

WATTnow

Be Enlightened

A **'lost generation'** of
students doing OBE

House repossessed
via **Facebook**

Golf clubs cause **hearing loss**
– but not from nagging



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February 2009

A lost generation of students – and more follow

With South Africa's already critical shortage of engineers, technologists and technicians in every one of the engineering fields, I find it particularly disturbing that the new Outcome Based Education (OBE) system is failing so dismally. And, worse still, it's a direct reflection of the abysmal quality of teaching in South Africa where the pass rate for students doing the National Senior Certificate was just 62,5 percent.

Bear in mind that this pass rate can be achieved by getting just 40 percent in three subjects and 30 percent in the other three. How pathetic is that for a standard and how dismal are the results when almost 40 percent of the students taking the examinations couldn't even scrape through at this appallingly low level.

It makes me despair for the future of our country when we all know that there are thousands of vacancies for professionals from all walks of life – engineering, any of the science disciplines, medicine, nursing and so forth.

Apart from the serious failure rate – and, incidentally how Education Minister, Naledi Pandor, can remotely be pleased with the results is beyond me – the fact of the matter is that we have no certainty that the youngsters emerging from our schools are capable of thinking, can make the transition to tertiary education or will be able to thrive in an environment of learning such as a university.

Already the Concerned Mathematics Educators has said that the standard of the mathematics paper this year was low and unacceptable. Added to this are the comments from Professor Jonathan Jansen, former Dean of the Pretoria University, who says the entire system should be scrapped because it's fundamentally useless.

Outspoken critic of the OBE, Mamphela Ramphele, condemns the education system in its entirety and even the self-proclaimed 'father of OBE' Dr William Spady has pleaded with the education authorities in this country to drop OBE because of the time based factor.

Will any of the educational authorities listen? Not a chance – they press on blithely ignoring the facts while contemptuously disregarding the students while they change standards in a one-size-fits-all attempt at education.

The fact is that more students failed last year than in the previous year and even fewer students are now eligible for tertiary education – particularly in any of the sciences. The youngsters who were misguided enough to believe that Mathematics Literacy would provide them with an entrance ticket to do a degree or a diploma are now facing the reality that Maths Literacy is of no value at all.

If my figures are correct there are precisely 14 possible courses – in the arts – that are open to students with Maths Literacy. So here we sit with a generation of school-leavers who have suffered through the new OBE system and thousands of them are debarred from studying the subjects of their choice.

They can't sit down this year and rewrite the mathematics paper on a higher level. They have to go back several years and start from that point.

Not like the old standard grade maths that taught students some of the principles of mathematics at a more elementary level. Those students could readily bridge the gap between standard grade and higher grade if they worked hard at doing so. But students today don't have that option because the gap between mathematics and Maths Literacy is actually a chasm.

When I look at the results of 12 years of OBE and I consider how many hundreds of thousands of children have worked hard to complete their courses only to find that the standards are poor and the doors to further education are closed, it makes me very sad.

Very sad for this lost generation of students and very worried about the future of our country too.



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Who'd like to buy a 'PinkBerry'



The BlackBerry Curve 8310 smartphone is available to MTN subscribers in a fashionable pink finish, which may appeal to some women but is most unlikely to be the colour of choice for engineers, boxers or any other of the vast male contingent of users who rely on smartphones to keep in touch with the business world.

The compact and colourful pink BlackBerry Curve 8310 is the smallest and lightest full QWERTY BlackBerry smartphone and offers advanced multimedia features and renowned functionality that includes fast email and messaging capabilities, web browsing, a built-in two megapixel camera, a media player along with a desktop software suite for managing multimedia content.

The BlackBerry Curve 8310 can also be tailored to satisfy individual business needs and lifestyles through a wide range of third-party applications, from sales force management and expense forms to fitness guides and games. With its built-in GPS functionality, the BlackBerry Curve 8310 is also a powerful all-in-one navigation system for people on the go.

Meanwhile, in the United States, where the touchscreen BlackBerry Storm has been launched, there are increasing reports that the handsets are being returned in droves as a result of apparent dissatisfaction with their performance.

According to Verizon, between 40 percent and 50 percent of the new phones have been returned but Verizon has declined to provide any information as to why users are dissatisfied with the new phones, which have been heralded as a real competitor for the iPhone – the dominant touchscreen phone in the US market.

Part of the problem appears to be linked to the firmware installed on the phone which prompted an upgrade just two weeks after the phone was launched last year. The update apparently cleared up a number of initial problems with the phone but there are still complaints that the clickable screen is responsible for slowing down typing, providing imprecise input.

Research in Motion is relying heavily on its new phone to increase revenues for the company, which has taken a severe knock as a result of the financial downturn, the increased competition in the smartphone arena from other manufacturers and, of course, the switch by millions of users to Apple's iPhone.

RIM has not commented on the returns or the software issues that may be linked to the new phone.

The Swiss Army Electronic Knife from Victorinox



I don't know whether this is completely daft or absolutely brilliant – I actually suspect the latter.

Major knife company Victorinox, famous for making and selling millions of Swiss Army Knives has released a new version of the knife dubbed the Presentation Pro. It features 32 GB storage capacity, 256-bit encryption and an integrated fingerprint scanner for authentication.

The gadget offers Bluetooth connectivity and provides two buttons for navigating slide-shows during a presentation along with a laser pointer to highlight specific areas on a screen while presenting your slide to a packed auditorium. In the true tradition of the Swiss Army Knife, the Presentation Pro also has a knife, a nail file, a screwdriver, pair of scissors and a key ring.

Electronically, the device supports both AES and DES encryption standards while the Bluetooth control is claimed to offer a range of about 25 metres. Software is included for the management of presentations, backing-up files, synchronising e-mail and contacts and so forth.

Customers can choose from the 8 GB, 16 GB or 32 GB Swiss Army Knife and prices range from \$170 to \$335. A flight variant of the Presentation Pro is being considered and, if it is made, will exclude the knife and scissors so as not to violate security regulations relating to dangerous weapons at airports around the world.

Sub-R4k netbook computers coming to SA?

Devices that are about the size of the average novel, are as powerful as you want them to be and cost considerably less than a laptop or desktop computer. These are the computers of the future, known as Netbooks, and they certainly seem to have been one of the star attractions at this year's Consumer Electronics Show held in Las Vegas.

Netbooks were launched by Elonex, Sony, Hewlett-Packard and Asus and Windows announced that the potential popularity of these machines meant that its new operating system, Windows 7 will run on these miniature computers.

The average netbook computer is retailing for a little over R4 000 but there are some expensive models too, with Sony's Viao P costing about R12 000. Research group Gartner predicts that sales of netbooks will grow by 80 percent this year from the 5,6-million units sold in the last three months of 2008.

It says that by 2012, annual netbook sales are expected to top 50-million units a year. One of the new models, the bright pink ONEt made by Elonex has a seven inch screen, sells for just £99, and has a tightly-packed keyboard that is considerably easier to use than a BlackBerry or Nokia smartphone.

Netbooks typically weigh less than 1,5 kgs and have screen sizes of nine inches or less. Many of the machines are running Intel's Atom processor and Windows XP operating system, which is less troublesome and buggy than Vista.

Storage space is generally more limited than on a laptop or desktop computer but that's likely to change as more and more powerful, minute hard disk drives and solid state drives are being made by companies such as Toshiba.

The netbooks typically have wireless network connections



and, because there are so few moving parts, they have lower power requirements for the processors and this increases battery life. Both Samsung and Dell are planning to launch netbooks with 12 inch screens, which are generally bigger than the conventional netbook specifications suggest. The Samsung machine will run the Nano chip from Intel while the Dell will use the Atom chip.

Manufacturers are currently trying to persuade computer users that the netbooks are not replacement devices for the existing range of laptops but should be seen as companion models for the larger computers.

A little trickle leads to a lot of lost energy

Technology start-up company Tricklestar has introduced two devices that are aimed at reducing power consumption in idle electronic equipment. For instance, idle game consoles are estimated to be consuming electricity worth \$1-billion a year while they just sit in the corner of the family room or bedroom.

Computers, too, waste considerable power when they are not shut down and many people prefer to leave the computer on so it can receive or download files during the quieter evening hours. The PC TrickleSaver, which plugs into the USB port of a Macintosh, Linux or Windows computer, senses when the computer has been shut down and automatically shuts down peripheral devices such as printers and scanners.

It uses current-sensing technology and requires no software drivers. It works on a master/slave configuration with the PC as the master, controlling a slave power strip for peripheral devices. The company sells a variation of the unit which has a switch that allows peripheral devices to be shut down even when the computer is in use.

The Universal TrickleSaver is used to cut down energy consumption



from video game consoles and other devices that are permanently left on. Using the television as the master device, TrickleSaver automatically shuts down connected consoles, DVD players and even set-top boxes when they are not being used.

According to a report issued by the National Resources Defense Council idle Xbox 360, Playstation 3 or Nintendo Wii consoles are costing the average user about \$100 in wasted electricity consumption charges.

The PC TrickleStar sells for \$25 and the Universal TrickleStar sells for \$35.

Sony produces a professional camera with the hallmarks of greatness

I had the great pleasure and joy of test-driving a Sony A900 digital camera for just over a week and what a magnificent camera – and range of lenses – Sony has made. For starters, the Alpha A900 has a whopping 24.6-megapixel resolution using its full-frame Exmor CMOS image sensor -- the highest sensor resolution of any 35mm digital SLR yet announced.

Apart from the sensor it has many other advance features such as the nine point auto-focus, the ability to capture five frames per second and so forth making it a truly sophisticated photographic too.

In South Africa – mainly because of duties and the low value of the Rand – it is a pricey camera and the little bundled camera bag that was delivered to me was worth, conservatively about R120 000. What a magnificent team the Alpha 900 and its Zeiss lenses make.

Let me say, too, that unless I was actually earning a living from my camera I would probably not be able to justify spending that kind of money. Not that the camera isn't worth every cent it's just that it is a full professional camera and one that needs to be mastered and then used.

Of course, having spent some time in a past life earning a living from taking pictures, I'm well aware of many hazards that face press photographers – more so today perhaps than in the past – who are often not welcome at gatherings, are attacked outside courts or beaten by Mrs Mugabe and her thugs.

In years gone by, the Nikon F series was pretty much the standard camera for press photographers all over the world and the primary reason for this was that it was particularly rugged and robust.

Sony Alpha 900 is intended as a full professional camera and one of the crucial questions is how well it will stand up to the robust treatment that is likely to be meted out to it during its lifetime.

It certainly has the specifications needed to compete with the Canon and Nikon heavyweight professional cameras that have dominated the market up to now. As with any digital camera it has literally hundreds of functions that need to be memorised. In a practical sense, a photographer doesn't want to start hunting through menus to find a function. Instead you need intuitively to know and understand the tools you're using and be completely familiar with all the functions..

Sony has complicated menus but no more so than those in the Nikon or Canon equivalents. In fact, I found the Sony menus simple enough to master and the various features quick to locate during the brief period I spent playing with it.

There is another concern, of course, which has little to do with the Sony Alpha 900 but an enormous amount to do with



the South Africa we find ourselves living in. Several of my buddies – who are still working as professional photographers – have been mugged for the camera bags on their shoulders.

Most often the best time to take pictures is early in the morning or late in the afternoon and this makes photographers even more vulnerable to the prowling thieves who'll steal anything and kill if they have to. So carrying a Sony Alpha 900 – or a Nikon or Canon for that matter – is always a risk.

Technically the camera has an optical view finder, a three inch liquid crystal display, ISO speeds that range from 100 to 6400 and shutter speeds from 30 to 1/8000 of a second. Flash synchronisation is up to 250th of a second. The apertures are determined by the lenses but I was using a F1.4 85 mm lens, an F2.8 70 to 200 mm zoom and an F3.5 17 to 70 mm lens. By any standards, these are fast lenses.

The camera accepts CF1, CF2, MS Duo, MS Pro Duo and Microdrive cards and runs on custom lithium-ion batteries. It offers a full 35 mm frame-size image sensor, putting it head to head with



The full-frame picture of a Bulbul at a feeding table in a Pretoria garden. The picture on the right shows the value of the 24,6-megapixel sensor because you can use a tiny section of the frame and still get a high quality shot.



two of the biggest names in the photographic industry, Canon and Nikon.

In a head-to-head comparison, at a price of R38 900, the Sony A900 has many more features than the mid-range Nikon and Canon professional cameras that can be bought for that price and it seems Sony has deliberately chosen to buy market share by offering a model that completely out-performs any similarly priced models. Processing of the high resolution images is done using dual Bionz processors and this allows the A900 to shoot at five frames-per-second for 11 JPEG images and 13 RAW format images.

The sensor itself is mounted on a moving platter to provide in-camera image stabilisation and it's the first digital SLR to offer the feature. Sony says that image stabilisation can provide between 2,5 and 4 F-stop improvements in low light conditions.

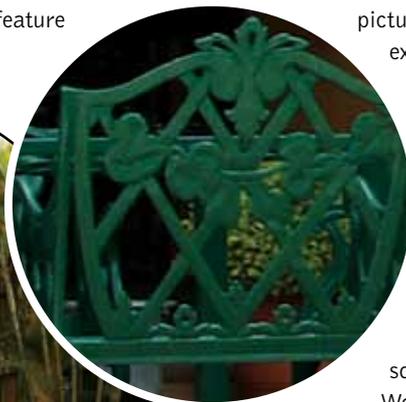
The camera body is made from five magnesium alloy sections, keeping the camera relatively light but the seals are sufficiently tight to ensure no ingress of moisture and only minimal dust. The auto focus feature

provides a nine-point phase detection with f/2.8 cross sensor and ten supplemental auto focus assist points adjacent to the main points.

Using the camera was a real treat and while I did not actually have enough time to test it extensively, I could take a couple of pictures and at least feel and work with it. First of all, it is an exceptionally well-balanced camera that's comfortable to handle.

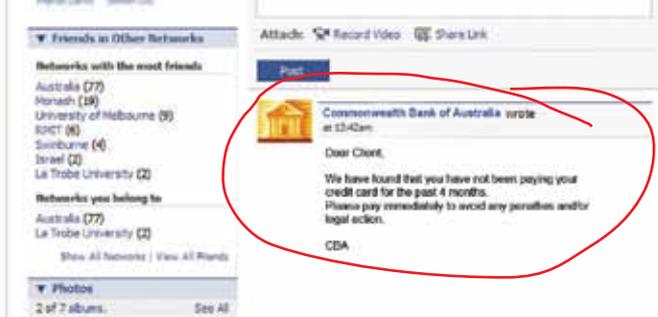
Image quality is exceptional and the range of metering choices is exactly what you'd expect from a professional camera. The autofocus system is as intuitive as it is superb so that you quickly and accurately compose photographs on-the-fly – a useful quality for any press photographer.

I certainly would buy the Sony Alpha 900 if I was not at risk of being mugged for my equipment I would buy one if I was working as a professional photographer or if I had so much money that a R100 000 was neither here nor there. Would I buy it as a point-and-shoot for quick mementoes of a trip, a tour or a celebration? Not a chance – it's way too good for that.



A snap-shot of a house in Waterkloof and then the detail from that picture showing the back of one of the chairs next to the pool. An indication of just how magnificent the 24,6 megapixel sensor is on the Sony Alpha 900.





Couple's house repossessed via Facebook

Debt-collectors in Australia are using Facebook to track down owners and have even served a 'summons' by 'writing on the wall' of individual Facebook users. In fact a court in Australia has ruled that a mortgage lender can use Facebook to break the news to a couple that their home has been repossessed by the financial institution.

Angry Facebook users are now mounting a campaign to prevent courts and debt collectors from using social networking sites to issue summons or to inform them that their goods have been repossessed, claiming that such action is a violation of an individual's privacy.

According to Colin Jacobs, vice chairman of the technology advocacy group, Electronic Frontiers Australia, people who join social networking sites such as Facebook or MySpace do not realise that they can be used by government agencies or debt collectors.

So far it seems that Australia is the only country that has accepted official notification of debts, repossessions or foreclosures via social networking sites. In the United States the legal rules do not accept social networking as an acceptable notification and, to the best of my knowledge, this delivery notice is not acceptable in South Africa either.

But that does not mean that things might not change. It just might be possible, for instance, for the Johannesburg Metropolitan Police to start posting traffic fines on the 'walls' of individual users for all to see, or for any one of the credit card institutions to post letters of demand on a user's site.

So far no such practices have been reported, but given the extent of panic among banks with regard to defaulting debtors it wouldn't surprise me if, sometime in the future, some banking smart-aleck decided to give it a try.

Can you imagine the embarrassment if personal financial demands were made against you for all and sundry to see. How would that make you feel and what would your rights be if such action was taken? Exclaiming that it might be defamatory would not really help if it were true and, the financial institution or the bank could prove that it might be in the public interest for everyone to know that you owe money to your bank.

So although privacy and confidentiality laws might offer some protection, this would probably have to be tested in court only once someone had been named and shamed.

Maybe it's a good idea to drop off all social networking sites if you owe anyone anything.

New Dawn is Africa's new satellite

After Nigeria parked its \$340-million telecommunications satellite in a safe orbit last year because it had a flat battery, Africa is now hoping to blast another \$250-million telecommunications satellite into orbit by the fourth quarter of 2010. Already half of the capacity of the satellite has been sold to companies that include Gateway Communications, Gilat Satcom, Vodacom and Zain Nigeria.

Known as New Dawn, this satellite will be operated by Intelsat in a joint venture with a consortium of African investors that include South Africa's Convergence Partners and Altirah Telecoms. The joint venture will be split, with 75 percent owned by Intelsat and the balance by the African investor group. More than 90 percent of the funding comes from African companies such as Nedbank and the Industrial Development Corporation.

This is Intelsat's first satellite aimed at providing telecommunications services exclusively to Africa and it will be equipped with 52 equivalent 36 MHz transponder units divided into 28 C-band and 24 KU-band units, supporting wireless networks, corporate networks, broadband, media and direct-to-home services for rural communities.

Providing that the batteries do not go flat – as happened in Nigeria's venture – the New Dawn satellite will have a design life of 15 years although Intelsat says that its satellites typically last for 20 years and more. In fact, the company has just retired a satellite that was launched more than 30 years ago.

Intelsat currently has 53 satellites in orbit serving 1 800 customers in 200 countries around the world and has provided a 99,997 percent reliability factor.



Air New Zealand flies planes on jatropha beans

Air New Zealand has flown one of its Boeing 747 planes for two hours using a mixture of jet fuel and jatropha oil mixed at a 50:50 ratio. Jatropha is a plant that grows up to three metres and produces inedible fruits that contain the oil. It is widely grown in parts of Africa and India, where it thrives in arid or marginal lands.

Air New Zealand's test used the jatropha biofuel in just one of the four engines but the airline intends conducting further experiments with the fuel. It is hoping that by 2013 it will use about a million barrels of biofuel a year, equivalent to about ten percent of annual consumption.

Jatropha is widely touted as being one of the best options for biofuels as it has limited value as a crop in any other circumstances. Mozambique has been working on plans for large scale production of jatropha as the feedstock for biofuels.

Air New Zealand's chief executive, Rob Fyfe, says that the commercial airline wants to become the most environmentally sustainable airline in the world. He says the biofuel's performance in the test conducted by the airline proved that it may be an excellent substitute for convention jet fuels but adds that further test will have to be conducted.

Some experts have warned that jatropha plants are not suitable for biofuel production because the plant itself is toxic and its yields are unpredictable. Furthermore, it is a labour-intensive crop as the fruit ripens at different times meaning that each tree must be harvested individually.

Different biofuels are being tested by different airlines around the world in an effort to reduce total reliance on jet fuels manufactured from oil. High oil prices – along with global warming and the swing towards alternative energy – have meant that investment in biofuels has increased dramatically in the past few years.

Now you can buy 'tunable' glasses

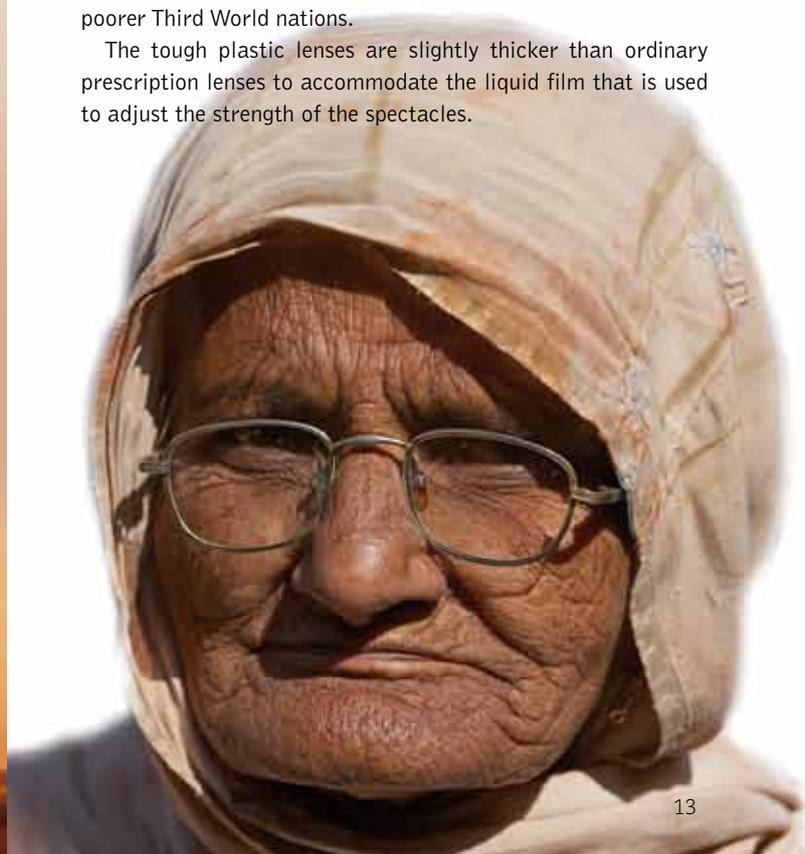
A British inventor has created a pair of glasses that can be 'tuned' by the wearer to improve eyesight without the help of an optician. Professor Joshua Silver, a retired Oxford University physics professor, hopes that his tunable glasses will allow billions of people in developing countries to receive and use spectacles for the first time in their lives.

It has apparently taken him more than 20 years to come up with a design that can be mass manufactured cheaply. The plastic lenses have a thin sac of liquid in the centre of each lens and are supplied with small syringes attached to each arm, with a dial for the wearer to add or remove fluid from the lens to tune it correctly and improve eyesight.

Once the lenses have been correctly tuned, the syringes are removed and the spectacles are worn as full 'prescription' glasses. A pilot project is already underway through the British Department for International Development and thousands of pairs of spectacles have been distributed to Third World countries.

Professor Silver is now setting his sights on distributing a million pairs of tunable glasses in India over the next 12 months and he is confident that, over the next ten years, he will be able to supply more than 100-million pairs of spectacles to people in poorer Third World nations.

The tough plastic lenses are slightly thicker than ordinary prescription lenses to accommodate the liquid film that is used to adjust the strength of the spectacles.



Police must hone their hacking skills

The British Home Office is encouraging police across Britain and Europe to develop their hacking skills so that they can illegally investigate personal computers anywhere in the world. The plan has sparked fears that the government is likely to increase police powers to allow them to hack into a personal computer without having to first get a court order.

The plan to encourage police hacking was originally drawn up by the Council of the European Union to improve cyber crime-fighting methods. Under the Regulation of Investigatory Powers Act of 2000, British police can remotely access computers for surveillance to prevent or detect serious crime.

Apparently the police have already carried out a number of operations as part of the 194 clandestine searches that were made of people's homes, offices and hotel rooms last year. The European Commission's vice president, Jacques Barrot, says that the goal is to ensure that other EU countries are committed to fighting computer crimes.

Cybercrime expert Professor Peter Sommer says that he doubts if the plan will increase the amount of police hacking and says that while the products that allow hackers easier access to personal computers have been freely available for some time, they have seldom been used by the police.

He says that most anti-virus software and almost all firewalls will detect and log any surveillance attempts as these products are designed specifically to prohibit unauthorised access to a computer. He says that it will also be particularly difficult for the police to submit evidence in court based on information that has been illegally obtained from a computer without the owner's knowledge or agreement.

When a computer is examined forensically, great care is taken to ensure that no information is actually written to that computer. If this is done remotely then, Sommer says, these controls vanish and the evidence can be questioned and disputed.

Robots may soon load the dishwasher

Japanese inventors have developed a robot that can be used to load a dishwasher – presumably to replace the more conventional human 'robot' who has that task after every meal, every day. The robot is able to properly rinse the dishes in a sink before neatly stacking them inside the dishwasher, adding the required amount of powder and then pressing the start button for the washing cycle.

The multi-jointed robot arm was developed by scientists at the University of Tokyo in conjunction with electronics experts from Panasonic. It is one of several prototype robots that have been specifically developed to take over many of the tedious household chores that have to be done every day – at least by those people who are hygienic and house-proud.

The Kitchen-Assistant-Robot (KAR) is fitted with 18 sensors that allow it to grasp and hold delicate china and cutlery without dropping or breaking it. Using an internal camera along with the sensors the robot can determine the shapes and sizes of dirty dishes and utensils placed in the sink. It then picks each item up carefully, rinses it and loads it into the dishwasher.

Scientists who built the prototype say that they have set a target to create a smaller, lighter robot that is able to rinse and then load the plates and cooking utensils for a family of five in less than five minutes. The robot will be commercially available within the next five years.

The scientists at Tokyo University say that they plan to have a squadron of robots, that are commercially available, to undertake a range of different activities including washing of clothes, dusting and vacuuming and even making beds.

According to the Japan Robot Association a number of companies have invested heavily in developing robots to handle household chores. The investment in robots and technologies to control them is currently estimated to be about £5,3-billion and this is poised to grow to £71,7-billion by 2030.



Skycar leaves London for Timbuktu in Mali



An intrepid British adventurer has just left London in a Skycar that is little more than a souped-up dune buggy and plans to drive and fly to Timbuktu in Mali in a journey that will last at least 42 days and will see him flying over the Pyrenees near Andorra and the Atlas Mountains in Morocco.

The Skycar flies with the help of a parachute and a giant fan-motor that's attached to the buggy. It can also be used as a totally legal street car that runs, believe it or not, on biofuel. The 6 400 kilometre trip will see adventurer Neil Laughton travelling across France and Spain before crossing the Straits of Gibraltar and continuing on to Morocco.

From there he plans to fly and drive across part of the Sahara desert until he reaches Mauritania and then completing the first leg of the journey by reaching Timbuktu in Mali before returning to Britain via Senegal.

Laughton hoped to be able to fly across the English Channel to France but the civil aviation authorities in the UK refused to grant him permission to make the flight so he will cross by ferry.

The two-seater Skycar was invented and built by Gilo Cardozo from Dorset who will accompany Laughton on the African leg of the trip as the co-pilot (on road and in the air). The car will be exposed to some tough conditions as they are expecting temperatures as low as -30 degrees C and, in the desert, reaching a blistering 50 degrees C.

Laughton claims that he has tested the vehicle in these extremes at a secret location and he is absolutely certain that it can cope with the testing climatic conditions. Cardozo is certainly an engineer who is eager to try new things. He designed and built the world's first powered paraglider that carried British survivalist, Bear Grylls, over the summit of Mount Everest in 2007.

Asked about the hostility of people in northern and western Africa following the cancellation of the Paris Dakar rally last year, Laughton says that he is acutely aware of the political situation in some regions.

However, he says, the advantage is that they can fly or drive and that means that should be able to avoid some of the more unpleasant people that might be eager to stop their journey.

The power of the fan fitted to the buggy is such that it takes less than 200 metres to lift the vehicle into the air at a speed of only 70 kilometres an hour. Once in the air, pedals in the foot well are used to steer the vehicle via a cables that change the shape of the wing.

If something does go wrong, an emergency parachute can be deployed, which will allow the vehicle to float back to Earth. The team will be accompanied by a convoy of support vehicles carrying all the necessary spares and supplies for the trip.

Plasma TV sets may be banned by the EU soon

Giant plasma television sets – dubbed as the 4 x 4s of the living room – are likely to be banned under new European Union legislation because they consume at least four times as much energy as traditional television sets that use cathode ray tubes.

A set of mandatory European Union regulations is being finalised by European governments to set minimum standards for television sets. Those that do not meet the regulations will be phased out over a period of time. New television sets will have to be labelled with an energy rating so that consumers can make an informed choice about the set they buy.

Britain currently has about 60-million television sets in operation – one for every person in the country. However, in the past five years the 32 inch and 42 inch flat-screen plasma television sets have proved most popular among buyers. The problem is that these new flat-screen sets use four times more electricity and provide emissions of carbon dioxide that are almost double the emissions of an average sized fridge.

The new legislation could see the plasma television sets being banned in Europe but a spokesman for the Department for Environment, Food and Rural Affairs in the European Union has said that it is unlikely that they will be banned for some years still.

The LCD flat-screen television sets are considerably more energy efficient than the plasma screen and will not face prohibition under the new legislation. In the United States, legislators are drafting regulations that will require retailers to sell only environmentally-friendly or 'green' television sets from 2011.

Energy regulators in California say that curbing the number of energy guzzling televisions sets will save the state as much electricity as is used in almost 90 000 homes.



Toyota's all-electric iQ vehicle by 2012

Toyota plans to start selling its all-electric motor car, based on the FT-EV concept vehicle, in Japan, Europe and the United States by 2012. The new all-electric car is aimed at commuters who live in cities and who travel relatively short distances to get to and from work.

According to Masatami Takimoto, executive vice president for research and development, car manufacturers around the world are accelerating plans to produce vehicles that use other fuel technologies and Toyota's Prius hybrid has established a worldwide precedent for more fuel-efficient vehicles.

The all-electric car is one of many new technologies being developed by Toyota including a petrol-electric hybrid, a plug-in hybrid and an all electric commuter vehicle. Takimoto says that Toyota is on track to sell a million hybrid vehicles by the end of 2010 and to hybridize the entire range of vehicles made by the company by 2020.

Toyota has apparently halved the cost of its electric motor and inverter systems, which has reduced the costs of manufacturing the vehicles but he refused to outline what the costs savings would amount to in terms of the price to consumers.

The concept car is based on Toyota's new iQ commuter vehicle which has been such a success in Japan in recent months. The petrol-driven iQ seats four passengers, offers exceptional fuel economy, provides sporty performance and has a rather youthful image.

The all-electric version of this vehicle is aimed at people who drive up to about 80 kilometres a day. Later this year, Toyota plans to start global delivery of 500 Prius PHV vehicles that are powered by lithium-ion batteries. The Prius will be tested extensive on global markets before being manufactured for commercial sale to consumers.



Bandwidth stolen – hacker charged

In the first case of its kind a man has been charged with allegedly selling cable modems that are able to steal free, anonymous Internet services from broadband providers. Thomas Swingler has been charged in a Federal Court in New York with trafficking in unlawful access devices supplied by his online business cablehack.net.

The site, which is still operating, sells modified Motorola Surfboard modems, at prices ranging from \$38 to \$58, that can be customised by the owner with a cable company's knowledge. Among other things, the user can set his own upload and download rates and change the MAC address – a unique identifier that is usually hard-wired into a modem.

In a rather strange disclaimer, the site warns users that *if you decide to use one of these modems to get free Internet, then you're committing theft of service and we will take no responsibility for what may happen to you if you're caught.*

Modified modems and hacking tutorials have been freely available on the Internet for several years. The hacks are mostly aimed at 'uncapping' modems to get higher speeds.

The Federal Bureau of Investigation sent an informant to work with Swingler last year and the FBI alleges that he knew exactly why people were buying his modems and he knew that they were stealing Internet access as well.

He apparently boasted to the informant that selling the hacked modems was a hundred percent legal because it is the end-user that is stealing the service and not his organisation. No-one knows for certain how many modified modems have been sold but the site itself has over 4 000 registered users.

Last year FBI agent Milan Patel ordered a modem from Swingler and then promptly sent it to Motorola for analysis. The company confirmed that the device had been hacked to allow users to change their MAC address and gain access to a free Internet service.



UFO blamed for failure of wind turbine

A giant 20 metre blade was smashed as it spun on a 88-metre high wind turbine in Lincolnshire in the United Kingdom and local residents believe that the damage was caused by a UFO that flew into the wind farm, damaging several turbines.

Russ Kellett of the Flying Saucer Bureau in Britain says that his organisation received more than 30 phone calls about a mysterious low-flying object in the area, which eye-witnesses claim, actually flew into the farm.

Dale Vince, founder of Ecotricity, which owns the site and operates the farm, says that while investigations are continuing they are not prepared to rule anything out, particularly as the extent of the damage was, in his words, unique and not something that had been seen before.

There are no scientists who endorse the UFO option. They have a simpler explanation: that chunks of ice started flying off the blades of other turbines following the failure of internal anti-icing systems and these chunks hammered into one of the other blades, causing the damage.

The Ministry of Defence is also investigating the incident but, according to a spokesman for the Ministry, this investigation is purely to establish if the UK's airspace has been compromised by hostile or unauthorised military activity. He says there is no attempt by the Ministry to identify the nature or cause of any strange sightings that might be reported to it.

UFO enthusiasts are adamant, though, that the strange phenomenon of a mystery aircraft suddenly appearing and winding its way through the wind farm was responsible for the damage to the turbine. The wind farm at Conisholme has been operating since April last year.

MTN and Neotel climb into cables

Neotel and MTN have signed an agreement to jointly build a long-distance fibre optic network that will connect all the major centres around South Africa. The network will span some 5 000 kilometres and the deal marks the biggest collaboration in the South African telecommunications industry until now.

According to MTN's managing director, Tim Lowry, the organisation will save about R200-million in operating costs in 2009 alone and will save considerably more in the future once the entire cable is rolled out and operating.

Neotel's Ajay Pandey, chief executive officer and managing director of Neotel, says the collaboration between the two companies is a bold step and adds that the partnership represents a significant milestone that will redefine the telecommunications landscape in South Africa.

The first cable will run from Gauteng to KwaZulu-Natal and construction work will begin in March this year.

The new network is due to be fully operational before the start of the 2010 Fifa World Cup. Other provinces will be added to the cable network at a later stage.

According to Bridget Bhengu, MTN spokeswoman, the entire project covering all provinces will be completed by April 2011 and will cost about R2-billion.

The network will provide high levels of bandwidth capacity and will be able to operate both voice and data services at higher speeds, over greater distances, using less power.

There is the added bonus that copper cable thieves generally avoid fibre optic cables because these are of no value to scrap metal merchants.



A 'lost generation' of students educated under OBE?

The South African constitution stipulates that all children in this country are entitled to free basic education and, if the critics of the new Outcomes Based Education (OBE) system are to be believed, then a very basic education is all that hundreds of thousands of young South Africans can expect to receive.

The first students to complete the National Senior Certificate (formerly matric) under the OBE system graduated last year and, in spite of predictions to the contrary from the National Department of Education, only 62,5 percent of students actually attained the certificate.

This, when just 30 percent constitutes a pass mark.

The most badly affected subject of the new OBE system appears to be mathematics and a body known as the Concerned Mathematics Educators (CME) – a collective of 90 mathematics teachers countrywide – has roundly criticised the current mathematics curriculum saying it is “watered-down” and “unchallenging” for competent pupils.

Astonishingly, geometry has been dropped from the mathematics syllabus, along with Additional Mathematics (formerly known as Add Maths) under the old matriculation system. To add to the woes of pupils, thousands of students around the country were advised to drop traditional mathematics in favour of the newer Maths Literacy module.

However, what most of the students were not told was that they would not qualify for a university entrance in a course of their choice. Maths Literacy opens the doors to about only 14 courses at universities around South Africa.

Maths Literacy is little more than a disguised form of simple arithmetic where students have to un-fathom much useless information contained in an anecdote and then deduce the answer using rudimentary arithmetic functions. Within the real world of science and technology, Maths Literacy is meaningless and at this stage it precludes any student from doing a degree involving engineering, any of the sciences, any computer or electronics degrees, and even certain of the social sciences.

Dr Salim Vally of the University of the Witwatersrand Policy Unit says that the pass rate was “even more desultory and pathetic than I thought”. More than 200 000 students failed the senior certificate last year and tens of thousands more are unable to enter university because they did Maths Literacy rather than mathematics.

Many students I have spoken to – and many more who have entered comments on online chat services – have roundly condemned Maths

Literacy, claiming that they were given assurances that they would still be able to go to university if they passed the subject. One student, who passed her National Senior Certificate with five distinctions, is outraged because she cannot enrol for an interior design course because she has Maths Literacy and not mathematics. The course used to accept Standard Grade mathematics students, but won't accept students with Maths Literacy.

Many academics and teachers have roundly condemned the OBE system after the first students completed the National Senior Certificate and there have been repeated cries for the government to ditch the system and revert to more traditional teaching and examination methods.

Even Dr William Spady, the self-proclaimed father of OBE, has urged South African authorities to jettison the OBE system after so few students – 62,5 percent, down from 65 percent under the old system – achieved a pass. He says that OBE will not work when a school system is governed by limited time and resources, and as a result is doomed to fail.

However, Education Minister Naledi Pandor is adamant that government will remain committed to OBE and that the existing system and curriculum will remain in place and not be changed under any circumstances.

Pandor claims that the final results show that the Department of Education is “making positive incremental gains in building an effective



learning-orientated school system". I'm not sure what she is smoking because, in the first year that the National Senior Certificate was written – and when the mathematics paper has been condemned for being of an unacceptable standard – the pass rate dropped by two and a half percent.

How is that providing "positive incremental gains"? The justification perhaps is that there is a 20 percent university entrance pass but exactly what courses are available to the students with this university entrance remains unclear.

In terms of the National Senior Certificate, pupils are required to pass three of their subjects with at least 40 percent and a further three subjects with just 30 percent. This equates to a total of 210 marks out of a possible 600, or 35 percent to qualify for a National Senior Certificate.

Pandor says that the national department is hoping to get 50 000 students to pass mathematics with a mark of at least 50 percent in the years ahead but her goals have been trashed by education expert Professor Jonathan Jansen, who asks how it is possible that 79 percent of pupils can pass mathematical literacy in a country with one of the worst numeracy results in the world?

He points out that every international test that has benchmarked South African pupils against pupils in other parts of the world has pointed to broken foundations for numeracy in the pre- and early high school years.

Jansen says that even South Africa's own Systemic Evaluation project confirmed the pattern of under-achievement across

the primary grades. And yet, as soon as students do mathematics or mathematical literacy there is a huge increase in performance. He says you don't need to be a rocket scientist or a statistician to see immediately that there is something wrong with the spike in mathematics achievements.

According to CME spokesman Aslam Mukadam, the standard of the mathematics examination in 2008 dropped to an unacceptable level and if this standard is used as a benchmark for future mathematics examinations then students will not adequately be prepared to cope with mathematics related courses at university level.

He says that students who excelled at mathematics usually did very well in the science subjects too, but under the first OBE examinations in 2008 the percentage of pupils who scored above 50 percent in mathematics was 21,2 percent, whereas in the science examination only 14,9 percent of students managed to pass with more than 50 percent. He says this indicates that there was something suspect about the papers and the standards.

To add to the education woes facing universities this year, CME points out that although the mathematics exam was of an unacceptable standard, 60 percent of pupils still failed the subject.

Given the chronic shortage of students who are able to enter any scientific fields of study, the overall National Senior Certificate results are abysmal. According to Witwatersrand University's head of education, Mary Metcalfe, there is some doubt as to whether the students who passed with more than 50 percent will be equivalent to the 2007 matriculants who wrote maths on the higher grade. It seems universities will have to seek some alternatives to boost basic mathematics understanding among many new students.

Former University of Cape Town vice-chancellor Dr Mamphela Ramphele slammed the system, saying that South Africa had chosen the "worst curriculum policy you could ever imagine" and adding, in a furious address in Cape Town at the end of last year, that "not a single country in the world that has undertaken outcomes based education has succeeded".

Meanwhile, the Council for Quality Assurance in General and



Further Education and Training (Umalusi) has given the National Senior Certificate its complete approval saying the examination structures, the standard of the exam papers, the marking and the moderation procedures were fair.

According to Professor Jon Volmink, chairman of the Umalusi Council, some papers had been "too hard" and others "too easy" so the council had adjusted the marks of three easy papers downwards and another five papers that were "too hard" upwards. While there were no major irregularities with the examinations this year, some of the papers were virtually unintelligible – particularly the paper set for the Afrikaans exams where there were significant errors in translation.

While many opposition political parties have called for the government to reconsider its position on OBE, Pandor says that these critics fail to distinguish between a curriculum and a teaching method and outcomes based education means that teaching must be based on the outcomes that are to be achieved. She says that OBE is currently the "whipping boy for all education challenges".

Academics, teachers and some politicians are deeply concerned by the appalling state of education in South Africa. Vijay Reddy of the Human Sciences Research Council warns that the 2,5 percent drop in the pass rate is "very worrying" because it means that close to four out of ten students failed the National Senior Certificate.

He says that the poor results are a result of historical and social inequalities in the education system. However, Brian O'Connell, rector of the University of the Western Cape says that the poor 2008 results should not be blamed on past inequalities but should be seen, instead, as an education system in crisis.

He says that South Africa lacks a culture of learning and instead of "throwing around the resources thing" should create a strong national culture of learning.

According to commentator, Glenn Ashton, the OBE system has, in many countries around the world, been directly linked to a drop in standards. He says that from the outset, there has been strident disparagement of the OBE system and its implementation from

organisations such as the National Education Crisis Committee, the South African Democratic Teachers' Union and from academia and pedagogues.

He says that the crucial question about OBE is whether it has delivered what it promised to deliver when it was implemented. Ashton says that the infrastructure in schools is as poor now as it was when the curriculum was introduced. There is a lack of teaching aids in these schools, the teachers themselves are not properly equipped and in certain townships gangsters make attendance at school a daily hazard for pupils who are eager to learn.

He says the government's approach of one-size-fits-all will only apply if everyone in the education system gets identical tools with which to work and learn. "Dishonest attempts to massage the system and set the pace at the cadence of the slowest, disadvantages the most able people and limits the potential of those who are not quite as able," he warns.

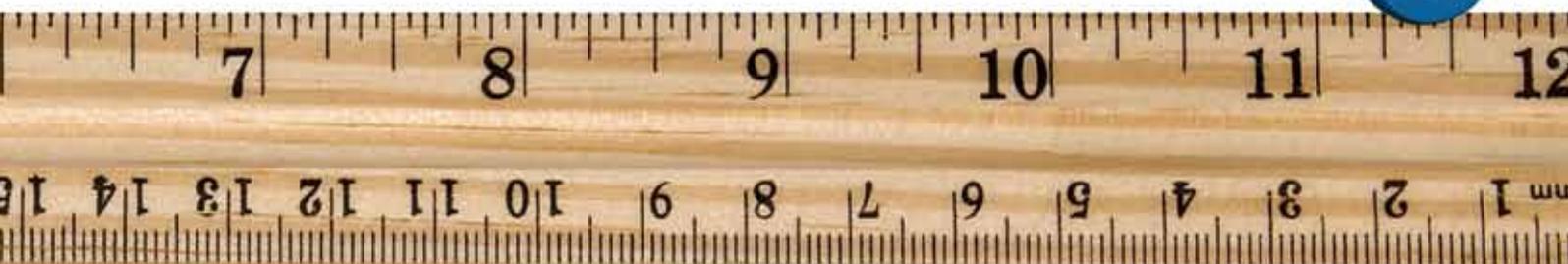
Ashton says that the OBE system works in small classes but in South Africa, class sizes are typically between 35 and 50 children, sometimes more. He also says that the new system does not narrow the gap between the haves and the have-nots.

But Ashton is quick to point out that the acid test is whether the most recent crop of students is better equipped and prepared for tertiary education than before. The answer to this question should be the basis for maintaining or scrapping OBE.

Cornia Pretorius, an associate editor of the Mail & Guardian's education unit, says that the single most important legacy of the OBE system is that there is yet another lost generation of children in South Africa's poorest schools.

"These are the children who still cannot read, write or do maths – the critical keys for unlocking the door to acquiring knowledge."

Sadly, she's probably right.



A way to fix the crisis in maths education?

The Concerned Mathematics Educators – a group of 90 maths teachers from around the country – have sent an open letter to the Department of Education and its minister, Naledi Pandor, expressing their grave concern that the 2008 mathematics examinations had been watered down, widening the gap between school and university for the top learners in the country.

It has outlined what it sees as an interim solution to bridge the gap between the level of mathematics taught at schools and the requirements of the universities around the country. The CME concedes that the affluent schools perform much better than those from lower income areas and says that in order not to further disadvantage the poorer communities, the assessment system should be tweaked until there are enough properly trained teachers to teach all learners.

The CME recommends that all mathematics students write the mathematics papers one and two at the end of the 2009 year (as they did in 2008) so that those students with lesser mathematical ability will be able to prove that they have a basic understanding of the mathematical principles without having to cope with the more rigorous conceptual demands of a higher grade mathematics exam.

Learners with a higher mathematical ability will also write papers one and two but their real assessment will be contained in the optional paper three, which would be compulsory for learners interested in going on to study science or maths at university.

Paper three will test the conceptual ability of learners through the application of their cognitive skills and their ability to answer higher level questions than those contained in either of the other papers. In other words, paper three would be designed for learners who have a real mathematical aptitude.

The CME says that for those learners, standards need to be raised and kept at an optimally high level to facilitate excellence in mathematics-based modules. Furthermore, the CME contends, such an approach will also help to close the gap between school and university mathematics.

According to the CME it is now imperative that the Department of Education and the mathematics teachers themselves address the teaching of mathematics at a more holistic level because not all learners have the same capabilities.

The CME says that the current structure and assessment system is based on a one-size-fits-all approach and this is making mathematics less accessible for the weaker learner and not challenging enough for the top learners. As a result, it says, the top learners are not adequately prepared when they reach university.

The CME has set up a web site (www.mathsexcellence.co.za) which contains free online mathematics text books from Grade One to Grade Twelve to assist learners upgrade their skills.

Referring to the lack of properly qualified and trained teachers, the CME says that while not all schools are equipped to administer the 'new' mathematics curriculum, the schools should still have the option of offering two or three levels of mathematics education based on the standard of their resources and the abilities of the learners.

It contends that those pupils who are not coping with the 'new' mathematics are likely to become apathetic and neglectful because while they know that mathematics is compulsory, they can still get a National Senior Certificate without actually passing the subject.

The CME says that a lot more time and money should be spent by the Department of Education on training the mathematics teachers to ensure that they are capable of teaching the new curriculum. It says that the 'rushed' implementation of the current mathematics curriculum has disadvantaged many students because there are what it calls "systemic deficiencies" in the curriculum and the teachers who have to implement it are not adequately trained or competent to do so.

It says the contingency strategies it has outlined should start to reduce what it calls the "crisis in mathematics education" and better serve the needs of all South African learners, particularly those from poorer communities around the country.



Hi Paddy,

I am a junior process engineer working for a hydrometallurgical design and consulting company in Johannesburg. I have always been passionate about finding engineering solutions to the environmental (especially water) issues facing our country.

After reading the article on the water crisis in South Africa I felt even more inspired to start making an effort to make a change. I submitted a proposal on expanding our company's business to the water sector and have now been tasked along with another group of engineers to procure projects in this sector.

I only have one year's experience in the field of water so have not built up a large network of contacts yet and do not want to leave it all to the other engineers on my team.

I thought that you may receive some feedback from mines or other industries with effluent problems in response to the article featured in WATTnow.

If you could be of any assistance in providing me with contacts or information of mines or industries that are looking for water treatment solutions I would be very grateful.

Within my company there are many engineers with water experience, but they are complacent about the crisis and happy just to work on hydrometallurgical projects they are assigned to. They would however be willing to take on water projects if the company procures such projects.

Regards

Rene Lombard, TMP Matomo Process Plant

Hi Paddy

Antonio's article on *Multitasking*, reminded me of the old adage in the early days of multitasking computers:

The best thing about multitasking is that many things can go wrong at once.

Also, the age block on Page 11: As a student, I could block out anything around me, and concentrate. Now, especially when the kids make a repetitive noise, it really drums into my brain. The result is not publishable.

Alan Clark, Pr Eng

Dear Paddy

Appeal for information and assistance regarding the SAIEE's History of Electrical Engineering in South Africa.

As part of the SAIEE Centenary celebrations the institute is preparing a book on the history of electrical engineering in South Africa between 1860 and 1960.

Much of the preparation work has already been completed but several sections still need to be created. We are appealing to anyone, particularly members of the SAIEE, to provide information on the following subjects:

1 Lightning:

Brian Austin has already prepared a section on the fundamental work done by Dr Schonland. This needs to be supplemented by a section covering the evolution of practical measures for the electrical industry to survive under the aggressive lightning conditions prevailing in South Africa.

2 Electrical Engineering in Pretoria:

Many of the early records held by the municipality were destroyed by fire and we are hoping that someone may be able to undertake the section using other sources.

3 Computers in SA:

We are hoping that someone can take us back to the early Hollerith machines used here followed by post-war equipment such as the Zebra and Leo computers.

Anyone willing and able to assist please contact Dirk Vermeulen on 011 476 1731 or by email – verdene@iafrica.com as soon as possible.

Dear Sirs,

I have a suggestion to make to cover the next few months of load shedding.

Why does ESKOM not buy power from all the hundreds of its customers who already have standby generators, and are prepared to use them? They could come up with some tariff structure, and if they cannot do so quickly, then I can do it quickly for them.

Most of these consumers would rather use their standby generators and have continuous power, than just have these assets sitting there being used for some 50 to 100 hours per year only, mostly for test purposes.

Now they could be used for some 500 hours instead, and become useful assets. Come on guys let's stand together and keep our country up and running with electricity. The installed capacity is there for us to simply put to use this summer.

I must admit that I have fallen behind in reading your excellent publication WATTnow. So I am replying a bit late, but not too late.

I have followed with extreme interest and disgust the many articles in all the SAIEE publications about the power shortage debacle of our new government and Eskom. It seems there is a total lack of understanding and responsibility of our new leaders?

Now we have this interest in providing electric vehicles, most of which are to be supplied to our wonderfully ignorant government again. Do they really still not realise that these vehicles will need their power from Eskom, which already has a desperate shortage of power? And this shortage will prevail for the next 5 to 7 years. Hey guys let us wake up.

What we need urgently is more power generation, not more consumers nor battery cars. So please let us bring the Independent Power Producers (IPPs) into the arena. And let's do so quickly.

I have been following the debate about bringing IPPs in to assist with power generation for many years.

Our power produced by Eskom is of the cheapest in the world. That is what was inherited. One of the many good things of the old regime. Why could it not be kept up? Spite? Or ignorance?

Why the new government and new Eskom management could not and still cannot get IPPs going, I fail to understand. Yes the problem is that they cannot generate as cheaply as Eskom. But for now, and the longer term, Eskom will have to swallow that one. Which of course means we, the consumers, will have to.

But it is abundantly clear that if our GDP growth targets are to be met, we need more electric power now, and quickly. Not by the time Eskom can build its two new coal fired power stations giving us more power in 5 to 7 years time.

The only answer I see, is that the IPPs must build their power plants quickly and sell their power at the going rate [to be checked internationally] to Eskom, and then Eskom will have to sell it off at a cheaper rate.

The amount the IPPs will produce so rapidly [3GW to 10GW max?] within the next 1 to 5 years, will not be so significant that it will have a major impact on the long term pricing that ESKOM is foreseeing anyway. The amount IPPs generate will be only some 10% of the total installed capacity. And hence have a similar 10% impact on the pricing only.

My philosophy is to rather have power for growth, even at a 10% premium, than not at all for the next five years.

What about it?

Frans van Neerijnen
SAIEE Member

Dear Paddy

I enjoyed your article on the Gautrain, and have been watching construction progress where visible with great interest. I would like to see information on the operation of the train, and perhaps Bombela would supply this as the basis for a future article. It should show a map of the entire route. It should indicate whether lines are single or double (very confusing in the November article) and how trains will operate. Do all trains stop at all stations or are there passing zones with express trains hurtling through.

How many people fit into one train? Do they sit in space wasting train configuration, facing one another, or are they bunched in like airplane passengers all facing the same way?

What about the logistics? If 100 000 people travel each weekday, I guess most will travel during the morning and afternoon peak periods. Assume say 90 000 travel in peaks, that is 45 000 in morning, say to arrive at work by 8 am. Assume most travel from Pretoria to Johannesburg in morning, and vice versa in afternoon, say 30 000. A coach carries the same number of passengers as a bus, 60 seated. Then a four coach train can carry say a thousand. So we need 30 trains to cater for that peak flow. Assume these people will not want to board the first train before 06h30, and the last must board by 07h00 to get to work on time, that suggests a train leaving Pretoria every minute. Can this be possible?

I'm sure the experts have this all well worked out at the design concept stage. So it would be very interesting to see this kind of operational information.

Then there are the interesting aspects of locomotive and rolling stock design. What kind of track is used? Is it like train rails, or concrete monorails? What gauge if normal? What is the driving equipment? Electric? Diesel-electric? How many motors? What size and voltage? Is there a plan of the carriage and motor-coach lay-outs?

So there is a lot of interesting detail yet to be revealed, and I am surprised the Bombela PR people haven't latched on to this yet.

What do you think?

Bev Lawrence

Thanks for your comments Bev and we certainly will provide more detail as time goes by. I suggest you visit the Gautrain website (www.gautrain.co.za) where there is an excellent image gallery that you can consult and where you will find answers to almost all the points you raised in your letter.

Paddy

A jewel in South Africa's car manufacturing industry?

The first South African developed electric vehicle was launched at the Paris Motor Show late last year. The car, called the Joule, is a six-seater multi-purpose electric vehicle (MPEV) aimed at the higher income bracket. Carol Dalglish reports.



The Joule, South Africa's first electric vehicle, a six-seater MPV to provide a comfortable ride for the urban user.

South Africa's Joule

South Africa's entry into the race to introduce an electric car was unveiled at the prestigious Paris Motor Show late last year. Home grown and aptly named the 'Joule', South Africa's first MPEV is sleekly styled, emits no carbon and will have electricity costs of between 4,0 and 10,0 c/km – 10 to 20% of the fuel cost to run a similar petrol or diesel vehicle. The Joule attracted international interest from 32 distributors representing 12 countries, keen to market the car globally – a promising start for the Cape Town-based developer and manufacturer, Optimal Energy.

Optimal Energy teamed up with South African automotive designer Keith Helfet to create the Joule. "Cars are sold on styling, design,

emotional appeal, marketing and branding and the sleek Joule has all the winning credentials," says Optimal's CEO, Kobus Meiring. The six-seater MPV has a driving range of 400 km, a top speed of 130 km/h and 700 litres of boot space. An optional extra includes a solar panel integrated roof that will help recharge the car.

While other manufacturers are looking at cheaper entry level smaller electric vehicles for the urban user, Optimal has set its sights on producing an electric vehicle comparable to a diesel or petrol four-door MPV in the R220 000 price range. The Joule is destined for export with 50 000 units set to go to Europe and the United States. The Joule will be first off the production line but Optimal is also

developing a three-seater light utility/cargo vehicle based on the same sub-frame.

The privately-owned enterprise has seen strong government support for its new technology through the Department of Science & Technology's Innovation Fund. Optimal spent three years testing and developing the lithium batteries with the University of the Western Cape and the University of Limpopo. Meiring tells *WATTnow* that the advantage of the Joule's adjustable generic schematically flat chassis design gives Optimal the freedom to use a variety of battery types, size and body shapes without being tied down to one technology or supplier.

The rapid advance in lithium battery technology is crucial to the success of electric vehicles. Currently the average lithium battery technology has a 10 year life cycle or 200 000 km. The previous fast charger battery chemistry was limited but now you can replace the whole pack of batteries in 10-15 minutes, or recharge the vehicle within 20 minutes.

The large-cell lithium-ion battery pack provides energy for 200 km, with two battery packs sliding in easily from below giving the Joule a 400 km range. The battery chemistry is similar to that used in mobile cell phones and laptop computers and free of any heavy metals.

An integrated computer, developed for the electric vehicle, controls all of the Joule's onboard systems. Each battery cell is monitored independently to ensure optimal performance and durability of the battery. An integrated, programmable onboard charger ensures that recharging can be synchronised with off-peak electricity.

Eskom's energy excess between 11 pm and 6 am makes it an ideal recharging time. Using a normal 220V household outlet it will take about seven hours per battery to recharge for a 200 km driving range.

Optimal's CEO claims that only one battery-pack is necessary as research shows that 99% of urban users drive less than 150 km a day. The batteries are not included in the price of the car, however. Optimal intends to offer various battery leasing schemes to soften the dent in the pocket paying off the car and a new technology battery simultaneously. Optimal expects that the monthly lease of a 200 km battery pack, including the warranty and electricity, will cost in the region of R1 500. At 2 000 km/month, this equates to 75 c/km.

Joule's designer, Keith Helfet, has a styling pedigree that includes various Jaguars, the stylish XJ220, XK180 and the F-Type, a medical MRI body scanner, boats, aircraft interior and merchandise. The Joule was 'imagineered' as a battery electric vehicle from the outset and no compromises were made for the inclusion of engine- or gearbox-related influences in the design and layout. The wafer thin flat chassis, with front and rear crumple zones, houses the batteries and electronic bays and it also provides attachment points for the suspension. The bodywork has a steel space frame with a combination of composite

(glass and carbon) and plastic body panels. Side impact protection is provided by high strength steel cross-bars in the doors.

Joule's regenerative braking system allows the energy recovered to go back into the battery, extending the car's range, and ABS brakes offer additional emergency support.

The vehicle has two drive options, front wheel drive, with a purpose-developed asynchronous permanent magnet motor driving the front wheels through an 8:1 reduction gearbox, and secondly, the use of individual asynchronous permanent magnet motors located in the wheels to achieve rear and four wheel drive.

The suspension is specifically tailored to provide a comfortable ride for the urban user, with McPherson struts in the front and a semi-independent trailing twist beam system at the rear.

The Joule complies with UN-ECE safety standards. "In South Africa you need one complete vehicle for SABS certification, while in Europe you need 10 vehicles to get it on the road," says Meiring. With three more prototypes due to roll out between March and May, the "Joule's development is nearly complete," he informs us.

The next phase will be the industrialisation of the prototype. The company is keen to team up with component suppliers and to form strategic partnerships. During the first quarter of this year Optimal will be looking at plant location and feasibility. Meiring says: "We will be looking at industrial assembly plants in those zones that are keen to get enterprise and we will make an announcement early in the year." Gauteng Province is being evaluated for Joule's first assembly plant as it has the biggest cities and has expressed an interest in placing the first fleet orders.

Optimal intends targeting government, commercial passenger fleets and cargo fleets. "With the electric vehicle there will be a saving on car maintenance, no engine, brake pads, shocks, exhausts, clutch to repair or replace and the braking is done electrically. For fleet owners there will be fewer components to service and no theft of fuel to affect the bottom line."

Optimal is determined to make a difference to the carbon footprint of the automotive industry. "Electric cars only require about 20% of the energy that conventional cars require, which means that the total emissions are much less, even if coal-generated electricity is used. With the global trend of electricity generation becoming more renewable and cleaner, total emissions caused by electric cars will continue to shrink," Meiring tells us.

"The whole world wants to live like Americans but we are borrowing from the future to live our lifestyles now," he adds. "When environmental influences are considered – such as increasing pollution and global warming phenomena caused by the rapid increase in urbanisation – urban transport plays a major role in energy wastage and climate changing pollution. There is no better time to get into the electric car business!"



Amazing new species from Asia and Africa

Amazing scientific investigations have revealed a host of new species that have been living in parts of Asia and Africa and are completely unknown to the scientific community. In one instance, scientists browsing through a mountainous area of northern Mozambique using Google Earth came across an area of inhospitable terrain that apparently had never before been explored.

Scientists were so confident that this was virgin territory that they put together a British-led group of scientists and researchers to venture to the Mount Mabu region where there were 7 000 hectares of forest that had yet to be explored. In just three weeks, scientists found hundreds of new plant species, birds, butterflies, monkeys and even a new species of giant snake.

Samples of the creatures have been taken back to Britain for analysis. Julian Bayliss, a scientist from the Royal Botanic Gardens in Kew discovered Mount Mabu while searching on Google Earth for a possible conservation project. He was looking for areas of land that were above 1 600 metres above sea level where the rainfall levels indicated that there might be a forest.

He found a place that had never before been explored and even detailed satellite maps could not throw any light on the Mount Mabu region. So he put together a team of 28 scientists from Britain, Mozambique, Malawi, Tanzania and Switzerland and headed off to the area.

Within three weeks they'd found a giant new member of the Gaboon viper family of snakes, capable of killing a human with a single bite, a new blue duiker antelope, samango monkeys,

elephant shrews, about 200 different butterflies and thousands of unknown tropical plants.

While these findings are remarkable, they don't come anywhere close to the work that has been done in the Greater Mekong region of Asia where at least 1 068 new species have been discovered and many more are being found by the day.

The Greater Mekong is a region comprising Cambodia, Lao People's Democratic Republic, Myanmar, Thailand, Vietnam and Yunnan Province of the People's Republic of China.

There are a staggering 16 World Wildlife Fund Global 200 ecoregions that are home to an estimated 20 000 species of plant, 1 200 bird species, 800 species of reptiles and amphibians and 430 mammal species including Asian elephants, tigers and populations of the critically endangered Javan rhino.

In addition to the rare Irrawaddy dolphins, the Mekong River basin has an estimated 1 300 species of fish including the Mekong giant catfish, probably the largest freshwater fish in the world. Between 1997 and 2007 researchers identified more than 1 068 new species, equivalent to two new species a week for ten years.

The new discoveries included 519 plants, 279 fish, 88 frogs, 88 spiders, 46 lizards, 22 snakes, 15 mammals, four birds, four turtles, two salamanders and a toad. In terms of the startling discoveries, scientists have identified a spider known as the *Heteropoda maxima* that has a colossal leg-span of 30 centimetres making it the largest hunting spider in the world. An equally savage but smaller *Pseudopoda confusa* was collected by hand in the forests of Luang Nam Tha and Muang Sing districts.

They also found the large and aggressive *Heteropoda dagmarae*, a nocturnal spider that ambushes its prey from shrubs, trees or



bamboo between two and four metres above the ground.

Elsewhere in the forests, researchers came across the shocking pink, spiny new species of dragon millipede known as *Desmoxytes purpurosea*. Scientists suggest that the shocking pink colour is a stark warning to predators that it is highly toxic and they are right as the millipede has glands that produce potent quantities of cyanide as a defensive mechanism. There are 23 species of new millipedes in South East Asia and four different types of the deadly, cyanide-producing millipedes.

The researchers have found 91 new species of amphibians and among the outstanding frogs is the *Leptobrachium xanthospilum*, which bears conspicuous yellow spots on its body while the *Leptocrachium banae*, found in Gia Lia province, looks even more dangerous with red-orange spots on its back and bright red and black bands on the limbs.

In Cambodia, the unique *Rana morafkai* frogs were found. They turn brown at night but during the day their entire body is green. Scientists also found a new species of rhacophorid frog, *Chiromantis samkosensis* from Phnom Samkos in the north-western section of the Cardamom Mountains. This frog has green blood and turquoise bones. Researchers have so far identified just 46 of the species found.

More than 519 plants have been discovered in the Greater Mekong including new trees such as the *Xanthocypris vietnamensis* or the Golden Vietnamese cypress, which is located in karst limestone mountain in Ha Giang Province near the Chinese border. The species is closely related to the North American Nootka cypress.

Other new species found in Tanzania

Italian and Tanzanian scientists working in the threatened rainforests of eastern Tanzania have discovered 17 new species of reptiles and amphibians that include chameleons, tree frogs and snakes in the South Nguru mountain region.

Researcher Michele Menegon from the Natural Science Museum of Trento, Italy, working with the Tanzania Forest Conservation Group and the Frontier Tanzania Forest Research Programme, discovered the the 17 reptile and amphibian species. A total of 92 herpeto-faunal species were identified and only 15 of these were previously known in other areas.

The surveys were conducted in virtually unexplored forests and the new species are believed to be endemic to the region. Among others, the researchers have found a chameleon known as the *Kinyongia fisheri fisheri*, several new toads and frogs, and several snakes. According to Menegon, the results prove there is a high species-richness in these forests, which are biologically important to the world.

She warns that the existing eco-system is already under threat because of fires, logging activities, the collection of wood and the clearing of the forests for cardamom cultivation. Apparently local villagers, working with government representatives, have devised a series of critical interventions that will be put in place to improve conservation of the forests there.

Menegon says that the programme will help to reverse the current trend of forest loss and degradation but she emphasises that the programme will need sustained commitment from the government of Tanzania, the local communities and the development partners.

From left to right: *Amphiesma leucomystax*, Annamite striped rabbit (*Nesolagus timmins*), *Chiromantis samkosensis*, *Cyrtodactylus phongnhakebangensis*, Dragon millipede (*Desmoxytes purpurosea*).



They also found the beautiful flowering plant *Aeschynanthus mendumiae* 850 metres up on the south-eastern slopes of the Phou Yang in Nakai Nam Theun, Khammouan Province along with the blue flowering *Gentiana khammouanensis*. Botanists admit that they still know very little about the plant species of the Greater Mekong.

A team of researchers working at the base of the Himalayas in temperate rain forests found the small jungle bird that looks like a wren and is known as the *Jabouilleia naungmungensis* or the Naung Mung Scimitar-Babbler. It has a long, curved beak and relatively large feet. Another species, as yet unnamed was found in North Vietnam.

Other new species of bird include the black-crowned barwing *Actinodura sodangorum* and the golden-winged laughing thrush *Garrulux ngoclinensis* found in the Central Annamites in Vietnam. The chestnut-eared laughing thrush *Garrulux konkakhensis* was found in Vietnam in 2001.

A total of 22 snakes, including species of pit-vipers have been found throughout the Greater Mekong region and include the Siamese Peninsula pit-viper *Trimeresurus fucatus*, which has a white and red post-ocular streak in some males. Another snake from Thailand, the *Enhydryis chanardi*, is a species of aquatic snake that has venom-injecting fangs located at the back of its mouth and is found in freshwater environments around metropolitan Bangkok.

More than twice as many lizards have been described than snakes and four new gecko species have been recorded in the forests of southern Vietnam while four new turtle species have been found in the Greater Mekong region.

Almost 280 new species of fish have been identified in the

Mekong River basin including the Toothy Blackhand Paradise Fish or *Polynemus bidentatus* found in the Cho Gao Canal of the Mekong River Delta in Vietnam.

In the Tapi basin in Thailand, a unique species of fish with a dark margin over its snout that looks like a moustache and known as the *Ellopostoma mystax* was found along with an abundance of catfish, cyprinids, fighting fish, gobies, loaches, stingrays and other new species which have yet to be identified.

South-east Asia has more than 500 species of mammals and 13 new species of small mammals have been discovered including the Annamite striped rabbit or *Nesolagus timminsi* that is a furry black creature with brown or pinkish stripes that resembling the endangered Sumatran striped rabbit.

They also identified a new woolly bat the *Kerivoula titania*, which is described as having a nymph-like nature and inhabits a range of countries including Cambodia, Lao PDR, Thailand and Vietnam. Fifteen new forest-dependent species have been identified in the area and there are many more exciting mammals to be found there such as the Dark Annamite Muntjac, *Muntiacus truongsongensis*, a type of deer that comes from the Truong Son mountain range.

No living species of this muntjac has been found so far but genetic samples from a dead creature were used to differentiate it from other species of muntjac. Locals call it the samsoi cacoong meaning the deer that lives in the deep, thick forest.

Researchers have also identified a new species of rat known as the *Laonastes aenigmamus* or Laotian rock rat. It is understood that this species is the sole survivor of an ancient group of rodents thought to have disappeared more than 11 million years ago.

From left to right: *Heteropoda dagmarae*, *Lygosoma boehmei*, Gumprechts green pitviper (*Trimeresurus gumprechtii*).



Billions of tons of ice melts

Scientists at the National Aeronautics and Space Administration (NASA) say that more than 2-trillion tons of land ice in Greenland, Antarctica and Alaska have melted since 2003. The calculations are based on figures collected by NASA's GRACE satellite. Worryingly, the rate at which the ice is melting appears to be increasing says NASA geophysicist, Scott Luthcke.

Apparently the land ice in Alaska actually increased last year mainly as a result of larger winter snowfalls, but the increase is minute compared with the 400-billion tons of ice that have been lost in Alaska since 2003.

The figures are a further clear indication of global warming and Luthcke says that between Greenland, Antarctica and Alaska, the melting land ice has raised sea levels by about five millimetres. Indications from parts of the Arctic north of Alaska were that the sea was between nine and ten degrees warmer last year than in previous years.

As the sea ice melts, the Arctic waters absorb more heat in the summer – mainly because they lose so much of the reflective powers provided by sheets of pack-ice – and the heat is released into the air, causing the increase in temperatures.

To complicate matters, melting ice also releases methane gas because as the sea ice warms the water, it also warms the permafrost on land and this produces the methane, which is one of the most potent of the greenhouse gases.

In a separate study, scientists say that large amounts of frozen methane are actually trapped in lake-beds and sea-bottoms around Siberia and as these heat up the methane is bubbling to the surface in what scientists say is alarming amounts.

According to Professor Igor Semiletov of the University of Alaska at Fairbanks, the methane bubbling to the surface from parts of the East Siberian Sea and the Laptev Sea is at levels ten times higher than they were in the mid-1990s. Semiletov says if methane continues to be released at current levels it could dramatically increase global warming.

Golf clubs cause hearing loss – but not from nagging



The range of thin-wall titanium golf drivers can cause a permanent hearing loss in users, but this is not caused by other golfers in your four-ball slapping you on the ear for constantly bashing your drive 450 metres straight down the middle of the fairway. Doctors report that the hearing loss is a direct result of the 'sonic boom' that occurs seconds after the titanium face smashes into the golf ball.

According to Dr Malcolm Buchanan, an ear, nose and throat specialist who has written a report on hearing loss in a 55-year-old golfer, tests conducted on the golf drivers indicate that they produce enough sound to induce temporary or permanent cochlear damage in susceptible individuals.



As an average golfer myself, I would be more tempted to believe that the hearing loss comes from your playing partners who constantly whinge about how well you hit the ball with a driver that takes full advantage of legitimate trampoline effects.

However, Buchanan says that the 55-year-old who suffered permanent hearing loss used a club that sounded like a 'gun going off' when he hit the ball. Buchanan says there is no other explanation for the hearing loss.

According to European Tour player, Andrew Coltart, who recently tested a number of clubs, there was a difference in sound levels of the thin-faced titanium drivers but he emphasised that he would "be amazed" if any one of them jeopardised a golfer's hearing.

I think a more likely explanation for what sounded like a 'gun-shot' each time the ball was struck was exactly that and came from pistols carried by gung-ho playing partners who were taking pot-shots at the ball in mid-flight to stop it from hitting the fairway at full tilt.

Most of them probably missed, which is why the golf ball kept coming to rest 440-zillion yards down the middle of the fairway. I reckon what we now need to do is test the eye-sight of the other golfers in the four ball and check their fingers for gun-powder residue while we're about it.

South African satellite can sumbandila



South Africa's Sumbandila (which means lead the way in Venda) satellite is due to be launched as part of a payload being carried into space by a Soyuz launch vehicle from Russia's Baikonur Cosmodrome in Kazakhstan on 25 March. The primary payload will be Russia's Meteor M weather satellite.

Originally the Sumbandila satellite was due to be launched in 2007 from a Russian Navy submarine using a converted Shtil submarine-launched ballistic missile, but for some reason this arrangement collapsed and the reasons for the launch delay were never divulged.

The Sumbandila satellite was designed, developed and assembled by Sun Space, a specialist micro-satellite technology company that was originally part of the University of Stellenbosch but has since become a private company. Before Sun Space was separated from the university it was responsible for the design, assembly and operation of SunSat, which was launched in 1999 and was South Africa's first satellite in orbit.

SunSat has a mass of just 64 kilograms and carries a small multi-spectral imager that operates in three bands of red, blue and green with a resolution of 15 metres (one pixel is equivalent to an area of 15 m x 15 m on the ground) at an altitude of 600 kilometres.

Sumbandila is a similar satellite that will operate in low Earth orbit and carry a 6,5 m multispectral imager with a resolution of 6,5 m x 6,5 m at an altitude of 500 km.

Broken Big Bang machine to restart in July

The broken Big Bang machine – less commonly referred to as the Large Hadron Collider (LHC) – is only going to restart in June this year because 53 of the magnets used to accelerate sub-atomic particles to almost the speed of light have to be cleaned and repaired. The first experiments are only likely to take place in July or August this year.

Just after it started up in September last year, a faulty electrical connection caused super-cold helium in the Big Bang machine to leak, damaging the magnets.

It will cost £30-million to repair the machine and then cool the helium down to 1,8 degrees above absolute zero.

Apparently the engineers responsible for building the £4-billion atom-smasher have designed what they claim is a fail-safe protection system to ensure that a similar accident cannot happen again. Electronic monitors will be used to provide early warnings of hazards and the magnet network – which runs around the 27 kilometre

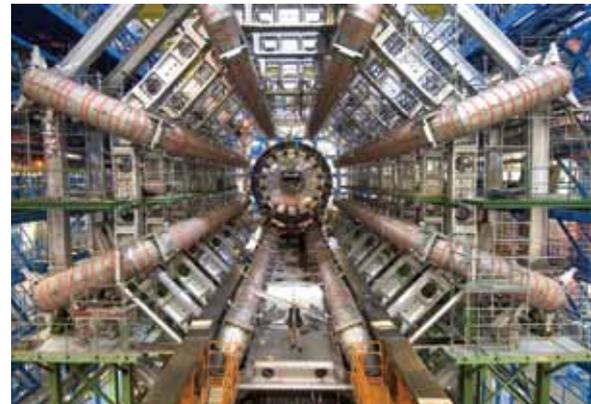
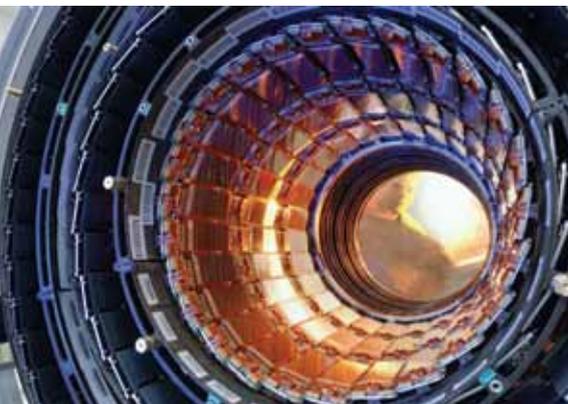
underground tunnel – has been fitted with press-release valves to confine the damage if there is a leak.

The LHC is built underground across the borders of France and Switzerland and is operated by CERN. It is designed to simulate the Big Bang that is believed to have started across the universe some 15-billion years ago.

For the simulation, the sub-atomic particles travelling at almost the speed of light will deliberately be smashed into each other, creating energies that have never been seen before.

More than 7 000 computers around the world will monitor the explosions as they happen and scientists hope that the experiment will help them to find answers to questions such as what causes mass and whether hidden dimension can be created.

Some scientists hope that mini-black holes will be created by the experiment, but they are quick to warn that such black holes will pose no threat to humanity or to the Big Bang machine.



Images: NASA

Laser may create miniature stars on demand

While scientists around the world are preparing for the Big Bang experiment due to take place in the Large Hadron Collider in July or August this year, another team of scientists has created the world's most powerful laser which will be used to simulate conditions found at the centre of planets, including Earth.

The National Ignition Facility at Livermore, California, built at a cost of \$1,8-billion and the size of about three football fields, will focus the world's most powerful laser on a spot that is little bigger than a pinhead and, for the briefest of moments, hope to recreate conditions found at the centre of planets and stars.

The ultimate goal of the Livermore facility is to trigger nuclear fusion, the reaction that drives the sun, as the first step towards creating fusion power stations. If successful, fusion could provide Earth with limitless amounts of clean energy.

The laser itself will focus a pulse of intense light, equivalent to about 1 000 times the total amount of electricity produced in North America or more than 10-billion times that of the ordinary lightbulb, for one billionth of a second on a target about the size of a pinhead. Using the laser beam, scientists will be able to compress material to pressures that are more than 25-million times those found at sea level.

The National Ignition Facility uses a 500-trillion Watt laser beam that travels through 1,6 kilometres of lenses, mirrors and amplifiers. It is then split into 192 beams, which are focused on the centre of a ten metre wide reaction chamber coated with aluminium and concrete.

Inside the chamber a sample of fluids mimics the composition of a particular planet. This fluid is held inside a gold capsule that generates high-energy X-rays when hit by the laser beam. These compress the target creating pressures equivalent to those found at the centre of planets and stars.

According to scientists, it is at these phenomenal pressures that all sorts of interesting things start to happen. For instance, at standard atmospheric pressure on Earth, hydrogen and oxygen can combine into a gas as steam, a liquid as water or a solid as ice. At more extreme pressures the molecular bonds between hydrogen and oxygen can break and reform in unexpected ways that resemble none of these states.

Bruce Remington, a physicist at the Lawrence Livermore National Laboratory says that scientists do not know if planets and stars have solid cores, liquid cores or something else entirely, at their centre. He says that at the high densities and huge pressure that will be created at the National Ignition Facility, matter starts to behave in strange ways.

The scientists at Livermore believe that they have the necessary techniques to achieve these ultra-high densities and say that by altering the component fluids they will be able to simulate the centre of almost any planet.

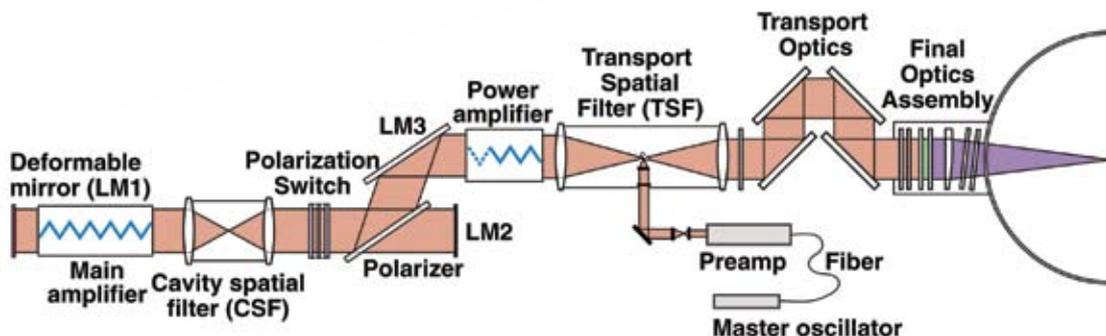
They say that the experiments they plan to conduct will allow them to determine what makes up the Earth's core. Seismic data suggests that the earth has a solid iron core that generates the electromagnetic field and scientists say that while the melting point of iron is just 1 535 degrees Centigrade, the extreme pressure at the centre of the Earth could keep this core solid.

Scientists say that a lot of other questions might be answered by simulating high densities and huge pressure. For instance, scientists have been baffled as to why Jupiter, which is essentially a huge ball of gas, has a magnetic field that is ten times greater than that of Earth even though it is only a quarter as dense. Scientists suspect that Jupiter may contain some kind of liquid hydrogen metal that is magnetic.

The National Ignition Facility will be completed by April this year and then scientists will start the huge task of focusing the laser beams on the target. They are hoping to produce a controlled thermo-nuclear fusion reaction at the facility before the end of the year.

It will generate temperatures of more than 100-million degrees and pressures of more than 100-billion atmospheres which, scientists believe, will be sufficient to produce miniature stars on demand.

Star formation usually occurs in relatively cold clouds of gas such as those in the Eagle Nebula where intense ultraviolet radiation from younger stars triggers the coagulation of the interstellar gas until the clouds collapse under their own weight to form young stars. Researchers are hoping to mimic the stellar life cycle and even recreate the conditions that cause stars to die in violent supernovae.



Simplified diagram of the beam path of a NIF laser beam, one of 48 similar beamlines. On the left are the amplifiers and optical switch, and on the right is the final spatial filter, switchyard and optical frequency converter.

Fish dung is keeping our seas healthy

The digestive systems of fish are actually responsible for keeping the ocean waters fertile and healthy, and for moderating against climate change. This is according to researchers from the University of British Columbia.

Computer models compiled during the research programme show that bony fish produce a large portion of the inorganic carbon that helps to maintain the oceans' acidity balance that is so vital to marine life.

The bony fish population in the oceans is estimated at between 812-million and two billion tons, and lead researcher, Villy Christensen, says that this is the first study that has estimated the huge impact that fish have on the carbon cycle.

Calcium carbonate is a white, chalky substance that helps to control the acidity of the sea water and is essential for the health of the many marine ecosystems and coral reefs. It helps to regulate the amount of carbon dioxide the oceans are able to absorb from the atmosphere.

Until now, scientists believed that the calcium carbonate came from microscopic marine plankton but Christensen says that their research

has shown that between three percent and 15 percent of the calcium carbonate comes from the digestive systems of bony fish.

Bony fish – which exclude sharks and rays – comprise about 90 percent of the species in the ocean and they produce calcium carbonate that forms crystals in the gut and is excreted as a chalky solid.

Christensen believes that because of the impact of global climate change, fish will have an even more important role in cleaning up the oceans in the future.

There are reports that climate change has already caused parts of the ocean to be dead zones where aquatic life is non-existent and even the vegetation has ceased to exist.



Skuas more of a pain than Canadian geese

The engines that were both lost to the Boeing 737 passenger aircraft shortly after take-off were apparently damaged by a flock of Canadian geese that flew into the path of the plane as it was climbing to its cruising altitude. Thanks to spectacular flying by the pilot 'Sully' Sullenberger, none of the 150 passengers or five crew was injured.

Pilots in the Antarctica, however, face a different hazard because the world's most southerly bird, the aggressive Skua, loves sitting on the warm, snow-free airstrips that are regularly swept before a plane lands or takes off from the British Rothera research station on the Antarctic Peninsula.

The Skuas are protected under the 47-nation Antarctic Treaty which has declared the entire frozen continent a nature reserve. As a result, residents at the research station have been forced to try and scare away the Skuas using large bangs.

Then, a runway worker drives a six-wheeled snow vehicle up and down the runway swerving towards any of the Skuas that are refusing

to make way for a plane wanting to land or take off. About 15 minutes before landing or taking off, the vehicle is used again and passengers blow whistles and clang bells in an effort to stop the Skuas from settling down on the warm ice again.

Researchers at the Australian Antarctic base are plagued with similar problems from these troublesome birds. The researchers try to entice the Skuas off the runway by offering them tasty morsels of food.

According to British pilot, Steve King, the kuas are troublesome and hazardous to the planes because they appear not to be in the least afraid when a plane comes in to land or tries to take off. He says the Skuas are attracted by the dark gravel surface of the runway that is warmer than snow.

Antarctic airstrips can get a license to kill birds in extreme cases but most researchers and pilots are reluctant to do so. The skua is a marauder that often eats other birds' eggs or steals their food in a behaviour that scientists call klepto-parasitism.



Huge tear in the magnetosphere

A fleet of five small NASA satellites known as Themis have shown there is a large breach in the magnetic field that protects the Earth from the sun's violent coronal mass ejections or solar winds. The breach can severely disrupt satellite and ground communications, lead to mass electricity blackouts, interfere with pilot navigation systems and interrupt mobile phone services.

Observations from the Themis fleet show that the Earth's magnetic field occasionally develops two cracks that allow the solar winds – a streams of charged particles flying through space at speeds of about 1,6-million kilometres an hour – to penetrate the Earth's upper atmosphere.

Last year, observations from Themis showed that there was a tear about 6 400 kilometres thick in the outermost parts of the Earth's magnetosphere – the largest tear in the protective shield found so far.

To complicate matters, the data from Themis proved that twenty times more solar winds passed into the Earth's protective shield when the magnetic fields were aligned than when they were pointed in opposite directions.

Scientists are hoping to be able to predict the severity of solar storms to warn people of the likely effects on national power grids, airline and military communications, telecommunications services and satellite signals.

Could Enceladus actually support life?

Scientists at NASA have discovered that Saturn's Enceladus moon has a spreading Earth-like crust which may indicate that there is a vast body of liquid water under the surface. High resolution images from the Cassini spacecraft show how the icy surface of Enceladus has changed over time.

The moon has distinctive cracks that are similar to mid-ocean ridges in the tectonic system on Earth where the spreading sea floor is created by molten rocks. NASA scientists now speculate that the liquid beneath Enceladus' South Pole is actually water.

Interestingly, says Paul Helfenstein of Cornell University, the spreading of the icy crust is in a single direction as though it were moving along a conveyor belt. He says that there is no certainty as to what is controlling the icy spread but says there

are patterns of divergence and mountain-building that are similar to what has been seen on earth, indicating that both sub-surface heat and convection are involved.

Scientists say that if the liquid is indeed water then Enceladus – Saturn's sixth-largest moon – may have the conditions that are suitable for sustaining life. The Cassini space craft has been orbiting Saturn and studying its rings and moon since 2004 and has provided extensive high resolution images for scientific study since it first went into orbit.

Meanwhile, data collected during flybys of Titan point to the likelihood that active cryo-volcanoes are spewing super-chilled liquid water, ammonia and methane into the atmosphere. According to Rosaly Lopes, another scientist working on the Cassini project, the cryo-volcanoes are some of the most intriguing features of the solar system.

It seems that the surface of Titan is extremely active because different flybys show evidence of changes on the surface of the moon. This data indicates that there is certainly some kind of volcanism on the surface. There is also evidence that ammonia frost is present at one of the sites being studied. Moreover, Titan seems to have an almost continuous supply of methane, which is believed to emanate from beneath the surface of the moon.

Dirty keyboard? Stick it in the dishwasher

An American healthcare company Seal Shield has built a new computer keyboard, a mouse and a range of remote control devices that are completely dishwasher proof and can be submerged in water to allow them to be properly washed and cleaned.

It developed the devices after research showed that keyboards are five times dirtier than the average toilet seat and, if people eat around their keyboards, the keyboard itself may contain up to 150 times the acceptable level of bacteria.

Apparently a keyboard represents a high infection risk in hospitals because it is particularly hard to remove any accumulated bacteria from the gaps between the keys. Experts have even warned that in the workplace, hygiene is sometimes so poor that people actually suffer from qwerty tummy and need to take a couple of days of work to recover.

According to University of London Microbiologist, Dr Peter Wilson, if someone has a cold in the office or even something more severe such as gastroenteritis, the most likely place to pick up the germs is from a keyboard for a computer.

The National Health Service in Britain spends about £1,6-billion a year on combating superbug infections in hospitals and clinics and is currently spending at least £1-million on buying infection resistant, flat keyboards that are easier to clean than the conventional ones.

The remote control devices – used mainly for television sets, set-top-boxes and sound systems – are apparently even more filthy than keyboards. Germs that cause a common cold or flu can live for up to

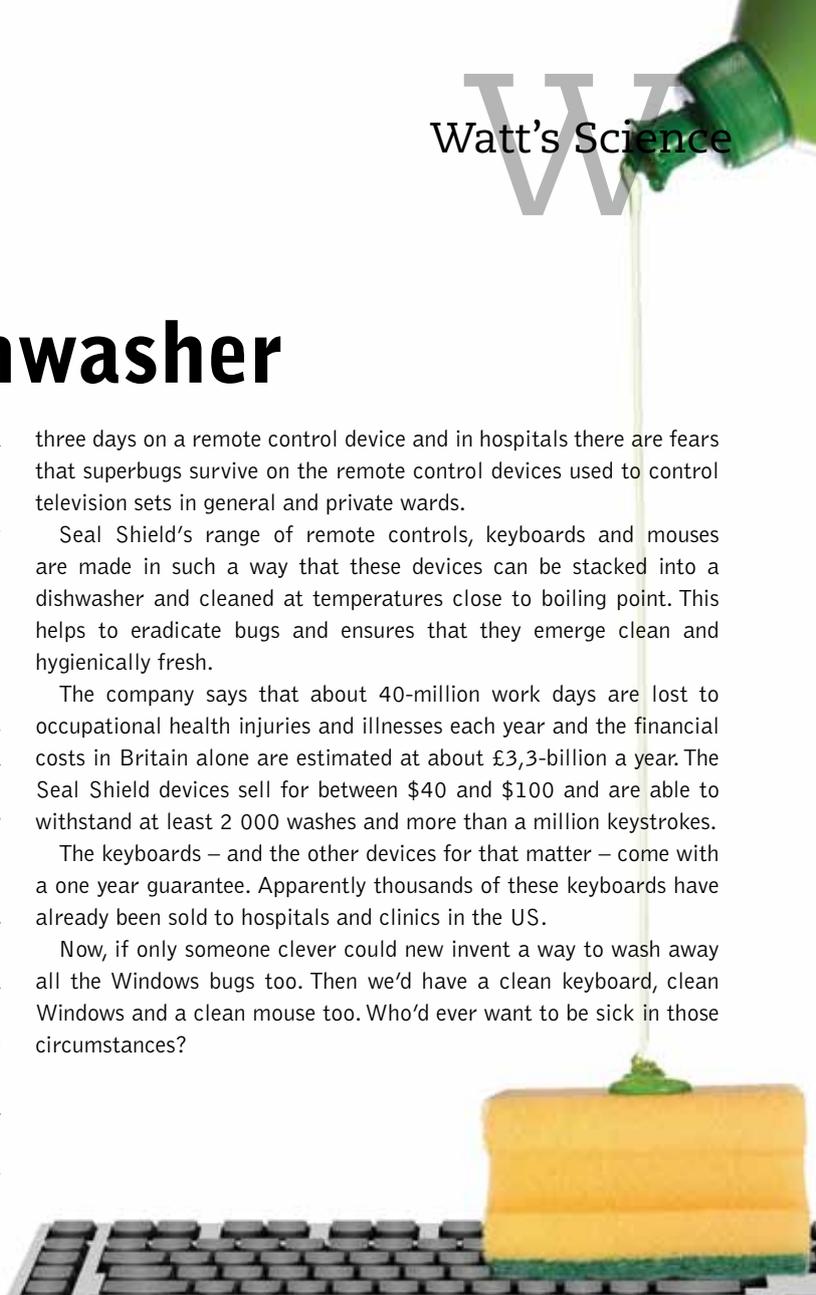
three days on a remote control device and in hospitals there are fears that superbugs survive on the remote control devices used to control television sets in general and private wards.

Seal Shield's range of remote controls, keyboards and mice are made in such a way that these devices can be stacked into a dishwasher and cleaned at temperatures close to boiling point. This helps to eradicate bugs and ensures that they emerge clean and hygienically fresh.

The company says that about 40-million work days are lost to occupational health injuries and illnesses each year and the financial costs in Britain alone are estimated at about £3,3-billion a year. The Seal Shield devices sell for between \$40 and \$100 and are able to withstand at least 2 000 washes and more than a million keystrokes.

The keyboards – and the other devices for that matter – come with a one year guarantee. Apparently thousands of these keyboards have already been sold to hospitals and clinics in the US.

Now, if only someone clever could new invent a way to wash away all the Windows bugs too. Then we'd have a clean keyboard, clean Windows and a clean mouse too. Who'd ever want to be sick in those circumstances?



Strongly brewed coffee might make you see things

People who drink just three cups of brewed coffee a day can triple their chances of suffering from hallucinations according to researchers working at Durham University. They say that the high caffeine intake increases the risk of hallucinating.

They warn that even moderate amounts of the caffeine stimulant can lead people to hear non-existent voices and see things that are just not there. Previous studies have shown that too much caffeine can lead to heart palpitations, insomnia and can even limit a woman's chances of falling pregnant.

According to lead investigator, Simon Jones, people who drink a lot of coffee or have a high caffeine intake are not more likely to suffer from a persecution complex as previous studies had suggested. Researchers looked at the caffeine intake of 200 students, some of whom had experienced



seeing things that were not there, hearing voices and evening sensing the presence of dead people.

The volunteers were questioned about their caffeine intake from coffee, tea, energy drinks, chocolate bars and even caffeine tablets. High caffeine users were those who had the equivalent of seven cups of instant coffee a day and the researchers confirmed that they were three times more likely to suffer hallucinations than those people who had less than the equivalent of one cup of coffee.

The researchers believe that caffeine heightens the effect that stress has on the body and this is what actually triggers the hallucinations. They are planning to carry out other studies on foodstuffs such as sugar or fizzy drinks to see if these can trigger similar episodes.

I wonder whether Jacob Zuma drinks a lot of coffee?

A Deeside a day keeps the wrinkles at bay

A bottle of mineral water costing just 80p (R11,85) can significantly slow down the signs of ageing and even reduce wrinkles according to scientists at Leeds University who carried out a range of tests on women aged between 18 and 52 over a three month period.

The researchers asked the women to drink a litre of Deeside a day and others to drink normal tap water. The women who drank the Scottish water, which is apparently bottled near the Queen's Balmoral home, were 25 percent more likely to report fewer wrinkles and better skin tones.

Dr Richard Bojar, who led the study, says that measurement clearly indicated that the skin was better hydrated when the subjects were drinking the Deeside mineral water than ordinary tap water. The skin's appearance was more radiant in its tone, creating a younger appearance.

In a separate study carried out at the Queen Margaret University in Edinburgh, scientists found that the minerals in Deeside water fight free radicals, which are believed to actively age cells. Dr Mary

Warnock who was part of this study says that free radicals are harmful and contribute directly to the ageing process in cells so by reducing the free radicals it is possible to provide some protection for the cells themselves.

Apparently people in Scotland have known about the curative powers of Deeside water and have been drinking it for centuries.



Five litres of green sludge per 100 km?

Green algae – that's invariably slimy, slippery and smelly – could be used as an essential feedstock to make biofuels rather than using crops such as corn, rape and soya. Dr Richard Pike, chief executive of the Royal Society of Chemistry, says that algae will not compete with arable land and require no nutrients to grow.

Algae uses sunlight and carbon dioxide to produce lipids which can, after processing, be used as biodiesel. Algae also grows remarkably quickly and provides exceptionally high yields compared with conventional food crops. For instance, 50 000 litres of biodiesel could be produced from an acre of algae-covered water compared with 218 litres from soya and 545 litres from rape.

Pike says that to produce biodiesel from crops is wasteful and expensive because it not only uses up arable land but requires fertilising, harvesting and transportation before it can be processed. He says that in the long run producing biodiesel from food crops is unsustainable in the UK because one percent of the available land will have to be used to replace one percent of diesel used.

There are apparently two different techniques for growing algae: the first fishing is a low-technology, low cost option where wild strains of algae are cultivated in open ponds. Farming is more sophisticated with algae grown in photo-bioreactors or translucent plastic or glass tanks.

Whichever method is used it still results in vast amounts of green sludge that is dried and then squeezed to extract the oil. Other methods use chemical solvents and researchers at the University of Texas have apparently developed a way of using ultrasonic waves to rupture the cell walls, allowing the oil to rise to the top of the container so it can be skimmed off.

The technique is apparently still being tested before it can be applied in a commercial operation. However, costs have dropped dramatically over the years and researchers point out that to make algae biodiesel 25 years ago was costing about \$3 000 a gallon compared with less than \$20 today. To make algae biodiesel competitive it would need to be priced – in the United States anyway – at about two dollars a gallon, well below the current production costs.

American scientist Craig Venter, working with his team of researchers at Synthetic Genomics in California, has developed bacteria that require just sunlight and water to grow and then secrete oil as a by-product of the metabolic process.

He believes that if he could raise the funding for a pilot plant he would be able to produce bacterial oil that could be pumped straight into an existing refinery and processed in the normal fashion. Some scientists optimistically believe that fuel from algae will be available by the middle of next year while others say that it will take at least four more years to become commercially viable.

But, it seems, it certainly can be done.

Wind farm, wind resources map coming for South Africa

Eskom is planning to build a wind farm with 50 wind turbines, generating two megawatts of power each, before the end of this year. This it hopes will boost electricity supplies to the country.

Work has already started on developing a comprehensive wind resources map of the South African coastline. It will take about four years to complete and will plot wind speeds and frequencies along the entire 3 000 kilometre coastline.

The project will be undertaken by the University of Cape Town, the Royal Danish National Wind Resource Institute, the South African National Energy Research Institute and the Department of Minerals and Energy.

The first wind farm will be built at Koekenaap in the Western Cape.

In a separate announcement, Eskom has confirmed that it has shelved all plans to build another nuclear power station because of the enormous costs involved. Eskom is planning to spend about R343-billion to overcome the chronic electricity shortage that is facing South Africa and this amount does not include the investment in a nuclear plant that will cost more than R100-billion to erect.

Apart from the high cost of the nuclear plants, Eskom has said that it is looking at increasing its investment in renewable energy and is counting on independent power producer projects to help it bridge the gap in supplying electricity to the country.

According to Portia Molefe, director general of the Department of Public Enterprises, the South African government remains committed to the principle of nuclear energy but she says that the country now needs to reduce its carbon footprint and diversify the existing energy mix.



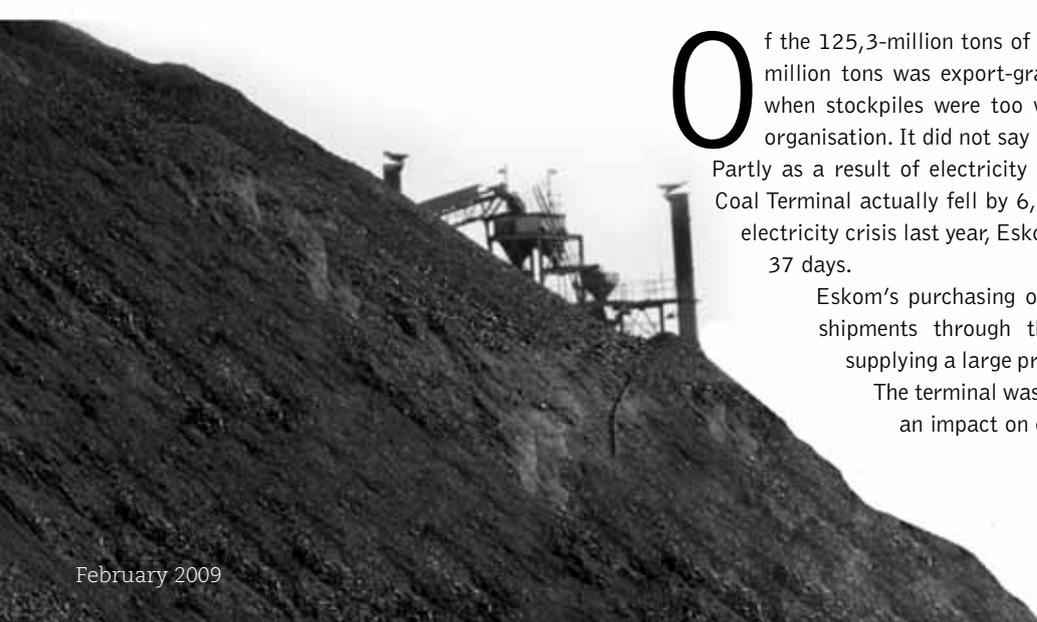
Coal exports drop but Eskom keeps burning all the coal it needs

Of the 125,3-million tons of coal burned last year by Eskom, just over two million tons was export-grade coal that was used to alleviate problems when stockpiles were too wet to burn, according a statement from the organisation. It did not say how much the export-grade coal had cost.

Partly as a result of electricity supply problems, exports from Richard's Bay Coal Terminal actually fell by 6,6 percent to almost 62-million tons. Since the electricity crisis last year, Eskom has increased its stockpiles of coal to about 37 days.

Eskom's purchasing of export-grade coal apparently did not affect shipments through the coal terminal, which is responsible for supplying a large proportion of the fuel for European power plants.

The terminal was affected by erratic rail deliveries that did have an impact on exports.



Severe food shortages by 2100 because of global warming

Widespread food shortages, affecting about 50 percent of the world's population are

likely to occur as a direct result of global warming according to Rosamond Naylor, director of Food Security and the Environment at California's Stanford University.

Working with David Battisti, a professor of atmospheric sciences at the University of Washington, the two scientists say that the worst effects of global warming will be in the regions where the poorest people in the world are currently living.

In temperate regions, the hottest seasons on record represent the future 'normal' climate in many locations. They have found, for instance, that there is a 90 percent probability that by 2100, growing-season low temperatures in the tropics and sub-tropics will be higher than the highest current temperatures.

That means that temperatures in parts of Limpopo and Mpumalanga could regularly top 45 degrees. Naylor says that all indications are that the worst of what the world has seen in the past few years will

become the norm and the conditions will be much worse in the future if global warming continues unchecked.

High temperatures hurt key crops such as maize and fruit and shorten crop ripening by between 10 and 20 days. Worse still, livestock becomes stressed by the high temperatures and because the soil tends to be drier, more water has to be used to get vegetables and fruits to grow or to keep cattle and sheep cool.

Apparently as a result of global warming, the researchers say, there was a record drop of 36 percent in maize yields in France in just one year, while fodder production dropped by 30 percent, fruit harvests fell by 25 percent and wheat yields were down by 21 percent.

The researchers have urged scientists to turn their efforts to developing crop varieties that will be able to withstand higher heat because more than 3-billion people living in tropical and sub-tropical regions will be directly affected by the higher prevailing heat that will probably destroy most of the current farm produce.

Naylor warns that while there will be stresses on food production and livestock resources, the added complication is that water supplies too will be stressed by the higher temperatures.

Green gadgets on show in Las Vegas



Green products have taken a relatively prominent place at this year's Consumer Electronic Show that's held in Las Vegas at the beginning of the year. The show itself was relatively subdued compared with previous shows where literally thousands of new products are launched.

On display at this year's 'green' section were new eco-buttons that will reduce a computer's power consumption, e-lanterns that will provide about an hour of light once they've been wound up, which takes less than a minute, and luminous television screens that use a fraction of the power of more traditional ones.

Many of the manufacturers are now calling for the establishment of a universal global standard that can be used to certify products as 'green' or environmentally-friendly. However, Jeff Omelchuck, a director of the Green Electronics Council which is responsible for compiling the Electronic Product Environmental Assessment Tool certification system for computers, says that such a global standard is not currently required.

He says that the current assessment tool is sufficient for manufacturers to measure their products against an established set of criteria and this will provide a projection of the environmental impact that these products will have.

Omelchuck concedes that while electronics products are much more

environmentally-friendly today than they were five years ago, there are problems with disposing of the enormous amounts of waste material that are generated by defunct electronic gadgets.

Environmental activists and analysts say that it's all very well to manufacture products that are more environmentally-friendly but the benefits of these products can quickly be offset by, for instance, the use of highly toxic batteries which are difficult to dispose.

Activists from Greenpeace conducted tests on 50 products at the Consumer Electronics Show and found that the most environmentally-friendly products in each category included:

- Lenovo Group's L2440x wide computer monitor;
- Sharp's LC-52GX5 television;
- Samsung Electronics new F268 mobile phone;
- Nokia's 6210 smartphone;
- Toshiba's Portege R600 laptop computer.

Samsung Electronics' new flat-screen television was also on show and it apparently uses 40 percent less energy than other television sets because of the light-emitting diode technology it has developed.

Meanwhile, LG Electronics has developed a Bluetooth solar car kit that is made using recycled plastic material and Toshiba showed off its ion battery that is used to power Schwinn's electronic bike and gives up to seven kilometres on a single charge.

High hopes for cellulosic fuel

Major United States ethanol producer Poet has opened an \$8-million pilot plant as part of its plan to produce an alternative low-carbon motor fuel using mealie cobs and other crop residue as a feedstock. It will produce almost 80 000 litres of this fuel a year from the plant as a precursor to establishing a \$200-million cellulosic plant.

Apparently there has been considerable interest in cellulosic fuel that emits less greenhouse gas than petrol or conventional ethanol. The cellulosic fuel can use fast-growing plants such as grasses or trees and even crop waste to produce the fuel.

In terms of a recent mandate in the United States, fuel producers will have to blend 60-billion of litres of cellulosic fuel and 56-billion litres of ethanol with petrol by 2022. The cellulosic fuel currently costs 20 cents more per litre to produce than ethanol.

However, Poet chief executive Jeff Broin says that economies of scale could reduce costs even further and could make cellulosic fuel cheaper than ethanol in the long run. Broin says that the company is hoping to make cellulosic fuel at all 26 of its existing starch ethanol plants around the US.

The Energy Information Administration, the government's top forecasting agency, says that there is too much uncertainty in the alternative fuels sector to see really significant investment and this implies that the country will fall short of its stated mandate unless really large amounts of cash are injected into new technologies such as ethanol and cellulosic fuels.

There is an existing federal mandate to blend, by 2010, 378-million litres of cellulosic fuel into the existing petrol blends made in the US.

SA enriches uranium for its PBMR project

South Africa has manufactured its first uranium dioxide-coated particles that will be used as fuel for the Pebble Bed Modular Reactor that's being built on a site adjacent to the Koeberg nuclear power station. The locally manufactured particles have been sent to a laboratory in the United States for irradiation testing.

PBMR's chief executive, Jaco Kriek, says that extensive development work has been done on manufacturing the coated particles and the testing phase is aimed at proving beyond doubt that the PBMR will perform to is predicted best-in-the-world safety standards in the process heat and electricity markets.

The PBMR is a high temperature, gas-cooled reactor with a closed-cycle gas turbine power conversion system. The coated fuel particles used in the reactor contain 9,6 percent enriched uranium.

The tests are being conducted at the Idaho National Laboratory. The fuel design consists of low-enriched uranium, triple coated isotropic particles contained on a moulded graphite sphere. The coated particle

consists of a kernel of enriched uranium dioxide surrounded by four coating layers.

About 15 000 of these coated particles – each one about one millimetre in diameter – are mixed with graphite powder and phenolic resin and then pressed into a sphere or ball. A further five millimetres of pure carbon is added to the non-fuel zone before the resulting spheres are sintered and annealed, a process that makes them hard and durable.

According to Kriek the PBMR is viewed as a small, inherently safe modular reactor which, he claims, is one of the best carbon-free alternatives for power generation and processing heat capacity in the world. He says that the heat a reactor generates can be used for various industrial process applications and its waste heat can be used to produce water via desalination.



Crude oil for Uganda and the Seychelles?

Heritage Oil has struck black gold in the Lake Albert Rift Basin in Uganda where it has unearthed oil deposits of at least 400-million barrels in two prospecting areas known as Giraffe 1 and Buffalo. The oil discoveries, in block one in western Uganda may extend further to the north and east and could even reach the Buffalo East prospect area.

Heritage says that it will continue drilling work in block one later this year and according to the company finance director, Paul Atherton, it could take between two and three years to unlock the full potential of the basin and its oil deposits.

In a separate development, the Seychelles has put out to tender a further 70 000 square kilometres of its ocean floor for oil exploration work. Two private firms, Houston-based PetroQuest International and Dubai-based East African Exploration (EAX) have already signed exploration agreements with the state-owned Seychelles Petroleum Company.

EAX believes that there are billions of barrels of oil locked beneath the ocean floor and its optimism is apparently based on the drilling work that has been done on a block of 38 000 square kilometres where seismic data suggests there are large reserves of oil and natural gas.

EAX has projects underway in Tanzania, Madagascar and Kenya and the Seychelles Petroleum Company recently purchased a ten percent stake in Black Marlin Energy, which owns EAX. The petroleum company is confident that the 70 000 square kilometre block being put out to tender now will provide it with further significant offshore oil fields.

Seychelles has long been regarded by the world community as a small, relatively stable and prosperous country that relies mainly on tourism for its income but that may all change if significant reserves of oil exist in the peaceful, tropical waters of the Indian Ocean.

No offices but Sanedi has its CEO

South Africa's new National Energy Development Institute (Sanedi) will be established early in the new financial year even though there is no clarity on how the entity will be funded or where it will be located. A chief executive, Kadri Nassiep, has however been appointed.

According to Tshilidzi Ramuedzisi, chief director of energy planning with the Department of Minerals and Energy, the establishment of Sanedi is still in the initial planning stages and discussions regarding to the business plan, funding and formal structure are due to start immediately.

Exactly why it has already appointed a chief executive is anybody's guess but, be that as it may, Sanedi has apparently been mandated to develop renewable energy resources, create energy efficiency programmes, be responsible for energy research, examine sustainable

ways to ensure security of the electricity supply and play a co-ordinating role in the development of energy infrastructure.

The entity was established as part of the National Energy Act that was gazetted in November last year.

Apparently Sanedi, with an infrastructure or even its own offices, has been looking at environmentally-friendly transport options for the 2010 World Cup of Soccer that included energy efficient propulsion systems and the development of infrastructure within cities to ensure the rapid, unimpeded movement of traffic around the cities.

It is apparently talking to the Development Bank of Southern Africa to provide a means to raise funds for solar water heaters and is said to be working on plans to create a more energy efficient RDP housing package that can be plumbed and wired in a factory environment and constructed on site in a modular fashion using pre-manufactured components.

Cape engineers visit Cape Town's Foreshore substation

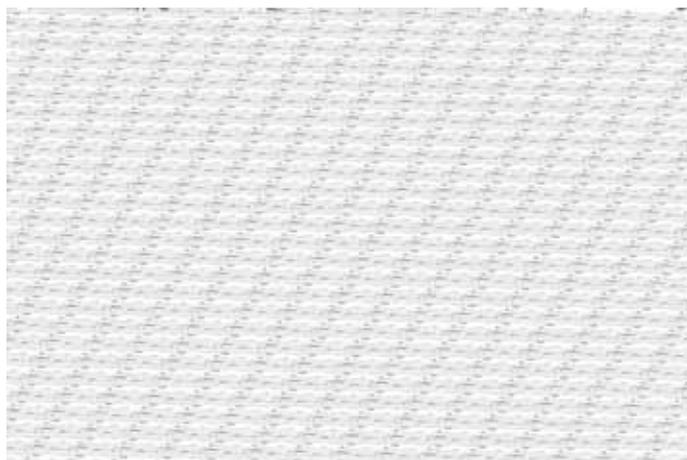
The City of Cape Town's Electricity Services Directorate hosted a tour for the Western Cape region of the SA Institute of Electrical Engineers (SAIEE) at the city's Foreshore gas-insulated switchgear (GIS) switching substation, which has been established to provide additional power to the rapidly expanding central business district, as well as the Green Point soccer stadium.

The 132 kV Foreshore substation, for which Alstom Power Systems, in conjunction with its technology principals, Areva T&D Switzerland, supplied and installed the state-of-the-art F35 three-phase SF6 switchgear, augments power supplied by the existing 33 kV Roggebaai and 132 kV Woodstock indoor switching stations.

The municipality elected to go for a GIS solution for the new substation as GIS switchgear is substantially more reliable than outdoor air-insulated switchgear in environments exposed to salt-laden sea air and industrial pollutants.

Optimal utilisation of scarce land is also at a premium in the congested central business district and the entire new 23-bay substation is contained within a 35 m long building. An equivalent capacity outdoor substation would apparently exceed the size of a soccer pitch.

The tour on was attended by 30 members of the SAIEE's Western Cape region. Conducted by Edgar Capes, manager: transmission system development, and some of his senior colleagues in the Electricity Services Directorate, the tour was carried out to inform the local electrical engineering fraternity about the steps the city has taken to provide the additional power supply required in the central business district.



Edgar Capes (left), Manager: Transmission System Development of the City of Cape Town's Electricity Services Directorate, discusses features of the Foreshore substation's GIS switchgear during the SAIEE's Western Cape region's visit with (from left): David Gray, leader of the SAIEE group, Marius van der Westhuizen, the Electricity Services Directorate's Manager: Infrastructure Management, and Leon Ginsberg, owner of Eltest Services, the commissioning engineer responsible for commissioning the new substation.

Key elements of the latest GIS technology incorporated in the Areva F35 switchgear are explained to some of the visiting engineers by Mike de Swardt (facing camera) of M-Sq Management cc, an SAIEE member and former Manager: HV Substations of Cape Town's Electricity Services Directorate.

It also set out to share technical knowledge with the electrical engineers and explain some of the cutting edge technologies that have been incorporated into the new installation. In addition to the GIS switchgear, there is a sophisticated substation control system, comprising an integrated protection, control and telecommunications scheme.

At the conclusion of the tour David Gray, the leader of the SAIEE group, said he and his colleagues were grateful to be afforded the opportunity of viewing the installation, which they found very impressive and interesting. "GIS technology has made great strides since we last had the opportunity of seeing it first hand at one of the storage schemes in the Western Cape several years ago," he commented.

"It was exciting to be exposed to the latest world-class technology in this field and fascinating to see the practical application of really heavy current electrical engineering, plus the SCADA system and electronics required to keep the whole thing safe," he added.

Alstom Power Systems is part of the South African black empowered group Alstom Electrical Industries (Pty) Ltd (Alstom South Africa). The company employs more than 6 000 people and has an annual order book of about R5bn. It has 27 operating units, 22 production facilities and 25 distribution centres throughout South Africa.

Alstom South Africa co-operates with Alstom France as a preferred partner for environmental equipment and in serving the maintenance, upgrade and retrofit market for larger boilers, as well as for railway transport activities. It has exclusive distribution, technology and representation rights for Areva T&D in Southern Africa and maintains management, technical and commercial links with Areva T&D business units in Europe.

The South African Institute of Electrical Engineers

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

2008 National Student Project Competition

The National Student Project Competition was held at the University of the Witwatersrand in 27 November 2008 and students from universities around the country took part in the event.

Students from all over the country took part in the competition and some interesting projects were exhibited by the students who had entered this year’s event.

Miroslav Minev and Andrew Russell of the University of the Witwatersrand produced a project entitled Chaos-based Secure Communication System, Renier Siebrits from the Cape Peninsula University of Technology was voted the runner-up in the Universities of Technology section for his project on a 1,572 Ghz Oscillator for Radio Telescope Applications.

Ashwill van Wyk from the University of Cape Town produced a project based on a Comparison of Standard and High Efficiency Induction Motors while Phumelele Nomtshongwana of Central University of Technology in Bloemfontein won the Universities of Technology section for the project on a Mini Integrated Communication System.

Claire Bleazard from the University of Johannesburg produced a project entitled TEMPEST for a PC Keyboard while Christo Kritzinger from the University of Stellenbosch created a WiFi Remote Control. Jacques Germishuys from the North West University in Potchefstroom was the winner of the universities section for his project on a Dual-channel USB-based oscilloscope.

The final project in the competition was from Isak du Preez of the University of KwaZulu-Natal for his work on the QFO Quad-rotor Flying Object which was adjudged runner-up in the universities section. His project included a stable demonstration flight of the QFO model.

Jacques Germishuys is congratulated by SAIEE President, Vic Wilson for winning the Universities section.



Renier Siebrits, runner-up in the Universities of Technology section receives his award from SAIEE President, Vic Wilson



Phumelele Nomtshongwana, winner of the Universities of Technology section is congratulated by SAIEE President Vic Wilson (Above) and Isak du Preez, runner-up in the universities section receives his award from Vic Wilson (Below).



SAIEE supports the Avril Elizabeth Home

The SAIEE runs a golf day each year and donates the profits to worthy charities. This year the Avril Elizabeth Home for the intellectually disabled was selected and Mike Crouch, Marketing Director of the SAIEE, visited the home to deliver a cheque for R12000.

The home, founded in 1970, cares for 140 permanent residents and 20 who attend on a daily basis. All the residents are intellectually disabled, some mildly and moderately and others severely and profoundly. Another 57 residents are also physically disabled and confined to wheelchairs. Many are orphaned or have been abandoned by their parents, have no family contact and no means of support. They rely on the goodwill of others to take care of them.

Mike Crouch says that when you visit the home, you are immediately struck by the dedication of the staff and by the huge problems that the residents face in having to cope with so many things that able-bodied people take for granted.

"Some of the mildly or moderately disabled residents are given simple tasks to do for a group of mainly private sector clients. For instance, residents assemble simple electrical components like battery clamps or, alternatively, insert direct-mail documents into envelopes on behalf of businesses.

"Activities such as these keep the residents occupied and contribute to the financial resources of the home as well," says Crouch.

The Avril Elizabeth Home's chief executive, Sylvia Haywood, says that the home is filled with love and laughter and has a universal language of hugs for residents.

As a charity, the Avril Elizabeth Home needs all the help and support it can muster so anyone interested in contacting them can do so on (011) 822-2233.



Mike Crouch presents a cheque for R12 000 to Sylvia Haywood, chief executive of the Avril Elizabeth Home.



Residents of the Avril Elizabeth Home hard at work.

A course in buildings and reticulation

A practical skills course for engineers and technicians will be held in Johannesburg, Cape Town and Durban between 30 March and 9 April. The two-day course is aimed at recently-qualified graduate electrical engineers, technologists and technicians and aims to assist these candidate professionals consolidate their academic knowledge with the essential practical skills that are useful in the working environment.

The focus of the course is on the practical aspects for building services and residential and township reticulation and according to the organisers, Lukhanji Technologies, the course will run over two days to provide the basic grounding for newly graduated engineers and technologists.

The first part of the course provides an outline of the design of electrical services for buildings and is intended for candidate professionals who want to specialise in the building services field. The building services design is approached from the perspective of a consulting engineer as opposed to an installation electrician or an architect.

The course covers some of the rationale behind the installation regulations and specifications and leads on to the principles of designing electrical services ranging from a residential home to a large factory.

The typical types of switchgear employed in building installations are covered along with methods of fault current calculations.

The second part of the course covers residential and township reticulation and the focus of this module is on the guidelines for designing an electrical network for a low-cost township. The emphasis is on designing for safety, reliability and low cost. A systematic design approach is used.

The course covers the operational planning techniques used for reticulation networks from the perspective of the electrical utility organisation responsible for maintaining the reticulation network once it has been commissioned.

Maintenance methods and techniques are discussed along with strategic spares management for the reticulation systems. In addition this module examines factors influencing the type of network design, the system supply planning and design parameters and diversity calculations.

Anyone interested in attending the course should contact the organisers and this can be done by logging onto the SAIEE website (<http://www.saiee.org.za>) where full course curriculum and all the charges can be found.