stop construction of the farm.

The Scottish ministers say the wind farm would have a serious impact on the Lewis Peatlands Special Protection Area which is designated, by the European Commission's Birds Directive and protected under its Habitats Directive.

Renewable energy company, Lewis Wind Power (LWP) planned to erect 181 turbines on the Western Isles to provide a consistent source of renewable energy for villages there. LWP is said to be "bitterly disappointed" by the decision.

Scotland's Energy Minister Jim Mather said the government remained committed to finding sources of renewable energy for the Western Isles but said the environmental impact of the wind farm would have a significant and adverse impact on rare and endangered birds living in the Peatlands Special Protection Area.

# Ultra-capacitors can empower a CityZenn




An enterprising inventor who runs a company called Zenn Motor in Toronto is building a new highway-speed (140 kph) car that will have a range of at least 400 kilometres and will recharge in just five minutes.

Company owner and inventor, Ian Clifford says the world needs a practical, everyday care that does not run on petrol or batteries and gives off no emission. Clifford says the new cityZENN model will use ultra-capacitors to store electrical power drawn from an ordinary household plug-point.

He estimates that the costs of operating this new vehicle will be just 10 percent of the cost of a petrol or diesel vehicle. Clifford says that the biggest problem facing electric car developments is that batteries are an inefficient way of storing electrical power.

Ultra-capacitors are similar to ordinary capacitors with activated carbon at their core which acts as a sponge for electrons. Ultra-capacitors can absorb power – or send a charge – far faster than batteries and they are far more durable.

Ultra-capacitors are used in computers, digital cameras and other electronic devices. However, the power stored by the current generation of ultra-capacitors is just five percent of the power in a lithium-ion battery.

However, computer industry veteran, Richard Weir who is named on the patent for the new technology, plans to manufacture what is described as a new electrical energy storage unit (EESU). Weir's company EEStor has reached agreement with Lockheed Martin to supply the defence company with its ceramic battery that can provide up to ten times the energy density of lead-acid batteries at 10 percent of the weight and volume.

Clifford's Zenn Motor has already invested $3-million in EEStor and will get exclusive rights to retrofit vehicles with the system and to make new mid-sized vehicles using EESU technology.

According to Professor Joel Schindall of the Massachusetts Institute of Technology manufacturing commercial quantities of EESUs could prove challenging since tiny impurities or any defects in the manufacturing process could result in what he calls a "violent discharge".

Clifford claims, furthermore, that the new ultra-capacitors will safe for use in commercial vehicles because if there vehicle is involved in an accident the electricity in the ultra-capacitor will immediately discharge to ground.

# Rivets sank the Titanic authors claim

Sometimes the type of research that academics and scientists are prompted to pursue seems to defy logic. For instance, a new book by two metallurgists, Timothy Foecke and Jennifer Hooper McCarty entitled What Really Sank the Titanic says that the shipyard, Harland and Wolff of Belfast, Northern Ireland, used low-grade rivets and this caused the ship to sink fast.

Hitting an iceberg at full speed – at least according to the researchers – seems to have had little to do with the problem.

Of course Harland and Wolff – which has been accused to buying and using weaker rivets on the Titanic and two other vessels - disputes these findings, preferring the simple and more likely iceberg explanation.

Strangely enough, the other two vessels that used the same rivets managed to sail the seven seas for many years. One ship, the Olympic, set sail in 1900 and had an untroubled life; surviving the First World War and even Black Friday in 1929.

The other ship was not so lucky. It started sailing in 1900 and would have endured a long and most enjoyable life had it not been attacked and sunk by German U-boats during the First World War.

It seems that a ship that hits a torpedo or an iceberg sinks, regardless of what rivets have been used.

Foecke concedes that the iceberg played a pivotal role in sinking the 'unsinkable', but he says that had better rivets been used the Titanic would have sunk more slowly and perhaps more people could have escaped.

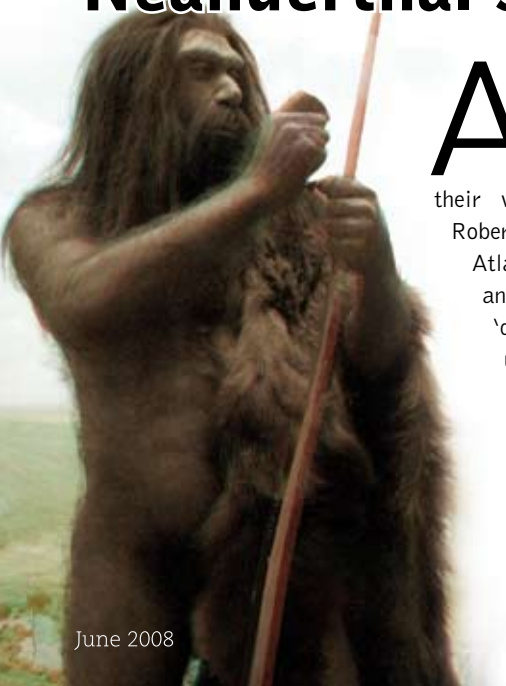
He hasn't explained why some scientists seem to think the 'unthinkable' but that's science for you.

Retired naval engineer, David Livingstone who worked for Harland and Wolff disputes the researchers' conclusions that the rivets were inferior or substandard.

He says that materials from more than 100 years ago are bound to be sub-standard when compared with today's materials but compared with other materials being used in Ireland at the time, the rivets were not faulty.

Livingstone's view – shared by many – is that ramming an iceberg and then scraping it right along the side of the ship caused tremendous damage to the vessel and that was what made it sink. I think he's probably right.

# Neanderthal speech simulation via computer



Anthropologists have used a computer synthesizer to recreate Neanderthal vocal tracts to simulate their voices and, according to Robert McCarthy of Florida Atlantic University, these ancient 'humans' lacked the 'quantal vowel sounds' that underpin modern speech.

Quantal vowels provide cues that help speakers with different sized vocal tracts understand one another. McCarthy says that Neanderthals would have "spoken a bit differently" because they lacked quantal vowels.

Using fossils discovered some 50 000 years ago in France, McCarthy and his team reconstructed the vocal tracts of the Neanderthals and then used this information to simulate speech via computer synthesis.

McCarthy says that he plans to simulate an entire Neanderthal sentence. So far he has only simulated the sound 'E' which, in Neanderthal speech does not have the quantal hallmark that helps a listener distinguish between 'beat' and 'bit'.

Interestingly, researchers discovered that the Neanderthals shared a version of the FOXP2 gene with humans and people missing a copy of FOXP2 suffer from language and speech disorders. The human version of this gene is different from those in other animals including chimpanzees and Orang Utangs.

You can listen to the simulated speech at the following Internet site: http://www.fau.edu/explore/media/FAU-neanderthal.wav

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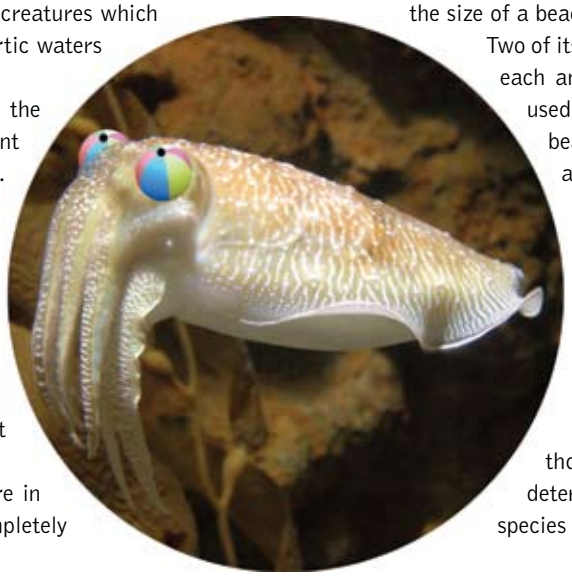
# Squid had eyes the size of beach balls

A colossal squid that is more than 10 metres long and weighs almost 500 kilograms is being studied by scientists at the Museum of New Zealand's Te Papa centre. Very little is known about these creatures which appear to live mainly in the cold Antartic waters and grow to about 15 metres.

The colossal squid, known as the Mesonychoteuthis and the smaller giant squid or Architeuthis are rarely caught. According to Carol Diebel, director of natural environment at the Te Papa centre, very little is known about the colossal squid as only six specimens have been captured since 1925. The Mesonychoteuthis hamiltoni specimen was accidentally caught by a fishing boat in the Ross Seas in 2007 and it has been frozen ever since.

Scientists are defrosting the creature in salt water and once it has thawed completely they will begin to dissect it. Its eyes measure about 27 centimetres across with lenses of 10 to 12 cm but the eyes had collapsed after the creature died. Scientists say that it were alive the eyes would be about the size of a beach ball.



Two of its long tentacles carry up to 25 rotating hooks each and its eight arms have 19 hooks which are used to capture prey and move it to the squid's beak. The lower beak measures about 40 cms across.

Other beaks from colossal squid have been found in the stomachs of captured and dissected sperm whales and these beaks have measured up to 50 cms. This, scientists say, indicates that the Mesonychoteuthis hamiltoni could grow to about 750 kilograms and be about 20 metres long.

The frozen squid at the Te Papa centre is thought to be male although its sex will be determined after dissection. The female of the species are larger than the males.

# Synthetic spider webs a possibility soon?

For many years scientists have been trying to find a way to copy spider silk or to make a material that has a tensile strength that's greater than steel and has five times the elasticity of Kevlar.

Now Professor Andreas Bausch and his colleagues at the Technical University of Munich say that they have successfully built a device that mimics the early stages of spider silk assembly and which may eventually lead them to develop synthetic spider silk

According to the Munich University team, spider dragline silk has two proteins, ADF3 and ADF4 which coil into fibres in an irreversible process. Proferssor Bausch and his team used bacteria to make the proteins using straight-forward genetic engineering methods and then made an artificial spinneret to adjust the ratio of the proteins.

According to Bausch there are three stages essential to the formation of spider silk: the proteins condense into spherical particles, the acidity rises sharply and then the particles are forced to slide past each other in a thin chamber.

The first synthetic silks are grainy and rough compared with natural spider silk by Bausch says that once the have correctly copied the drying and drawing techniques used by spiders the synthetic product will be "as good as the real thing".

If Bausch and his colleagues are right then large scale production of synthetic spider silk might be possible.

# New scientific base for Marion Island

According to the Department of Environmental Affairs and Tourism, a new scientific base costing about R200-million is to be built at Marion Island. Construction will take some time as it is only possible for construction work to be done between March and May and between August and November because of inclement weather and ship delivery schedules to the island.

A permanent staff of just 12 people is based at the island for 12 months although about 80 scientists and researchers visit the island during the summer months. The existing base will remain fully operational while the new base is being built, but once the new base has been completed, the old one will be dismantled and returned to South Africa.

According to Adriaan Dreyer who is based on Marion Island and is the assistant director of the South African National Antarctic Programme, (SANAP), building was due to start in 2003 for completion in 2007 but work has been delayed because of harsh weather conditions, a shortage of construction workers willing to work there and the limited availability of ships to transport materials for the base.

So far, the outer structure of the base has been completed and work has begun on the interior. Water supply infrastructure, using a 2,4-kilometre long pipeline with a 160-mm diameter, has been installed at the new base.

The existing base at Marion Island has four diesel generators and one uninterruptible power supply that supplies electricity 24 hours a day. The new 6 000m2 base will have a similar number of diesel generators but will have four uninterruptible power supply units on standby.

The design of the new base comprises a central hub with medical and communication facilities, a kitchen, dining room, a bar, an open recreational area with a fully equipped gymnasium, Jacuzzi and sauna.

Leading from the central hub are the sleeping quarters, the science building and the technical centre with workshops, generators and stores. In the technical centre is a launching pad for the weather balloons that monitor the climate on a daily basis, sometimes rising to a height of 30 000 metres.

New hangers have been built for two Super Puma helicopters. The hangers have a workshop, emergency first aid and an emergency base that accommodates up to 12 people.

There are also nine new observation and overnight huts on the island that accommodate up to four people and are used mainly for research purposes.

# Ion engine for Goce spacecraft

An ion propulsion engine, being developed by British company Qinetiq, will probably be used in the European Space Agency's Goce spacecraft, which is due to go into orbit 300 kilometres above the earth in June or July this year.

The 1 100 kg Goce is built from rigid materials, has fixed solar wings and is fitted with solar cells that will produce 1 300 Watts of energy. The T5 engine weighs three kilograms and ejects xenon ions at velocities of more than 40 000 metres per second. The spacecraft will carry just 40 kilograms of fuel.

The T5 engine is currently being tested and perfected in a vacuum chamber in Hampshire, Britain, where cryogenic pumps using helium as a coolant reduce the temperature in the chamber to -253°C (20 Kelvin). The pressure in the chamber drops to one millionth of an atmosphere.

According to lead engineer Neil Wallace the engine fires ions at the opposite end of the chamber, which is coated with graphite for protection. The ions actually knock atoms off the surface of the chamber as they collide.

Wallace likens it to sandblasting at an atomic level. He says out that while the engine looks unimpressive – like the oil filter in an ordinary car engine – it has taken about 30 years to develop at a cost of tens of millions of pounds. In space, the ion propulsion engine will draw electric power from solar panels fitted to the craft and produce a thrust that's equivalent to the weight of a postcard.

He says that, in theory, this incredibly gentle thrust is sufficient to carry the spacecraft beyond our solar system.

Goce aims to map Earth's gravity field to an accuracy of one mGal (about a millionth of the acceleration due to Earth's gravity at its surface). It expects to determine the geoid to a precision of one to 2cm and achieve this at resolutions down to 100km.

**"This is cruise control for a spacecraft, but at an unbelievable level of precision"**

**Neil Wallace, QinetiQ**

# Pinwheel galaxy at M83

New stars have been forming on a remote edge of the Southern Pinwheel galaxy which is known at M83. The new stars were forming about 15 million years ago in the galaxy arms.

According to Frank Bigiel, an astronomer at the Max Planck Institute for Astronomy in Germany says there are an enormous number of young stars developing up to 140 000 light years away from the centre of M83.

He points out that the majority of stars are found in the central wheel which in M83 case is about 40 000 light year across. The striking image shows the pinwheel galaxy M83 rotating some 15 million light years away.

The red areas in the image are radio emissions from gaseous hydrogen atoms which are the raw material for building stars.

# Carbon dioxide pollution is 14 000 times higher

For eons before humans started burning fossil fuels, there was a distinct balance between carbon dioxide emissions and the Earth's ability to absorb them. Researchers, studying Antartic ice bubbles contain air samples from 610 000 years ago have determined that the earth can no longer keep up with the enormous carbon dioxide output caused mainly by burning fossil fuels.

Climate scientists have been suggesting for the past 25 years that the Earth has used a natural mechanism or 'feedback' to regulate the temperature and the level of carbon dioxide in the atmosphere.

According to climate scientist, Richard Zeebe, who has been studying this phenomenon the excess levels of carbon dioxide was removed from the atmosphere by the weathering of mountains which take in the chemical. The carbon deposits in mountains were then washed downhill into oceans and buried in deep sea sediments.

He analysed the carbon dioxide captured in the Antarctic ice to determine how much carbon dioxide was in the atmosphere at various points in time. Zeebe says that when the carbon dioxide levels were low, the temperatures dropped and the Earth was plunged into an ice age.

However, he points out, that the planet's mean temperature has been dropping slowly over the past 600 000 years. The average change in the amount of carbon dioxide over the last 600 000 years was just 22 parts per million by volume.

Since the Industrial Revolution of the 18th Century when fossil fuels started to be used by humans the amount of carbon dioxide in the atmosphere has risen to 100 parts per million. This equates to about 14 000 times more carbon dioxide being pumped into the atmosphere by humans.

Worse still, the levels are speeding up as the United States government reported in 2007 that the atmospheric carbon dioxide level that year increase by a further 2,4 part per million.

Zeebe says that while the natural mechanisms for absorbing excess carbon dioxide will eventually prevail it will take hundreds of thousands of years for the atmosphere to return to its clean state of the late 17th Century.

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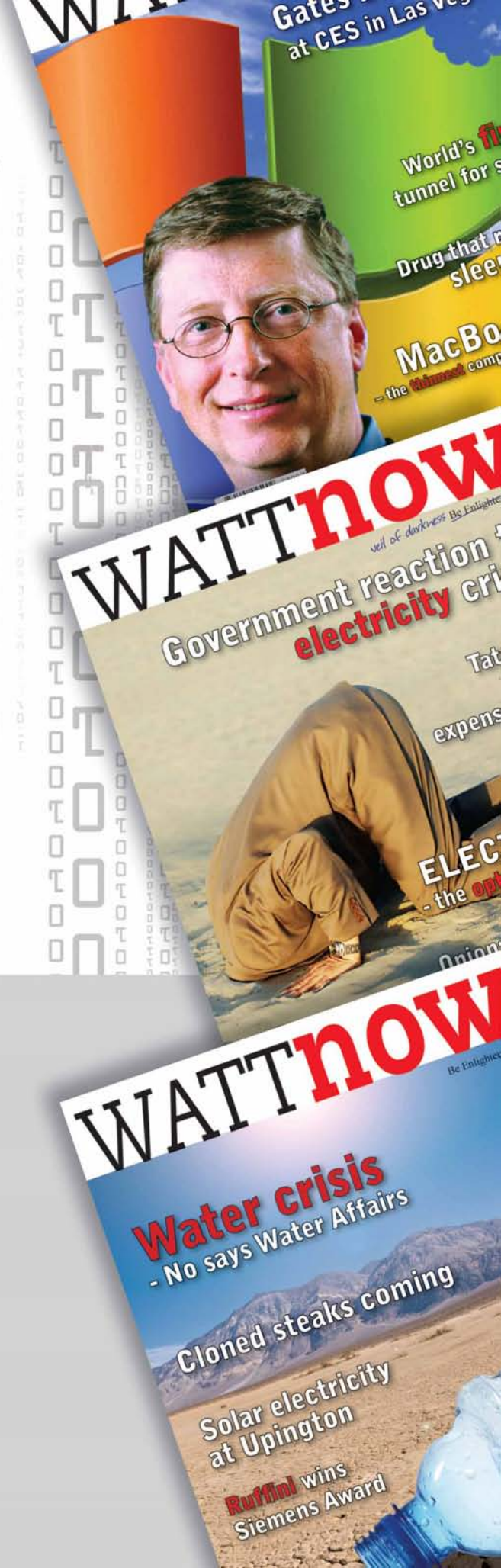
In addition, WATTnow gives its readers extensive and in-depth coverage on a number of topical issues such as the energy crisis facing South Africa or government's plans to extend the roads network around Gauteng and toll motorists using it.

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.

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# 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**

### Weighing in a Harder Way

You've got 27 coins, each of them weighs 10 g, except for 1. The 1 different coin is 9 g or 11 g (heavier, or lighter by 1 g). You should use a balance scale that compares what's in the two pans. You can get the answer by just comparing groups of coins.

What is the minimum number of weighings that can always be used to determine the different coin.

### The Liar, The Truth Teller and The Random Answerer

There is a truth teller (always tells the truth), a liar (always lies), and one that sometimes answers truthfully and sometimes lies. Each man knows who is who. You may ask three yes or no questions to determine who is who. Each time you ask a question, it must only be directed to one of the men (of your choice). You may ask the same question more than once, but of course it will count towards your total.

What are your questions and to whom will you ask them?

### Sequence Puzzle

The below is a number puzzle. It should be read left to right, top to bottom.

1
11
21
1211
111221
??????
????????

Question 1: What are the next two rows of numbers?

ON THE LIGHTER SIDE

## Studying the obvious – that's what some people do

There's no doubt that some scientists, medical researchers and engineers have a special talent for studying things that mere mortals would find obvious at the outset. Yet these special people go out and set up a detailed study and then research the topic in the hope, perhaps, of finding some awe-inspiring solution. Inevitably they don't – instead they achieve the most obvious answer that we all knew before the researchers studied to topic. Here are some of the absurd research findings:

### Goats and people find it easier to climb in zigzags

Hikers might be astonished to learn that waling in a straight line up the side of a mountain is uses up much more energy than if the climbers zig-zag up and down the mountainside. Professor Marcos Llobera of the University of Washington says that by moving at an angle up the side of a mountain hikers will walk further but use up a lot less energy and will probably get to the top that much quicker. He says that avoiding the steep direct route between point A and point B and zig-zagging up the mountain is the most efficient method of getting to the top. He should tell all the hikers and mountain goats who've been using this method for eons.

### Some people don't like learning online while others do

Psychologists have found that some people don't like learning online and yet they do not specifically say that people without computers are more prone to not enjoying studying online they do say that some people find it more difficult to motivate themselves to work independently at home. The ground-breaking conclusion was that many people who don't like studying at home seldom finish the course they've start. The research team also went to great lengths to point out that shy people don't like going to crowded places. Then, in a blindingly obvious conclusion they say that online learning suits people who like spending time alone, working on their computers and learning things. The ordinary mind boggles.

### Fat cats and dogs suffer from obesity problems

Can you believe that researchers, after studying a group of cats and dogs discovered that pets become obese for exactly the same reasons human do. It's a combination of genetics, a lack of exercise and over-eating. And the consequences of obesity for cats and dogs are the same as for humans: the animals are unfit, have bad skin, suffer from painful joints and are prone to getting diabetes. So if your dog or cat spends all its time lying around on a sofa watching TV, eating pizza or snacking on crisps, you're going to end up with a huge vet's bill. Take the animals for a walk, get them exercising and cut down on their food intake too. The money you save on vet's bill and food will then pay the kennel costs when you take a three-week holiday in Paternoster.

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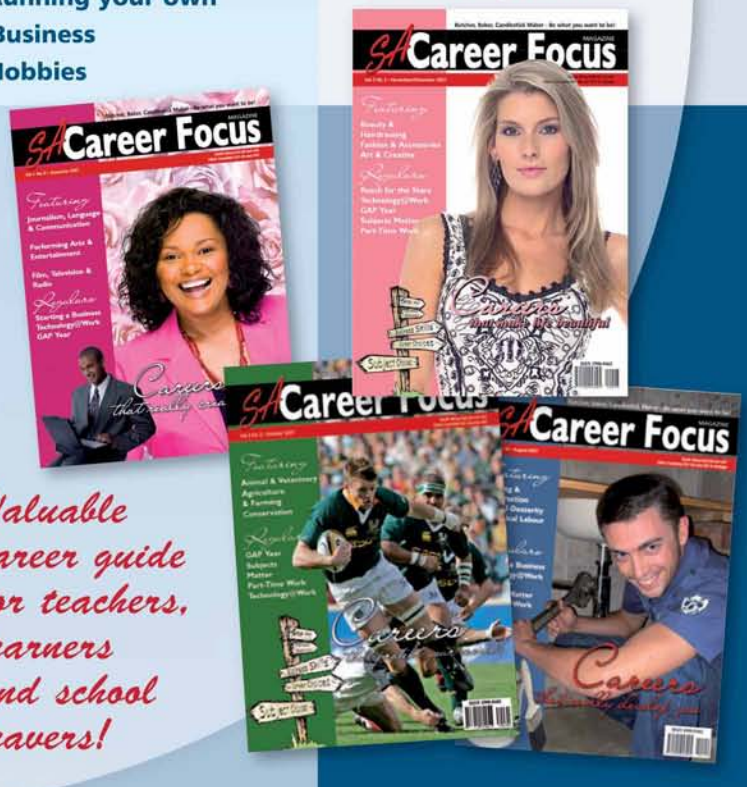


*Valuable career guide for teachers, learners and school leavers!*

# A Fairytale – the Accidental Engineer

A reflection by Janet Gillespie

Once upon a time, not toooo long ago, a little princess was born. She was raised in a typical household of the day, and as all little princesses are, was expected to be oh-so-very-ladylike, and help her mother and the other princesses with the women's work inside of the castle. Her brothers were expected to help the King with the "boys" work, like doing the garden, and fixing the car.

Unfortunately, this little princess was not very ladylike at all, and while the other little princesses played with their dolls, she would run around with the little boys, climbing trees, building tree-houses, getting into fights, and generally getting into trouble for not being a good example of lady-like behaviour.

All her life, the princess dreamed of being a famous actress. Unfortunately, she "had brains", and was particularly good at things like mathematics and science. So her daddy, the King, forbade her from studying to be a famous actress, with the well-worn phrase "Over my dead body". Although she was not a very ladylike princess, she was not a killer, and really couldn't murder her daddy, whom she did love.

The King and Queen decided that the princess had to study "something with maths and science in it". Well, she considered medicine, but decided that there was too much learning of funny names to do that. One day she took part in a Science Olympiad – a nice way to get off school for a couple of hours, and actually did very well. As a result, the famous university, Wits, invited her to take part in the Engineering Winter School. Now this was the first time that the princess had thought of engineering, in fact, she wasn't even sure what it was. But a week away from home sounded like a good idea, so off she went.

By the end of the week, she had decided that she would be an engineer. The week had been fun, and the princess had met all sorts of interesting people who would also be studying engineering. Now all that remained was to decide which type of engineer she could possibly be. Well, civil engineering sounded far too dirty, as did mechanical. Chemical engineering involved far too many smelly substances, while mining engineering was strictly reserved for members of the other sex. So, it had to be electrical engineering.

The princess, (no longer a little princess), went away to Wits, then Natal-Durban, to get her degree. Something that made the King very happy and proud. While at university, the princess met Sir Brian, a knight-in-shining-armour, who swept her off her feet.

The next obstacle was to get a job. For four long months, the princess worked as a barmaid and waitress – one of the reasons that her daddy would not let her study to be a famous actress. Eventually, she did get a job, in the consulting engineering field, with a company called Watson Edwards which is now called WSP.

The now-not-so-little princess soon learned that she actually liked being an engineer, and especially liked working on buildings, which were just modified castles or palaces anyway. She especially liked the bling of lighting. Even though she was not an oh-so-ladylike princess, all princesses like bling. It was during this time that she joined Institute of Lighting Engineers. (Just like companies, this also changed its name to IESSA). She joined the committee, and eventually became chairman of the Durban Centre. Princesses are very good at is being bossy.

Being a different princess, she experienced a six-year itch, and moved to Stewart Scott, (this company is now called SSI) and worked there for (you can guess) six years. During this time, the princess learned things like management, and became a project manager, and then the manager of theiIndustrial division in the Pinetown office. She also joined the South African Institute of Electrical Engineers, (which has not changed its name, and remains the SAIEE). Being bossy meant she was quite well suited to the management stuff but she missed the fun of lighting and the design of the building services. It seemed she was moving away from her passion

So, the princess left the corporate world to fend for herself without the safety net of a regular salary. A friend, the renowned Dawie Barnard, encouraged her to join his company, DBA, as a contract worker and associate. However the princess was also able to find her own contract work from other consulting engineering companies as well.

And so, in the present day, the princess has found hat she likes electrical engineering, and is pretty good at it too. She is also quite good at pub quiz games, plays league ten-pin bowling and on-line poker. Occasionally, she is persuaded to do some Karoke which, she claims, is very poor. Perhaps at one of the monthly SAIEE meetings persuaded to perform. Clearly tea parties and cucumber sandwiches are not her style. But then again, this princess is different.

Janet Gillespie is an Electrical Engineer whose experience lies in building services, underground reticulation and street lighting projects for the building industry.
Her electrical engineering experience includes lighting, power, reticulation, standby power, nurse call systems, fire detection, evacuation, public address and PABX systems aswell as data and television reticulation infrastructure and external lighting systems.

She has been a member of IESSA for 16 years and is the Past-Chairman of the Durban Branch committee for that organisation. She is a member of the South African Institute of Electrical Engineers, and has been the Senior Member and Chairman of the KwaZulu-Natal Centre since the startof this year. She has presented numerous papers and lectures on a wide range of different topics.

# From the President's Pen


Victor Wilson
President SAIEE

I write this as I am touring the country to visit members in Cape Town, George, Port Elizabeth, East London, Durban, and Bloemfontein. The interaction and feedback on what members want from the Institute and how they are participating in and contributing to Institute activities is wonderful.

We have welcomed a new staff member. Sue Moseley who will be managing our conference and continuing professional development events.

As you read this, a programme of conferences will be taking place. The SAIEE has endorsed and is participating in a number of them. These conferences are a way to keep up to date with, and in some cases influence, current developments and at the same time contribute to your own development.

Remember to keep an eye on http://www.saiee.org.za/ for current events and discussions on the various forums.

# Is there a role for load shifting programmes?

Commentary by Viv Cohen

Two highly successful SAIEE events were recently held at the Eskom College in Midrand on February. Both events, the Power Crisis Coping Forum and Generation Conference directly and indirectly addressed the extremely topical subject of the power crisis.

One question that remained unanswered after both events related specifically to the Eskom load profile control together with load shifting programs in achieving such control.

Pursuant to these two events and in recognition of the need to further address that question, the SAIEE hosted a third event in the form of a breakfast talk in March at which Andrew Etzinger, Eskom's Distribution General Manager (Demand Side Management Department) was invited to present his views and deliver feedback on the Eskom DSM programme.

The theme of Andrew's talk was to open and close his presentation with as he called them, Six Tough Questions. The six questions were:

1) How will the Power Conservation Programme (PCP) be implemented?
2) Is there a role for utility driven DSM after introduction of the Power Conservation Programme?
3) Is there a role for load shifting programmes given that energy efficiency is a priority?
4) How do we entrench a savings culture in South Africa?
5) How do we best capture opportunities presented for business development and job creation?
6) What policy and regulatory changes are required to improve effectiveness of DSM?

His question on 'Is there a role for load shifting programmes given that energy efficiency is a priority?' caught this writer's attention.

In consideration of the unfortunate situation that this country finds itself in all of Eskom's efforts in achieving its Power Conservation Programme are both understandable and necessary. However, there is a disturbing message or implication.

A comment made during the presentation exposed an alarming misconception that may exist in some quarters of our favourite utility. That perception is that Eskom's load profile is relatively flat

This then begs the question relative to what?

Until proven otherwise, it is suggested that until the load profile of Eskom or of any other electricity utility is shown to be truly "flat", opportunities exist for improving both the utilisation and economics of this scarce energy resource.

Andrew Etzinger in full cry

It is conceded that the draft Regulations of the Electricity Regulation Act, 2006, incorporate proposals for licensees to include facilities allowing it to remotely control the supply of electricity to water heating geysers, heating ventilation and cooling systems as well as swimming pool drive and heating systems.

However in consideration of the less than perfect history and experiences in regard to licensee investments into ripple control systems for water heating geysers, any further investment into any system that is dependent on a sophisticated management and control backbone remains questionable. The chronic national shortage of skills in itself must cast some doubt on the sustainability of such measures.

While centralised remote switching of the electricity supply to disconnect selected loads certainly does provide electricity utility licensees with the opportunity for bulk load shedding, this undemocratic process is unlikely to curry favour with the general electricity consuming public.

Unfortunately only limited recognition has been given to unobtrusive, proven devices that have been used and available to South African consumers for at least three decades that passively and automatically achieves the load shifting function without requiring any backbone infrastructure, control or maintenance.

These clip mounted Load Control Relays are designed to control any non-essential load.

They are designed to fit easily into standard residential, commercial or industrial panel boards and operate on the principle of monitoring any peaking loads (of which cooking loads are a prime example) and shedding any non-essential loads.

It becomes apparent the any load shedding is effectively under the control of the user through his or her own electricity usage patterns and actions.

Particularly in the case of thermal storage loads such as water heaters or under floor heating the function of these devices, while being automatic, is unobtrusive and far less likely to encourage tampering and by-passing.

Roland Hill, Ricardo Nostri, Ian McKechnie, Andrew Etzinger, Mike Cary and Viv Cohen (Author of this comment).

Sequential load shedding with prioritising is easily achievable through the use of multiple devices in higher load consuming installations.

Both Government and Eskom have together succeeded in creating the power shortage situation. In this time of crisis it is hoped that they do not again fail to derive the full benefits of both power conservation and load profile control through load shifting.

While the promotion of power conservation is admirable from a utility that is in the business of earning revenue from the sale of its product (electricity), it should not be forgotten that load shifting, when carried out effectively and economically, does not result in the loss of sale of a single unit of electricity.

In recognizing the benefits to be gained from load profile control, a window of opportunity has arisen in which a brave government can cut through all the red tape.

In this time of identified need, we can for once afford to behave a little undemocratically, through the declaration of a national emergency.

Of course there will be those who will find all sorts of reasons why we should not follow the rest of the world in introducing a much needed time zone differential for our large country that spans up to 15 degrees of longitude.

Of course there will be objectors who will find reasons for our people not to benefit from the advantages in quality of life that could be gained from daylight saving.

And the costs associated with the introduction of time zones and daylight saving?

Minimal, if we achieve this under a national emergency situation and avoid all the working groups, committees meetings, referenda and so forth that such a proposal will no doubt precipitate.

So what if some of the concerns are real. So what if some of the doomsayer's predictions are justified? After a few years, (again at minimal cost), once Eskom's efforts have managed to get us over this electricity shortage period – we can very easily go back to where we were!

Alternatively, what if we actually come to enjoy the benefits of daylight saving? It is not really a new or novel concept and many people have suggested introducing daylight saving for many years. It certainly would provide an immediate solution to the pressing question of providing a constant source of electrical power.

In conclusion, to answer Andrew Etzinger's question: Is there a role for load shifting programmes given that energy efficiency is a priority? I believe the answer is an emphatic yes.

President Ian McKechnie, Andrew Etzinger Eskom, Mike Cary Eskom.

# SAIEE annual golf day at PCC

On Friday March 28th at about 10h00 the golfers and golf bags started arriving at the Pretoria Country Club for the Annual SAIEE Golf Day. The atmosphere was full of smiles and handshakes as old friends from the electrical industry met to do battle with their clubs and balls.

The event included 4-balls from the following companies in order of tee-off times:

**Tee No1**

Schneider Electric, Tyco Electronics, Nulec-Africa, Aberdare Cables, Megatron Federal, CBI-Electric, Opti-Num Solutions, Zest, Concillium Technologies, Phoenix Contact, CBI Electric African Cables, SEW Eurodrive.

**Tee No 10**

PB Power, ABB, Alstom, Tyco Electronics, Aberdare Cables, ABB Powertech Transformers, Zest, Phoenix Contact, ABB Powertech Transformers, Master Financial.

The Institute is grateful to all the players who participated in this event, and a collage of all the teams is included. The winning 4-ball was Aberdare Cables (right). Second place was CBI_Electric (bottom left) and third place was ABB Powertech Transformers (bottom right) as seen at the prize-giving after an excellent day with lots of networking.

Generous sponsorships were received from the following organisations:

**Sponsors of Prizes:**

ABB SA, Aberdare Cables, CBI-electric, Concilium Technologies, Megatron Federal, Nulec-Africa, Phoenix Contact, SEW Eurodrive, Schneider Electric, Steelcor, Tyco Electronics and Vodacom.

**Hole Sponsors and Hole Prizes:**

Aberdare Cables, Alstom Electrical, Megatron Federal, SEW Eurodrive and Zest.

Thanks are also due to Gerda Geyer of the SAIEE Secretariat who organized the golf-day.

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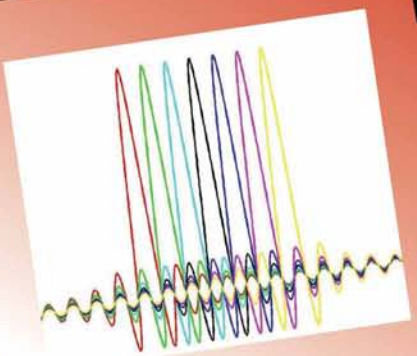

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