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veil of darkness Be Enlightened


Government reaction to **electricity** crisis

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- the **options** you have

Onions with no sting
- why bother?





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Our government is failing to deliver?

We, the citizens of South Africa, have been called upon to respond to the crisis inflicted on us by our own government. A government that knew that in 2007 we would run out of power – and did nothing about it. In fact, they waited until 2008 for us to run out of power and then asked us, the citizens, to bail them out of the mess they'd created.

Remember, it was our government that in 2004 stopped Eskom from spending any more money on generating power. It was our government that created the electricity shortages that we face today; shortages that have closed down our gold mines for two weeks. Power failures (forget this horrid term 'load-shedding' it's a power failure) that have left us all in the dark; power failures that have kept us in our cars for hours on end and left us with hungry children at night or, for the richer few, unhealthy and costly take-aways instead. It is our government – at all levels – that has stopped our cities.

If we trust our government then we will dispense the atonement they seek. Our President, Thabo Mbeki has said he's sorry and we, the citizens of South Africa, must gratefully accept his humble apology. We can go hungry, lose money, even lose lives and know, in our hearts that our government is 'sorry'.

But let's stop for a second: let's look a little deeper and probe that apology.

Our government, in its own White Paper said 'Hey, we're going to run out of electricity by 2007'. And yet did nothing. Six years later in 2004, when Eskom was pleading for funds to increase electricity generation, our government – in the interests of its citizens – said 'No, Eskom, you may not have any more money'.

We, all of us, must now respond to the crisis our leaders have created and we must find a way to resolve it.

Blithely, we accept the apology and get on with solving the problems. We resolutely set out to 'maak a plan'.

But, I ask you all to pause for a second and probe some of the other realities that our government is asking us to accept, or choosing to ignore.

Electrical engineers tell us that the electricity transmission lines are on the point of collapse primarily because the threat of privatisation, through the creation of Regional Electricity Distributors, discouraged local authorities from investing in maintenance. So even if Eskom could generate enough electricity to meet our needs, the distribution network would fall over anyway.

At the same time our water specialists tell us that water supplies are so perilously threatened that we (through our government) need to spend at least R180-billion just to maintain our existing infrastructure. Forget about new projects that would allow people in Orange Farm to drink a little fresh water each day – these are not included in that figure.

We also have the combination of minimal maintenance and incessant power cuts which mean that raw sewage is now flowing directly into our rivers. Impure water is making our people sick and killing our babies – babies that could be as great as Nelson Mandela himself one day. Why are people sick and dying? The water purification works are not running – or running intermittently because of the power failures.

So we, the citizens of South Africa, face two other cataclysmic crises: no efficient electricity distribution and increasingly unhygienic, impure water supplies.

Can we, the citizens of South Africa admit that our government is failing us?

The 2009 election results will probably show that millions believe it is not, even though it is our government that has plunged us all into a crisis that we – and not our government – must now resolve.

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WATTnow

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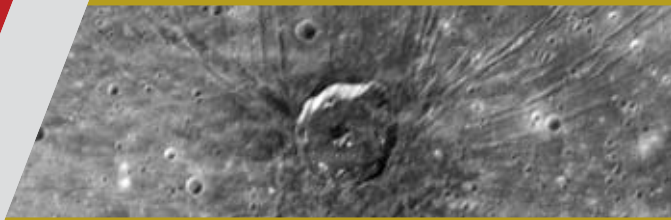
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the playground.



HP's new dc7800 business computer

Hewlett-Packard (HP) has launched a new energy-efficient desktop computer, the HP Compaq dc7800, which comes with a solid-state drive for data storage and complies with the Energy Star 4.0 standard.

The solid-state drive provides faster system start-up times, better reliability and greater durability. It is also much smaller than traditional hard disks.

The ultra-slim dc7800 uses Intel's Core 2 Duo processors, has 1 GB flash memory to enhance Windows Vista's response times in opening and using applications. It is the same size as an A4 piece of paper.

The optional 80 Plus power supply is apparently 15 percent more energy efficient than standard power supplies and HP claims that 1 000 computers using 80 Plus power supplies could save the equivalent of carbon dioxide emissions generated by burning 20 000 litres of petrol.

The remote Surveyor power management software is pre-loaded on the dc7800 and, if used efficiently, can reduce power consumption on computers and monitors by 33 percent – equivalent to about 200 kWh per computer annually.



Toshiba's portable gaming computer



Toshiba has launched its new notebook range, the Satellite X200, which is aimed primarily at power multimedia users and the gaming market. It features the latest dual-core Intel Core 2 Centrino Duo processor, an nVidia SLI graphics card and a 17-inch Trubrite screen powered by two nVidia GeForce 8600M GT graphics chips.

This provides high-end graphics for multimedia developers or users and has an HDMI interface so that users can connect the X200 directly to an HD-ready television set. The audio system uses a Harmon/Kardon Dolby home theatre system.

While it is specifically aimed at gaming enthusiasts and multimedia specialists, the X200 is also a serious business computer. It comes with built-in fingerprint identification for one-touch security, Bluetooth 2.0, a built-in Webcam and a 5-in-1 multimedia card reader.

It comes with Windows Vista Home Premium pre-installed and sells for just under R19 000.

Canon and Pentax launch new cameras

Both Canon and Pentax have launched a range of new cameras for the coming year. Canon's new PowerShot has been upgraded to include a 'designer' model, which comes in colours that include bohemian brown and pink melody. It has an 8-megapixel sensor with image stabilisation. It uses the Digic III nine point auto-focus system, has better shutter response and overall image quality is higher. Three A-series cameras are included in the Powershot range: the A470 at 7,1 megapixels, the A580 at 8-megapixels and the A590IS with a more powerful 4 x digital zoom with image stabilisation.

Canon has also introduced its entry level single lens reflex (SLR) camera, dubbed the EOS Rebel XSi, which offer users higher image quality at 12,2-megapixels using the Digic III image processor. The new processor provides a 14-bit analogue-to-digital conversion process, better auto-focusing, highlight tone priority and noise reduction at higher ISO speeds that peak at 1600. According to Canon, the XSi can take pictures at 3,5 frames per second for six shots in full-quality RAW or 45 images in the JPEG equivalent. Canon has also changed the battery pack that will provide 50 percent more pictures without increasing any of the camera's dimensions. The XSi with a new 18-55 mm F/3,5-5,6 image-stabilised lens costs \$900 and the body only is sold for \$800.

Meanwhile Pentax has released the k20d, which is a 14,6-megapixel camera with a new CMOS sensor that apparently limits much of the 'noise' that occurs with conventional CCD sensors at the mid-to-high ISO sensitivity. As a result, Pentax has extended its ISO range to 6400 and has added hardware image stabilisation through the body rather than via the lens. This is an expensive camera coming in at \$1 300.

The k200d is an entry-level camera that still uses the CCD sensor and offers a resolution of 10,2-megapixels. It also has hardware image stabilisation and a dust removal sensor. The k100d will sell for \$800 with a standard lens.



SatNav on BlackBerry's New Pearl

BlackBerry's new Pearl 8110 is available in South Africa from Vodacom and includes the Vodafone SatNav general positioning system software that uses Telmap SatNav technology displayed on a three-dimensional map. It also provides navigational voice prompts.

According to Dot Field, chief communications office for the Vodacom Group, the BlackBerry Pearl offers users an ideal blend of personal and business features in a compact design.

In typical BlackBerry design styles, it has an intuitive trackball, a SureType keyboard system that offers word completion, spell-check with automatic correction and has Afrikaans as one of its language settings.

The phone has a number of additional devices such as a 2.0 Megapixel camera and a media player that uses Roxio Media Manager to allow users to control media files from a personal computer.

It also comes with Roxio Photosuite 9 LE, a tool that lets users create photo albums and edit photographs. From a business point of view, the BlackBerry Internet Service means that users can access up to 10 supported work or personal e-mail accounts.

It provides wireless access within the IBM, Lotus, Microsoft Exchange or Novell GroupWise environments. A 1 GB microSD card is included with the package.

The BlackBerry Pearl 8110 Smartphone is available on contract from Vodacom



Laser and OLED TV sets built

Mitsubishi has launched the world's first laser high definition television set which will compete with the liquid crystal or plasma displays. According to the company, the laser is the purest light source available and is the most intense on the planet. The 65-inch televisions sets that it has launched use three lasers, red, green and blue, that project the image from the rear of the set to provide vivid colour and crisply sharp images.

Mitsubishi has not set a price for the new models which will be shipped to retailers later this year. A number of other companies have expressed interest in using Mitsubishi's technology.

Meanwhile, Samsung and Sony have launched prototypes of their new organic light emitting diode

(OLED) television sets, which are brighter than the LCD displays but are ultra-thin and considerably more energy efficient.

According to Sony's Stan Glasgow the OLEDs do not need a backlight to boost brightness but he admits that the new technology is very complex. The diodes emit a brilliant white light but different organic materials can be used to produce different colours and then combined to display the high definition pictures.

Sony has made a 27-inch prototype while Samsung has a 31-inch model. Glasgow says that the technology makes manufacturing of large screens prohibitively expensive. Currently, its 11-inch OLED set costs £850.





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Google's new mobile service

Google has launched a new search service for mobile phones which, the company claims, is faster and much more accurate as well. The new service is currently available in Britain, France, Germany and Canada but will be extended to other parts of the world.

According to the company, mobile searches are most often used for local area information such as cinema listings or *What's On* information. The company has set up engineering groups in North America and in Britain to develop new applications for mobile services.

Last year Google launched Android, its own operating system for mobile phones, and intends challenging the Windows Mobile and Symbian platforms, which tend to dominate the mobile market.



New wireless messaging devices launched



Sony, Nokia and Zipit have launched new messaging devices that allow users instant access to the Internet in any Wi-Fi enable area. The devices mean that users can save on cellular data service fees or leave their laptop computers at home.

The Sony Mylo Com-2 offers users the ability to surf the Internet, send instant messages and play MP3 music files. It has an 800-by-480 pixel screen, a 1,3 megapixel camera and a slide-out QWERTY keyboard. It comes with 1 GB of memory, which can be upgraded to 8 GB, and is priced at \$299,00.

Nokia's new N810 Internet Tablet uses a 400-megaHertz processor with 128 MB of RAM and runs a Linux operating system. It has 2 GB of internal storage, which can be boosted to 8 GB or more by adding a card to the mini-SD port. It has an 800-by-480 pixel screen and a slide out keyboard. It is Bluetooth enabled so a wireless keyboard can be used.

The device has a built-in VGA camera for video-conferences, plays MP3 music files – accessed via the SD slot – comes with a collection of Widgets for easy Google searches or to listen to streaming radio broadcasts. It has a built-in global positioning system receiver. It costs \$479.

For people who want to use a messaging device predominantly for text messages, the Zipit Wireless Messenger, which costs just \$149, might be the answer. The flip-open device is about the size of a thick wallet.

Once connected to the Wi-Fi network users can access messaging accounts such as Yahoo, AOL or Microsoft's messenger services. It has a mini-SD card which lets the Zipit play MP3 music files. Users can log onto the Zipit website and gain access to eight streaming radio stations.

Software update for BlackBerry phones

Research In Motion (RIM), the manufacturer of the BlackBerry® mobile phones has updated its software to enhance messaging, improve security and expand its application development support.

According to Mike Lazaridis, president of RIM, the software enhancements make BlackBerry smartphones more powerful than ever and even easier to manage. He says the software update makes document download and editing simple because it has integrated the 'Documents To Go®' software into the BlackBerry platform so users can edit Microsoft Office documents directly on their phones.

It also offers a remote search facility for e-mail messages, a calendar with a free or busy look-up to check availability of colleagues before requesting a meeting and the ability to view HTML and rich text e-mail messages with original formatting.

The software is available as a free download from www.blackberry.com



New free TV channels coming to Africa



Free2view has launched its first free satellite television channel in South Africa, MSNBC Africa, which provides free 24-hour live news coverage as well as award-winning documentaries.

The company behind this initiative is Great Media working in partnership with MSNBC and according to Malcolm Ramsay, chief technical director of the company, the pay-TV channels are "fundamentally flawed" as a business model.

"The majority of Africa's people live on less than a dollar a day so how can they hope to afford a pay television service when they don't even have enough money to feed themselves or their families," he asked.

Free2View, which currently offers 14 channels, is broadcast via Eutelsat W3A at 7° East ensuring that viewers from South Africa, Botswana, Mozambique, Namibia, Lesotho, Angola, Zimbabwe, Swaziland, Kenya, Tanzania, Madagascar, Congo, Gabon, DRC, Malawi and Uganda will be able to watch the programmes.

Viewers will have to spend between R1 000 and R1 400 to buy the receiver and satellite dish so they can pick up the signals.

However, the Independent Communications Authority of South Africa (ICASA) says that the Free2View service is "illegal" as the company has not applied for a broadcast licence and "any attempt to provide a free television service will constitute a criminal offence".

Free2View chief operating officer, Elissa Wilding, claims the company does not fall under the jurisdiction of ICASA as the service is not broadcast from South Africa and is being funded from advertising overseas.

Pneudrive – a ‘pneu’ competition for students

SEW Eurodrive and Festo have launched a design competition for third and fourth year mechanical or electronic engineering students and for students studying mechatronics. Eight educational institutions around the country have been invited to participate.

Known as the Pneudrive Challenge, the competition incorporates many aspects of each university’s design curriculum. According to SEW Eurodrive’s general manager for sales and marketing, Ute Bormann, each university will receive pneumatic, electronic and mechanical equipment from the sponsors.

“This will familiarise students with the products that need to be used in the designs they produce. Students do not have to make working models but must come up with a practical design,” she says.

Festo’s engineering manager, Adrian Buddingh, is also excited about the project, which he believes will give students plenty of creative freedom within the context of the engineering disciplines. “In later years, students are likely to work with our products or with similar ones and familiarising themselves with these products while studying will certainly stand them in good stead,” Buddingh says.

SEW Eurodrive and Festo are international companies with a large global presence. SEW Eurodrive employs more than 11 000 people in 46 different countries. Festo operates in 176 countries and employs about 12 000 people around the world.

Both companies have head offices in Germany and the winning student will visit their research and development facilities. The winning entry will also be on display at Electra Mining Exhibition, to be held in Johannesburg later this year. The winning university will receive equipment valued at R100 000 from the two companies.

“Growing engineers in this country and providing them with real opportunities to test the skills that are needed in the workplace is hugely important to us,” says Bormann. “These youngsters are not only our future employees but also our future customers and as such form the cornerstone of our business and our future.”

The format of the competition is such that it will encourage as many students as possible to participate. “We recognise that time is limited for students who are particularly pressurised in the final years at University, and by making this competition part of the curriculum, we believe that students will take the necessary time and effort to apply their minds and come up with ingenious, creative and innovative designs that are a hallmark of true education,” says Borman.



SEW Eurodrive’s general manager for sales and marketing Ute Bormann.



Festo’s engineering manager, Adrian Buddingh.



10

Check time.

9

Thank speaker.

8

Summarise points.

7

Bring about decisions.

6

Allocate tasks.

5

Clo

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1
Ignition.

2
Open roof.

3
Close door.

4
Say goodbye.

use briefcase.



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Government knew SA's energy would run out – but did nothing

South Africa is in the throes of an energy crisis of enormous proportions with serious ramifications for all households, all industrial and mining endeavours and all shops, offices and commercial undertakings. Eskom has been branded as the root cause of all energy problems facing the country – an allegation that is unfair and untrue.

Here's what we know:

- In 1998 the government, led by Thabo Mbeki, was told that South Africa would need additional generating capacity by 2007. In fact the government's own White Paper on the Energy Policy published in December 1998 gives this explicit warning. Government did nothing.
- Instead of mothballing power stations that were deemed to be unnecessary, Eskom in its wisdom shut them down without mothballing them. Now, as these power stations are being returned to service, a great many components and essential parts have to be entirely replaced. Had each power station been correctly mothballed, the return-to-service process would have been less expensive, quick and relatively simple.
- The privatisation programme set down by government is, to all intents and purposes, a complete failure. The Regional Electricity Distributors – part of the 1998 White Paper – do not operate. Worse still, maintenance of the electricity transmission network has all but ceased because municipalities allegedly do not have the cash to maintain the network.
- The government's onerous procurement processes are seriously inhibiting the development of new projects or the maintenance of existing infrastructure. In fact, the picture is so bleak that statistics released in February show that only 49 percent of the capital expenditure budgets of government and provincial departments had been spent by December, even though 75 percent of the year had passed.
- Extensive electrification programmes – primarily for the poor – have steamed ahead and almost 2-million homes have received electricity supplies since the National Electrification Programme started. Ironically, not one new power station has been added to the grid to cope with the increased off-take of electricity.
- More than R16-billion was spent on new residential and non-residential buildings that were completed in 2007 alone and not one megawatt of power was added to the grid.
- Eskom, despite its warnings to government and its pleas for capital to build new generating capacity, was stopped by government from putting up new plants.

The litany of blunders, errors and misjudgements has finally crept up on the government and bitten it – and all of South Africa – squarely in the ankle, threatening to bring the economy crashing into a phase of minimal growth, exports losses, failing investor confidence and of course, higher interest rates.

Thabo Mbeki, on behalf of the government, has apologised to the South African public. He's admitted that government was wrong and conceded that emergency plans will now be needed to provide some consistency in our electrical supplies. It does sound like 'too little, too late'.

In January this year the Department of Minerals and Energy, while accepting that there is an electricity crisis released a draft document entitled 'Electricity Regulations for the Prohibition of Certain Practices in the Electricity Supply and Compulsory Norms and Standards for Reticulation Services'. This document is meant to provide more efficient use of electricity and, in this way, reduce demand for the commodity.

In terms of the draft document the following activities are outlined:

- Energy efficient lighting must replace incandescent lighting.
- Unoccupied buildings may not be lit up after working hours.
- All street and highway lights must be off during the day.
- Solar heating must be used in all new houses valued at R750 000 and more, or that exceed 300 square metres in extent. Furthermore all geysers must be equipped with a geyser blanket.
- In commercial buildings, hospitals, hotels, resorts and shopping complexes all geysers must incorporate solar heating panels.
- From 2010, all geysers must have a relay switch allowing for the remote control of the unit. This applies to all heating and ventilation systems as well.
- Swimming pools or spa baths must have relay switches for filtering units, pumps and heating systems so that these units can be remotely controlled by the municipalities or electricity distributors.
- All street lights must use energy efficient bulbs.
- By 2010 all customers with a monthly consumption of 500 kWh and above must be billed on a time-of-use tariff with higher tariffs at peak times and lower tariffs in off-peak times.
- Non-compliance will invoke the existing penalties contained in the Electricity Regulation Act of 2006.

These are relatively tough measures and there is little doubt that further prohibitions will be imposed as the electricity supplies become more intermittent and less reliable. The irony, though, is that the Energy White Paper of 1998 called on government, through the Department of Minerals and Energy, to embark on programmes that would lead to a more efficient use of electricity in South Africa. Ironically, it's taken 10 years and a supply crisis for any of these efficiencies to be debated let alone legislated. Yet another apology is probably due.

What follows are the government's own objectives in its own White Paper. The following excerpts from the White Paper make interesting reading:

- 'Governance of the energy sector will be improved.'
- 'Government will encourage competition in the energy sector.'
- 'Given increased opportunities for energy trade, particularly within the Southern African region, government will pursue energy

security by encouraging a diversity of both supply sources and primary energy carriers.'

- 'Cheap energy benefits our foreign exchange reserves.'
- 'Greater energy efficiency could provide savings of between 10 percent and 20 percent of current consumption.'
- 'Government will establish a transitional process that will lead to the establishment of independent regional electricity distributors.'
- 'In some ways energy is like money in the economy, in that it flows through and empowers all social and economic sectors.'

Worse still, the main objectives contained in the White Paper are:

- Increasing access to affordable energy services.
- Improving energy governance.
- Stimulating economic development.
- Managing energy-related environmental impacts.
- Securing supply through diversity.

By 2007, when the government knew that South Africa would run short of energy, plans for new generating capacity were announced. Eskom is spending more than R400-billion on power stations and transmission networks. The new power stations will take between five and eight years to come on stream so South Africa must get used to intermittent electricity supplies (euphemistically dubbed load shedding) and the picture can only get worse.

With thousands of new houses, shopping centres, offices, hospitals and complexes springing up all over the country, the strain on electricity supplies will increase. Power outages of three, perhaps four, hours are likely to become an everyday occurrence as Eskom's strained infrastructure is unable to cope with demand.

The impact of electricity shortages is not one of pure inconvenience. Mining and industrial companies have built their businesses based on reliable and consistent electricity supplies. Currently mines are getting just 80 percent of the power needed to operate efficiently. Industrial concerns are at 90 percent. Households have been told to reduce power consumption by at least 10 percent or face severe penalties.

All these issues could have been avoided had government just stuck to its own recommendations, in its own White Paper, ten years ago. It didn't and emergency measures must be used to make up for the lack of planning. **Wn**



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The National Electricity Emergency Plan

The government has introduced what it calls the National Electricity Emergency Plan aimed at improving electricity stability throughout the country. In a statement released by the Government Communication and Information System (GCIS), government spokesperson, Themba Maseko claims that Cabinet says “the national electricity emergency must be addressed with urgent, vigorous and co-ordinated action”.

The government has not set a time-frame for the power conservation measures it plans to introduce. The measures include:

- The introduction of quotas for all electricity users backed by a system of incentives or penalties to ensure compliance with these quotas.
- Government will provide eight compact fluorescent lamps (CFL) to every one of the 10-million electrified households in the country in an effort to convince users to stop fitting incandescent lamps.
- Government will provide a subsidy of between 20 and 30 percent of the cost of a solar water heater to encourage households to install these units. Maseko claims that solar water heaters are “prohibitively expensive” costing between R7 000 and R20 000 each and current manufacturing capacity is limited to 10 000 units a year. The DME, working jointly with the Central Energy Fund, will be responsible for this programme.
- Remotely controlled relay switches will be fitted to geysers in all households. This will allow municipalities to switch off geysers at times of peak electricity demand and turn them back on when demand drops.
- All traffic lights and public street lighting will be converted to solar power with a back-up battery. The cost of this programme is estimated at R400-million.
- Legislation will be enacted to ensure the hospitality industry is forced to convert all water heating to solar power. Solar panels can be used to pre-heat water, which can then be stored in conventional electric geysers.
- Government also plans to regulate the maintenance regime of the electricity infrastructure to ensure the transmission network does not fail and that the electricity grid can efficiently distribute the electricity at its disposal. No details on the maintenance regime have been released.

The statement warns that consumers can expect “significant increases in electricity prices” but these will be implemented in such a way that they will not have a dramatic impact on the poor people of the country.

Solar power plant may go ahead

According to Eskom’s renewable energy specialist, Louis van Heerden, the decision on whether or not to build a 100 MW solar energy plant in the Northern Cape might be made in April this year.

Eskom completed its feasibility study at the end of last year and the results are being evaluated although the project has been approved by the Department of Environmental Affairs and Tourism. If it goes ahead, the project will use a molten-salt-type central receiver system that concentrates the sun’s energy through multiple large mirrors and uses the thermal energy to produce steam that drives a steam turbine to generate electricity.

Heliostats (sun-tracking mirrors) concentrate the energy, and the heat-transfer medium (molten salt) is pumped through the receiver absorbing highly concentrated radiation reflected by the heliostats. The heated fluid is circulated through a heat exchanger, generating steam for the turbine. Temperatures in the system can reach 600 degrees Celsius.

The solar power station is likely to be built at Upington – renowned for its searingly hot climate, particularly in summer.



Shoprite offers to pay for panels at traffic lights

Shoprite is offering to fund solar panels to keep traffic lights working at shopping centres close to its stores and has embarked on formal discussions with various local authorities. According to Shoprite's chief executive, Whitey Basson, the traffic congestion caused by non-functioning traffic lights was having a direct impact on Shoprite's business.

"People must start to manage the energy crisis and get involved in coming up with solutions," he says. Basson does not condone government's failure to meet South Africa's energy needs and has called on the government to act decisively against the mismanagement of the state departments involved in energy supplies.

Shoprite has installed generators at its stores around the country to ensure that it can continue trading when the lights go out.

Other retailers, including Woolworths and Massmart – which controls Game, Makro and Builders' Warehouse – have also installed generators. According to Raymond Ackerman, chairman of Pick 'n Pay virtually all the group's stores have back-up power systems and within the next few months all stores will be fully functional during power outages.



Eskom not entirely blameless

While Eskom may partly be exonerated for the power shortages that South Africa currently faces, it is not entirely blameless, according to electrical engineers who have visited various Eskom sites around the country.

The engineers – who asked to remain anonymous because of their close ties with Eskom – point out that instead of mothballing power stations such as Grootvlei and Camden, the Eskom technicians and engineers simply 'switched them off'.

That's apparently the primary reason for the time delays in bringing these power stations back into production. Electrical engineers who have visited the sites say that the damage done to power stations by

switching them off is enormous and results in extremely costly time delays since new components have to be ordered and installed.

"These delays and costs could have been averted had Eskom taken the trouble to shut down the power stations carefully and mothball them so that they could be returned to service at minimal cost," one engineer says.

Added to the woes facing Eskom are the procurement procedures that have to be followed to adjudicate tenders and place orders. These are particularly onerous and lead to extensive delays in getting replacement parts that are urgently needed on site.

Eskom has not officially commented on these allegations.

Power station contracts awarded

Hitachi has awarded the R15-billion boiler construction contracts for Eskom's Medupi and Bravo coal-fired power stations to Murray & Roberts, which has tendered for the civil construction work at Medupi and the R6,5-billion Ingual pumped storage construction work. The contracts are being evaluated by Eskom officials.

In a separate development, Eskom has confirmed that it plans to award contracts for the coal supply at the Project Bravo coal-fired power station within the next six months. This power station will be built near Emalahleni in Mpumalanga and will add 5 400 MW to Eskom's grid by 2015.

The turbine and boiler contracts are expected to go to Alstom and Hitachi respectively as no independent tenders have been called for by Eskom.

Although South Africa has abundant supplies of coal, it is coal shortages that have been blamed for the power outages that occurred at Kendal power station in February. As a result, a task team has been set up to evaluate coal stocks at every one of the coal-fired power stations around the country and to ensure that stocks are increased from current levels of between three and four days to a minimum of 20 days.

Meanwhile mining company Xstrata says that South Africa's coal supplies are so strong that unexploited coal reserves under the Waterburg in Limpopo are sufficient to run eight coal-fired power stations for the next 200 years.

DME's Electricity Master Plan

In a document published by the Department of Minerals and Energy entitled 'Energy Security Master Plan – Electricity', the government stated that it intended to address the energy requirements of the poor and enhance the competitiveness of the economy by providing low cost, high quality energy inputs to industrial, mining and other sectors.

It also sought to introduce competition into the industry, especially in terms of generation, and encourage private sector participation in the electricity industry. As part of the White Paper on Energy, circulated in 1998, the government intended to unbundle Eskom, sell 30 percent of its generation capacity and ensure that all new generation capacity was built by the private sector.

It appears that Energy Security Master Plan 2007-2025 is fanciful and misleading. Eskom is putting up the new power stations and investing more than R400-billion on generation, transmission and distribution over the next 20 years.

Among others, the Master Plan states that its goals are:

- To support economic growth and development.
- Improve the reliability of electricity infrastructure.
- Provide a reasonably priced electricity supply.
- Ensure the security of electricity supplies.
- Diversify the primary energy source of electricity.
- Accelerate household universal access to electricity.

At this point, economic growth is being hampered by a lack of electricity and the private sector is seeking alternative energy sources to keep the wheels of commerce and industry turning.

Individual businesses in the service sector are switching to generators for back-up power supply. The Johannesburg Stock Exchange, for instance, installed back-up generators to keep the exchange running and currently is spending R1-million a month on diesel for these generators.

For the bigger organisations – mines, industry and manufacturing – the option is to build their own power stations so that they can use Eskom electricity as back-up power. AcerlorMittal's Vanderbijl Park plant is refurbishing its own power station, which will return to service later this year.

Certain municipalities – such as Bethlehem – are building private power stations for residents of the town itself. Bethlehem's hydro-power generators are expected to produce electricity by June this year and the town will no longer be solely reliant on Eskom. Tshwane is re-commissioning its Rooiwal power station to provide additional energy for that metropolitan area.

So while Eskom is ploughing billions into power stations, other smaller organisations are taking steps to make themselves independent of the national grid, which will be used as back-up rather than primary power.

Electricity

The Options You Have

By Antonio Ruffini

South Africa will experience electricity power failures over the next few years. As SAIEE President Ian McKechnie stressed during a recent radio interview, the additional base load generation power stations the country requires are very large projects. They take time to build. So, what can you do meanwhile?

January's rolling blackouts that culminated with most of the country's large-scale mines being shut-down for days finally brought home the impact of a shortfall in South Africa's electricity generation capacity. Any economically active South African still complacent about the consequences of the failure of government and Eskom to timely initiate capacity expansion doesn't live in this country.

Though new to South Africa, electricity generation capacity shortages are not unique. Numerous cities across the developing world experience blackouts. It comes down to the basic nature of electricity; it cannot be stored in meaningful quantities.

The government's solution in the short to medium term amounts to rationing and tariffs that will encourage electricity saving. Eskom CEO Jacob Maroga says electricity rationing could provide a necessary 10% to 15% reduction in power usage across the system and minister of trade and industry Alec Erwin announced that electricity rationing will begin from March.

South Africa is one of the few countries in the world to have caps on telecoms broadband usage. Get used to a similar mindset regarding electricity. Expect a sliding scale of disincentives for electricity usage, with extra usage above certain caps to cost more. Perhaps residential time-of-use tariffs will be introduced to limit use of electricity during peak periods.

So what options do you have? Can you remove yourself from Eskom's clutches? Drickus Crous of African Emissions Trading a company that provides alternative energy solutions says it is financially implausible to try and make a modern suburban home independent of grid electricity.

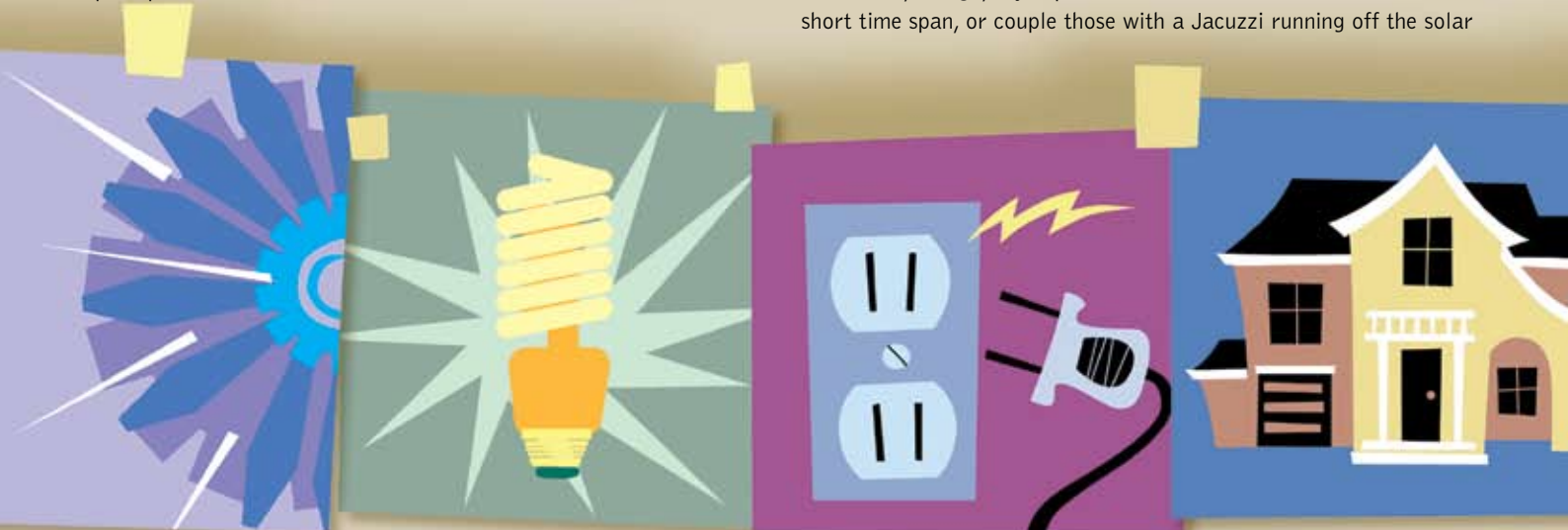
"However, it is possible to reduce your grid dependence to as much as 20% of your current levels."

There are a number of steps one can follow, depending on how far you wish to go. A first low cost and easily implemented step entails replacing all your incandescent lamps (light bulbs) with compact fluorescent lamps, which use 20% of the electricity to generate the same amount of light.

The second step entails converting your cooking system to gas. "The idea here is to eliminate the use of your electrically powered heating elements, such as the kettle," Crous says. A reasonably sized four-plate gas stove cost about R3 000, with installation costing about R1 200, and about another R1 000 for the gas bottles and valves.

A further step could be replacement of geysers with solar water heaters, which will remove a lot of electricity demand from your system, water heating accounting for about 30% to 35% of a typical household's electricity demand. Solar geysers typically have back up electric elements to boost the water temperature when necessary.

However, if a solar water heater is used carefully the element seldom needs to kick in and the solar water heater might pay for itself in electricity savings in as little as three years. This takes into account that electricity prices in South Africa will climb steeply over the next five years and solar water heaters may be subsidised. There is a caveat, though; if you plan to run numerous baths or showers in a short time span, or couple those with a Jacuzzi running off the solar



water heater, the element will be activated much more frequently and the payback will take longer.

A next step could be to power low wattage devices such as television sets, lights and desktop computers via photovoltaic panels, a battery pack and an inverter.

While all these measures collectively will reduce your dependence to 20% - 40% of previous levels, don't expect to get away with spending anything less than R70 000 to R75 000. By far the most expensive component is the photovoltaic cells, battery and inverter combination. For each 70 W of photovoltaic capacity, enough to run about four compact fluorescent lamps, you are looking at R2 500 with the batteries costing about R2 500 and the inverter costing R5 000.

That is the green option.

If you are less worried about being totally green, but still want to strive for independence from the grid, substitute for the photovoltaics a small back-up generator of about 6 kVA. This is cheaper than photovoltaics, but don't forget that a 6.0 kVA generator uses about 2.5 litres of petrol an hour, so factor in your running costs. Get a qualified electrician to integrate this generator into the home's existing electricity system, typically limited to supplying power to a few plugs and lights. With such an installation, an automatic transfer switch will start the generator automatically when power from the grid is interrupted. When the grid power is restored, the generator automatically switches off.

Note that many electrical appliances require more power upon start-up than their specified steady state wattage. When purchasing a generator to suit your needs, you should multiply by two the steady

state wattage ratings of the appliances you plan to connect to it, in order to take into account their start-up power requirements.

Don't try to run too many appliances from too small a generator since exceeding the capacities of a generator and its wiring will damage both, with about a 10% reduction in the generator's life each time its capacity is exceeded.

If you are not interested in all the other options and just want a backup generator to kick in for your electricity needs during the next few years of load shedding, bear in mind that a typical household uses about 15 to 20 kVA. A fully automatic generator of that rating linked into the home's three phase electricity system will cost you no less than R45 000.

For those homes running on a single phase circuit the generator cost is cheaper at about R32 000.

You can also find cheaper generators, if you are not worried about their longevity, but Crous offers a warning. A number of cheap generators on the market are of poor quality with no warranty and break down after operating only a few times. Then owners discover there is no backup service or parts available for that particular unit in South Africa.

For those who are very budget conscious and still want some energy supply security for a home office, or to limit inconvenience, the cheapest option is a small mobile generator. These typically run on petrol, and run off an extension lead from the generator to the inside of the house, and one can plug essential items into it. This avoids wiring and installation costs. However, unlike the automatic generator integrated into the home's wiring, you have to start the generator manually when you are shed from the grid.





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It is important to note that most generators are four stroke, air cooled engines, which means they need a well ventilated area. Also, generators are noisy and cannot be silenced without impairing performance.

Builders of new houses can reduce the costs of implementing energy efficiency measures by installing solar geysers and gas stoves from the start, as well as installing some 12 V outlets that can be used for lamps, devices and appliances designed to run off 12 V. Such appliances then would not require an inverter and save some 50% on their electricity consumption.

There are also numerous energy efficiency steps you can take which will cumulatively reduce your electricity consumption:

Water Heating

A home's geysers are the most important component of its hot water system. Geysers have internal insulation that prevents the escape of heat, but heat loss does still occur. Over 25% of the electricity consumed by a home's water heating system can leak out of the geyser due to standing losses and another 15% may be lost in the hot water pipes. External insulation of geysers and hot water pipes will reduce electricity usage, particularly where the piping and geysers are installed outside the house and not under the roof which is warmer.

Save electricity by setting your geyser thermostat temperature at 60°C. You get no additional benefit if the setting is higher and have to deal with water that is too hot. Do not set your geyser thermostat too low, however. Setting it at 55°C or more will avoid conditions conducive to Legionnaire's disease.

Many municipalities already undertake automatic regulation of residential hot water tanks, switching them out during peak periods. In the future, this may be extended with smart switching systems that allow municipalities and utilities to shed only the geysers while retaining power supply for all other residential applications.

Fit your taps with aerators and your showers with low-flow showerheads. These maintain a normal pressure while using 50% less hot water and consequently less electricity.

Thermal Insulation

As much as 50% of heat losses in a home can be attributed to a lack of ceilings and ceiling insulation. The energy efficient solution is the installation of some form of ceiling insulation. This is a viable proposition no matter what part of the country you live in and should be seen as an investment in your home.

In addition, air leakage into and out of the home can account for as much of 20% of heating and cooling costs. Air leakage occurs wherever different materials or parts of a house meet. Caulking and weather stripping can be used to close these energy loopholes. Caulking simply means sealing cracks and holes in areas where air leakage can occur. Weather-stripping is effective at eliminating air-leakage when it fits tightly against closed windows and doors.

Lighting

Avoid the installation of multiple lights on a single switch. Remember that a bulb's wattage is not a measure of the light it gives off. A 100 W incandescent lamp provides 50% more light than four 25 W lamps. A 40 W CFL may give off three times as much light as a 20 W CFL. Hence it is preferable to have a light fitting with fewer globes rather than a multiple globed chandelier.

Use a photo-electric system for lights outside the home. This will automatically switch them on when it becomes dark and switch them off when it gets light. The use of movement switches is a useful option for security lighting as the lights will only come on when movement is detected, instead of burning all night

Automatic time switches can help ensure the lights in the home are switched off when they are not needed. They are also useful for security as they allow a home to appear occupied when it is not, by automatically turning certain lights on and off in the evening.

Cooking

One of the best ways of improving electricity efficiency when cooking is by reducing the amount of cooking time. The microwave energy used in microwave ovens causes water molecules within the food to move rapidly producing heat directly rather than in the surrounding air. This cooks the food more efficiently and in about one third the time taken by conventional ovens and stoves.

Appliance Selection

Appliance labelling has been largely ignored in South Africa. In the future expect to start seeing more appliances clearly labelled in terms of their electricity efficiency, and make new appliance purchases accordingly.

The power rating of an appliance is not a reflection of its efficiency and a 1,300 W vacuum cleaner is not necessarily better at its task than a 600 W vacuum cleaner. Gain for yourself a better awareness of what your heavy power consuming appliances are.

Space Heating

Infra-red heaters can be more electricity efficient than other space heating systems. These types of heaters can be used both for spot heating and area heating. They transfer energy directly by radiation, creating heat and comfort instantly without the use of air circulating fans. An infra-red heater will warm the people in a room rather than the space. Infra-red heaters often use metal sheathed infra-red radiation elements, reflector lamps or quartz tubes. **Wn**



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Battlefield Heroes available free of charge?

Electronic Arts (EA) is to release its new computer game, *Battlefield Heroes*, online and will not sell it through conventional retailers. It is EA's first attempt to find new sources of advertising revenue and the company hopes that this will help to achieve the goal.

EA released a free version of its FIFA game in South Korea and it is now earning more than \$1-million a month through in-game sales. A similar model will be used for *Battlefield Heroes*, which will also be available as a free download and will contain advertising on the company's website and splash screens as the game opens.

According to EA, the new *Battlefield Heroes* will have greater mass appeal than previous releases of the game which has sold more than 10-million copies worldwide.

The game occurs inside a fictional world and apparently has a 'cartoon' feel with more emphasis on participation and fun than skill and strategy. Gamers will be able to buy items online to customise their appearance but will not be able to buy weapons. EA says that its goal is to make its games easy to download, ensure they run on older computers and have the games structured in such a way that they attract broader audiences.



March 2008

Quarterly Internet sales top £15-billion in UK

Products worth a staggering £15.2-billion were sold over the Internet in Britain in the last quarter of 2007, an increase of more than 50 percent over the same period the previous year. According to market research company Capgemini, electronic products and clothing were particularly popular.

Internet sales still represent a small proportion of consumer retail sales in Britain and for every pound spent on purchases by the public, just 15 pence was spent online. However, this too was a significant increase because in the previous year consumers were spending just 10 pence of each pound online.

Major retailing group, Marks & Spencer saw its Internet sales rise by a whopping 78 percent in the last quarter of the year while retailer Tesco said its sales were up by 24 percent during the same period.





No more XP sales from July

Microsoft has said that it will stop selling Windows XP from July this year, much to the dismay of thousands of people around the world because XP is viewed as one of the better and more stable operating systems released by the company.

So much so, that an online petition, Save XP, has already collected 30 000 signatures from disgruntled users who don't want to be forced into upgrading their operating system to the newer Windows Vista platform. They have called on the company to continue selling XP indefinitely.

The petition claims that there are not many 'clear benefits' from upgrading to Vista, particularly as the operating system itself is considerably more bulky than XP and requires additional memory and, in some cases, an upgraded CPU as well.

The petition also claims that the Vista operating system running Microsoft Office is actually slower than XP.

Vista has apparently sold 100-million copies worldwide, which sounds impressive enough. However, the fact that only 37 percent of computers sold last year were using the Vista operating systems shows that XP remains the first choice for consumers throughout the world.



Windows 7 may be here by 2009

Microsoft new operating system, simply dubbed Windows 7, is unlikely to be released before 2011 if the company is to be believed, although there have been widespread and persistent rumours that the new system will be released earlier than originally expected.

The official position from Microsoft is that the system – dubbed Vienna or Blackcomb – is still in the planning stage and development will take another three years.

Unofficially, there have been a number of rumours saying that the Milestone One beta version has already been released and expires in March, with a new Milestone release coming in April. There is even a video with screenshots supposedly taken from Windows 7 Ultimate. Apparently the blogger who leaked this story produced a video that was discounted as fake and a rebadge version of Vista.

Someone, if Microsoft is right, went to an enormous amount of trouble hacking Vista's source code, changing its Media Center options and even adding a new boot-up screen. The video, screen shots and other material can be viewed at www.thinknext.net.

Microsoft is notoriously secretive about plans for new operating systems or software applications until these have reached an advanced beta stage.





Photographs used 'illegally'

Photographs and images are being stolen from social networking sites such as *FaceBook* and *Flickr* and being used in advertisements without permission. For instance, a 15-year-old girl from Dallas posted a photograph of herself at a youth car-wash and this was used in an advertising campaign for Virgin Mobile in Australia.

She was apparently portrayed as a dorky 'pen-pal' that Virgin suggests should be dumped and replaced with text messaging. The girl's parents sued Virgin and the company responded that it 'had done nothing wrong' because the photograph had been taken from the 'Creative Commons' page on *Flickr*, which allows the photographs there to be used with proper credit.

The photograph of the girl used in the Virgin advertisement was sent to her by a friend in Australia.

Popular social networking sites do publish restrictions on what can be lifted off the Internet. For instance, *Flickr* has a disclaimer which clearly states that users must 'respect the copyright of others' and takes it one step further stating: 'This means don't steal photographs that other people have taken and pass them off as your own.'



March 2008

4-million iPhones in just 200 days

More than 4-million iPhones have been sold throughout the world in the first 200 days, according to figures released by Apple. And, according to Google, it received more traffic from iPhones over the Christmas period than from any other mobile devices, even though the iPhone has less than one percent of the mobile phone market.

Apple announced that it has released a software development kit for the iPhone so that software developers can create new applications for it. Until now, developers were restricted to writing Web-based programs for the iPhone.

Interestingly, a report from M: Metrics in Britain says that in France, Germany, Italy and the UK, more mobile phone users were listening to music shared between phones via Bluetooth or other technologies than were listening to music downloads from a music store.

Some of the wireless operators in Europe and Britain have already introduced a service that allows phone users to stream or download digital music files from their home computer to their mobile phones.





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HP now largest computer brand

Hewlett-Packard is the largest selling computer brand in the world, with a market share of 18,2 percent of the 271-million computers sold last year. According to market research firm Gartner, Dell's market share dropped to 14,3%.

According to the research, HP's sales of personal computers increased by 30 percent compared with Dell, which shipped just 1,7 percent more computers last year than in the previous year. Dell is currently undergoing a major transformation of its business after sales started to dip several years ago. Dell and HP had virtually identical market share in 2006.

In the United States, Apple computers showed the strongest sales growth of 28 percent year on year. Apple has a much smaller market share of just 6,1 percent.



Digital music sales reach \$3-billion

Record companies around the world have seen a 40 percent increase in digital music sales in the past year, with combined revenues reaching almost \$3-billion as international sales of compact disks continue to decline sharply.

According to the International Federation of the Phonographic Industry, the increase in legitimate music sales did not offset the billions of dollars being lost through music piracy. It estimates that illegal downloads are 20 times higher than legitimate sales. There are now more than 500 licensed digital music sites selling music around the world.

In a move that has been widely welcomed by the music industry, France has become the first country in the world to clamp down on music piracy. French President Nicholas Sarkozy has stipulated that Internet service providers in that country must automatically disconnect any users who are involved in piracy and, if there is a continued infringement, ban them from connecting to the Internet altogether.

He has not said how the service providers will be monitored or what penalties will be imposed on them.




Tata's brand new People's Car for just R18 000

By Peter Middleton



The Tata NANO — the world's cheapest car at around \$2 500 — will be available in India before the end of the year. Initial production is expected to be 250 000 units a year.



Tata motors of India launched the much-talked-about '1 lakh car' — now officially named the Tata NANO — at the Auto Expo in New Delhi. The car's price is just one Lakh rupees, equivalent to \$2 500 or R18 000, making it the cheapest car in the world and possibly the most affordable car ever made.

This begs the question "Is this the cheapest car by far, or is it just too cheap?"

The car has 'a snub nosed look' in the tradition of the Fiat 500 that has sold millions of models since it was launched in 1957.

The Fiat 500 is still available in Britain and Europe but there don't appear to be any plans to launch it in South Africa.

Although there is no local price for the car, the price in Britain for the base model is £9 300 or almost four times the price of the Nano.

Tata's One Lakh Nano has four doors and can seat four or five people. It is, in the promotional literature released by the company, a comfortable, safe, all-weather car, high on fuel efficiency and low on emissions. Tata says it represents a development that signifies a first for the global automobile industry, as a People's Car, which brings the comfort, safety and convenience of an economical vehicle within reach of thousands of families.

Speaking at the launch at Auto Expo in New Delhi, company chairman Ratan N. Tata said, "I observed families riding on two-wheelers — the father driving the scooter, his young kid standing in front of him, his wife seated behind him holding a little baby. It led me to wonder whether one could conceive of a safe, affordable, all-weather form of transport for such a family.

"Tata Motors' engineers and designers gave their all for about four years to realise this goal.

Today, we indeed have a People's Car, which is affordable and yet built to meet safety requirements and emission norms, to be fuel efficient and low on emissions. We are happy to present the People's Car to India and we hope it brings the joy, pride and utility of owning a car to many families who need personal mobility."

As a result, the People's Car is designed with a family in mind, says Tata. It has a roomy passenger compartment with generous leg space and headroom. It can comfortably seat four people. Four doors with high seating position make ingress and egress easy. "Yet with a length of 3.1 metres, width of 1.5 metres and height of 1.6 metres, with adequate ground clearance, it can effortlessly manoeuvre on busy roads in cities as well as in rural areas. Its mono-volume design, with wheels at the corners and the powertrain at the rear, enables it to uniquely combine both space and manoeuvrability, which will set a new benchmark among small cars."

The Engine? It has a rear-wheel drive, all-aluminium, two-cylinder, 623 cc, 33 bhp (25 kW), multipoint fuel injection petrol engine. "This is the first time that a two-cylinder gasoline engine is being used in a car with single balancer shaft," claims Tata. The lean design strategy has helped minimise weight, which helps maximise performance per unit of energy consumed and delivers high fuel efficiency. Performance is also controlled by a specially designed electronic engine management system."

The car's low price has clearly not been achieved by a combination of old technology and minimalism. Tata cites the lower cost of Indian engineers and the "out-of-the-box solutions to slash development and production costs."

The Nano's safety performance exceeds current (Indian) regulatory requirements. With an all sheet-metal body, it has a strong passenger compartment, with safety features such as crumple zones, intrusion-resistant doors, seat belts, strong seats and anchorages, and the rear tailgate glass bonded to the body. Tubeless tyres further enhance safety.

It also claims the 'Environment-friendly' label. The tailpipe emission performance exceeds current Indian regulatory requirements. "In terms of overall pollutants, it has a lower pollution level than two-wheelers being manufactured in India today. The high fuel efficiency also ensures that the car has low carbon dioxide emissions, thereby providing the twin benefits of an affordable transportation solution with a low carbon footprint."

Tata predicts that a whole new market segment will emerge as a result of this vehicle.

"It is bound to eat into the high-end two wheeler market and the low-end car market," says Tata.

The cost advantage of manufacturing small cars in India is already evident in the Maruti 800, originally known here as the Daewoo Matiz and now called the Chevy Spark. The Maruti — majority owned by Suzuki motors — is manufactured in a highly self-sufficient factory in Gurgaon, south of New Delhi. It employs about 4 700 people and is ringed by suppliers who employ at least that many more.

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Family transportation by motorcycle or bicycle in India. The Tata Nano may replace these vehicles and the hazardous journeys.



The site generates its own electricity and recycles its own water. Inside the main factory are all the materials the company needs for two hours of production at a rate of one completed car every 21 seconds. Giant swivelling robots do much of the welding, and manpower is employed mostly to check for errors. It manufactures 350 000 vehicles a year and has a maximum capacity of 500 000.

"We have made the entry for our competitors smoother," says Mr Khattar of Maruti. "India will never be a global manufacturing hub for all automobiles, but the country has a major role to play in the manufacture of compacts. What India can offer," he adds, "is frugal engineering."

Toyota, Hyundai and Chinese automaker Chery are also looking to make ultra-cheap cars in India. According to PricewaterhouseCoopers, India will become the testing ground for all low cost vehicles. It predicts that by 2010, more than 100 million world households will be able to afford a \$2 000 - \$3 000 car.

At this stage it appears the Tata Nano will not be coming to South Africa – although it may be available in other parts of Africa. One of the apparent reasons for this is that it has a top speed of only 105 kph - with the congestion on our roads it's virtually impossible to travel at anything approaching that kind of speed, particularly at peak times.

Of course, setting another couple of thousand cars and drivers free on South Africa's roads is also a worrying thought since we are currently injuring, maiming or killing about 50 000 people a year through collisions and accidents.

The traffic jams in South Africa are certainly not nearly as extreme as those in the major cities of India and if plans to improve the highway infrastructure around Cape Town and Johannesburg come to fruition then perhaps there would be room for more vehicles, making the Tata a wonderful option for those families that are driving ancient jalopies because they cannot afford anything else.

In India itself, green advocates are worried. They say the low price will bring the car within the reach of millions of Indians, and open up an entirely new export market, triggering more pollution and placing even more of a burden on the country's already crumbling infrastructure. Ratan Tata responds: "The car will adhere to strict quality norms like any car in the developed world. We will have less pollution per vehicle than any other car in the country today." He acknowledges there will be more congestion, but says the answer is in building more and better infrastructure rather than asking car makers to roll back production.

He is curious as to why his low-cost car for average Indians is being singled out for criticism. He has a point when you consider that car ownership in the US is at 750 per 1 000 of population compared to eight cars for every 1 000 people in India. The Toyota Prius, the hi-end hybrid environmental solution sold in the West, currently advertises fuel economy figures of 5.11 litres per 100 km — a figure already adrift of small car benchmarks being set by the likes of the Smart

car at 4.7 l/100km. Tata's fuel consumption predicted to be around 5,0 l/100km - seems comparatively high for such a small engine.

Future fuel options for Tata's small car may also be worth watching. Tata claims that it is "keeping fuel options flexible, including the use of ethanol." In February 2007, Tata signed an agreement with the MDI group, inventor of an environmentally friendly compressed air engine.

While Tata has made no link between this engine and its new car, the move suggests a readiness by Tata to compete internationally in the low emissions markets of the future. At the signing, Mr Guy Negre of MDI said: "MDI is happy to conclude this agreement with Tata Motors and work together with this important and experienced industrial group to develop cost saving technology for the Indian market." **Wn**

Key specifications

Dimensions: 3.1 metres (10.23 feet) long, 1.5 metres wide and 1.6 metres high. It has four doors and can seat four to five people. The interior cabin size is only 20% smaller than its nearest competitor, the Maruti 800.

Engine: A two cylinder 623 cc, 25 kW (33 hp), all aluminium, multi-point fuel injection petrol engine that can power the car to top speeds of 105 kilometres per hour. The engine is rear mounted, like the Fiat 600.

Fuel Efficiency: Currently predicted by Tata as 5,0 litres per 100 km or 20 kilometres per litre.

Pollution: Exceeds Indian regulatory requirements and can meet strict Euro IV emission standards in terms of overall pollutants. Tata says the car is better than two-wheelers currently manufactured in India.

Safety: Exceeds current regulatory requirements with a strong passenger compartment, crumple zones, intrusion resistant doors, seat belts, strong seats and anchorage.



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BRAIN BUSTERS

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

Question 1

Two materials have different resistivities. Two wires of the same length are made, one from each of the materials. Is it possible for each wire to have the same resistance? Justify your answer.

Question 2

You have four identical resistances, each of value R . You are asked to connect all four resistances together in such a way that the equivalent resistance is R . How many ways can you find to do it?

Question 3

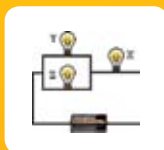
A simple lie detector consists of an electric circuit, one part of which is your body - perhaps from one finger to another. A sensitive meter is used to indicate the current that flows when a small voltage is applied. Can you think how such an arrangement might indicate that a person is lying?

Question 4 [This is not a trick question.]

In a typical day, about 20 kW per hour of electrical power is consumed in the average household. How many electrons does the electric company provide then to a household in a typical day?

Question 5

In the circuit below the bulbs are identical. Which bulb (or bulbs) is (are) the brightest, and which is (are) the dimmest, or are they equally bright?



Killing weeds with electricity

An unusual question appeared some time ago on ScienceForums.net. A forum member asked: "How much electricity over a certain amount of time (say instantly to about ten seconds) would it take to kill your average garden weed (roots and all)? How does the electricity actually kill the weed, other than by simply frying it? Do you know of any commercial products that can do this already?"

Someone replied swiftly: "Have you actually heard of using electricity as a weedkiller, or are you just proposing it yourself?" A good question!

He continued: "I would bet that you would need a hell of a lot of voltage or current to do the job. The easiest test that I can think of is to take a car battery and a jumper lead, place one lead to one terminal and the other to a metal pole placed in the ground next to the test weed. Then take the other lead and connect one end to the other terminal and the other end to the weed. If this does not work, take two car batteries ..."

Now, we all know this is totally out of the question. One wonders just what weeds the person responding had been smoking. He added, to make more of a fool of himself: "The high voltage option would be more spectacular -- just imagine going around your garden with an electric weed zapper, saying "die weed, die -- zap zap zap!" and compounded the whole lot by finishing with a "ha ha ha (mad scientist type laugh)".

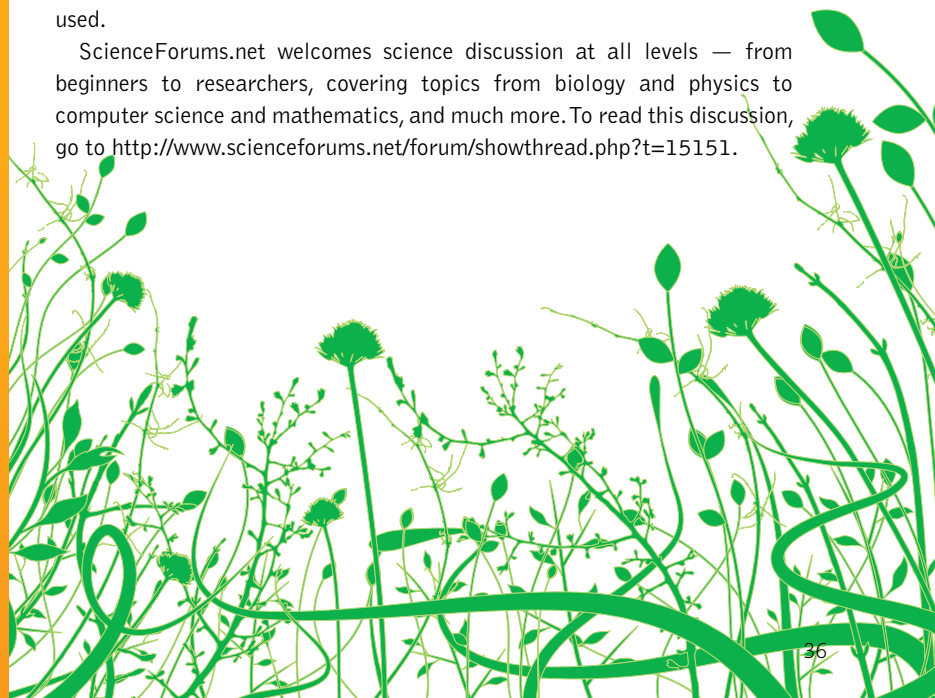
A more reasonable response came from another online reader who had this to say: "In the early 1980s, UK TV had a programme called "Tomorrow's World" on which it demonstrated inventions which included an electric weed zapper, powered by a battery on the belt. All you to do is get the amps right! It basically bursts the cells of the plant, which then dies... all the way to the tip!"

He (or was it she?) pointed out that the police, who banned the product, also used the principle to create the tasar, which, although legal for use by police officers, is illegal for all others.

A further idea was put forward on the site, for a gadget (to be attached to a tractor) which could target weeds higher than the surrounding crop, described as something like a comb device with alternate polarities per tooth, a bit like hedgetrimmers separated and staggered with the + applied to one length and the - to the other, using nylon nuts and bolts and separators.

A late addition to the thread suggested that high voltage can kill the nutrients that are causing the weeds to grow, and that resonance creates vibrations, but that the use of electricity will depend on the technology used.

ScienceForums.net welcomes science discussion at all levels — from beginners to researchers, covering topics from biology and physics to computer science and mathematics, and much more. To read this discussion, go to <http://www.scienceforums.net/forum/showthread.php?t=15151>.



Electrical applications in aircraft - 1942 view

by Glynnis Koch

In the first half of 1942 Lieutenant Bruce Morison of the South African Air Force addressed members of the SA Institute of Electrical Engineers on electrical applications in aircraft. The meeting was presided over by the then President of the Institute as well as by Lt-Col Morton, the Chief Technical Training Officer at the SA Air Force Training Headquarters and by Professor Raikes, Principal of the University of the Witwatersrand, which had at the time a training squadron to prepare university students in ground training work in the air force.

Lieutenant Morison opened his address by commenting on the "enormous advance" that had been made in the design of aircraft since the early days of the aeroplane, three decades earlier. This advance had been made possible, he said, by the application of electricity to perform innumerable functions enabling the modern aeroplane to be flown safely.

Aircraft functions performed by electricity

There are numerous functions of the aeroplane which rely on electricity and Lieutenant Morison gave detailed explanations of all these in his talk. He stressed, firstly, that the aircraft electrical system is similar to that of a motor car, low tension current being obtained from a generator, provided with suitable means of voltage regulation, operating in conjunction with a floating battery or batteries.

Generators

In the 1940s, engine-driven generators were the norm, although, because of space limitations, restricted to an overall diameter of six inches [sic]. Two types were in general use: the shunt-wound and the self-regulating. The former operated in conjunction with an automatic voltage regulator and was rated at 500 watts (12/14 volts or 24/28 volts). The automatic voltage regulator used at the time consisted of a carbon pile rheostat connected in series with the generator field winding. The automatic regulation maintained a constant generator voltage irrespective of engine speed.

The self-regulating generator (usually 500 watts) was compound-wound with shunt and series fields designed to give level compounding with an additional control field in series with the battery-charging circuit only. The associated equipment included a cut-out and a charge-regulating switch that reduced the current charge to half by

the introduction of a suitable resistance in the shunt field.

Morison told his audience that recent developments in the USA had resulted in the production of a three kilowatt generator (100 amp, 30 volt, weighing 32 pounds) and that a six kilowatt (200 amp, 30 volts, weighing 37 pounds) machine was being investigated at the time. The latter generator was apparently force-cooled from the propeller slipstream. These figures were indicative of the large step forward that had been taken in reducing the weight/capacity ratio of generators from 44 pounds per kW to about six pounds per kW.

Accumulators

The lifespan of all aircraft accumulators was very short because they were designed to give the highest capacity-to-weight ratio. The 15 ampere hour battery was intended for use in fighter planes and delivered 50 amperes for about six minutes, when the voltage on load fell to 8 volts.

Alkaline accumulators of the nickel cadmium type were also available in various sizes. These had the advantage of a longer life and required less maintenance. Their regulation was, however, very poor, and they used to suffer serious loss of capacity at temperatures below 32°F.

Starters

Two main starter types existed in 1942: the direct starter and the inertia starter. In the former category, a starter such as the Rotax Eclipse E160 starter, the motor torque was transmitted to the engine shaft at a ratio of 90:1 through a gear reduction unit.

The basic design of the inertia starter involved the storage of energy in a small fly-wheel by rotating it at a high speed, then engaging it by means of a clutch and gears to the engine-spinning crankshaft. This type of starter had the following advantages: minimum weight in proportion to the cranking torque of the starter and high initial cranking speed, thereby ensuring delivery of fuel to the cylinder.

Ignition

Magneto ignition possessed many superior features to battery ignition. The inductor type magneto had two important advantages in that it could produce four instead of two sparks per revolution and the armature windings were stationary. Morison said that most modern



magneto at the time could run up to 8 000 rpm, which was far above any service speed required. For engine starting purposes, a booster coil or hand-driven starting magneto was connected to a starting electrode in the distributor set about 30° behind the main electrode in order to ensure that the piston in the cylinder was over top dead centre, thus eliminating the possibility of a back-fire.

Wiring and distribution

Aircraft electrical installation regulations have to be very strict because of the disastrous results which may follow on electrical failures. In 1942, all British aircraft adopted the double-pole system, but in most American, all-metal machines, an earth return was used.

Care had to be taken to position cables so that the magnetic fields did not interfere with the aircrafts' compasses. Conduit was being used extensively in the '40s, divided into three separate sections:

- Lighting, heating and power
- W/T services and intercommunication
- Ignition

Application of electric power in aircraft had the decided advantage that the distribution system could be rendered self-protecting which made it possible for any failure to be automatically isolated. Fuses were extensively used for this purpose, but the more extensive use of relays was being considered at the time.

Motors

Electric motors of various types were very important components of the electrical installations in aircraft and were used for, amongst other things, operating controllable pitch airscrews, flaps, pump units and landing gear.

Explosion-proof motors were being developed at the time for the operation of fuel pumps. At the time of the talk, the latest application of motor-driven positioning was used for the operation of flaps, accomplished, in the simplest installations, by the operation of a potentiometer.

An important application of motor power that was gaining favour in the '40s, was the operation of varying the pitch of propellers or airscrews. The Curtiss electric variable pitch airscrew was operated by a series of motors rated at 0,28 HP at 1 800 rpm and the consumption at full load on a 12 volt system was approximately 15 amps.

Lighting and heating

Navigation lights, identification lamps, formation-keeping lamps, cockpit and instrument lights as well as landing lamps, are all electrical applications in aircraft. In 1942 it was common practice to provide electrically heated gloves and boots requiring 36 watts. Small heaters were often fitted to machine guns to prevent the mechanisms from freezing.

Electrical armament equipment

Lieutenant Morison spoke about bomb release in fighters saying that this was effected by pressing the firing switch which closed a circuit through the release solenoid. Each release unit was connected to its own selector switch which, in the 'off' position, made contact with the jettison bar. He explained that small bombs were rendered live as they left the carrier by the release of spring pressure on the nose. Large bombs were usually nose and/or tail fused. The pilot or bomb aimer was able to drop the bombs by operating a fuse selector switch box.

Alternating current in aircraft

A 400 cycle, 110 volt supply of AC was used for operating gyroscopic instruments. Fluorescent lighting was being introduced onto aircraft in the '40s, being ideal instrument lighting since numerals and dials became the source of light and there was no glare.

In general AC offered more advantages than DC, although Morison noted that dispensing with the battery as a reserve source of power (which would follow if AC were adopted), was a decided disadvantage. He was of the opinion that the 110 volt, 400 cycle, three-phase system would, in all likelihood, be introduced in the near future. He added that a separate accessory power plant would be necessary, in that case, for starting the aircraft engines on the ground. At the time, a five kilowatt 28,5 volt plant (externally supercharged) was available, though the size of the supercharger had rendered the plant impracticable.

In conclusion

Lieutenant Morison closed by saying he had only been able to touch lightly on all the various aspects of the subject and that he had, naturally, been unable to deal with the interesting developments in electric armament equipment. **Wn**

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All blue-eyed people related

All blue-eyed people apparently share a common ancestor who was responsible for the gene mutation that changed the eye colour from predominantly brown or green to blue. The mutation occurred between 6 000 and 10 000 years ago.

Scientists at the Department of Cellular and Molecular Medicine found that the genetic mutation affected the OCA2 gene in chromosomes that provide codes for the so-called P-protein involved in the production of melanin. The lower melanin 'dilutes' the brown eye to blue.

In people with brown or green eyes there is a relatively large difference in the amount of melanin in the iris, which is controlled by considerable individual variations and the DNA responsible for melanin production.

The blue eye mutation is not seen as either 'positive' or 'negative' as it is not a life-threatening change that limits chances of survival.

Beatles song heads for SPACE

Using the Deep Space Network, the Beatles' hit song *Across the Universe* has been beamed into deep space by the National Aeronautics and Space Administration (NASA). It was beamed into space on February 4, 2008 to commemorate the 40th anniversary of the day that the Beatles recorded the song and the 50th anniversaries of NASA's founding and the Beatles' formation.

The transmission, being undertaken by NASA's Jet Propulsion Laboratory in Pasadena, California, is aimed at the North Star Polaris, more than 430 light-years away from the earth. The song will travel through space at a speed of 186 000 miles per second.

When told about NASA's plans, former Beatle Sir Paul McCartney asked the space agency to "send my love to the aliens". However, John Lennon's widow Yoko Ono was more philosophical claiming that this transmission was the "start of a new age in which we will communicate with billions of planets across the universe".

Imagine if a song comes back and, better still, if we understand it.



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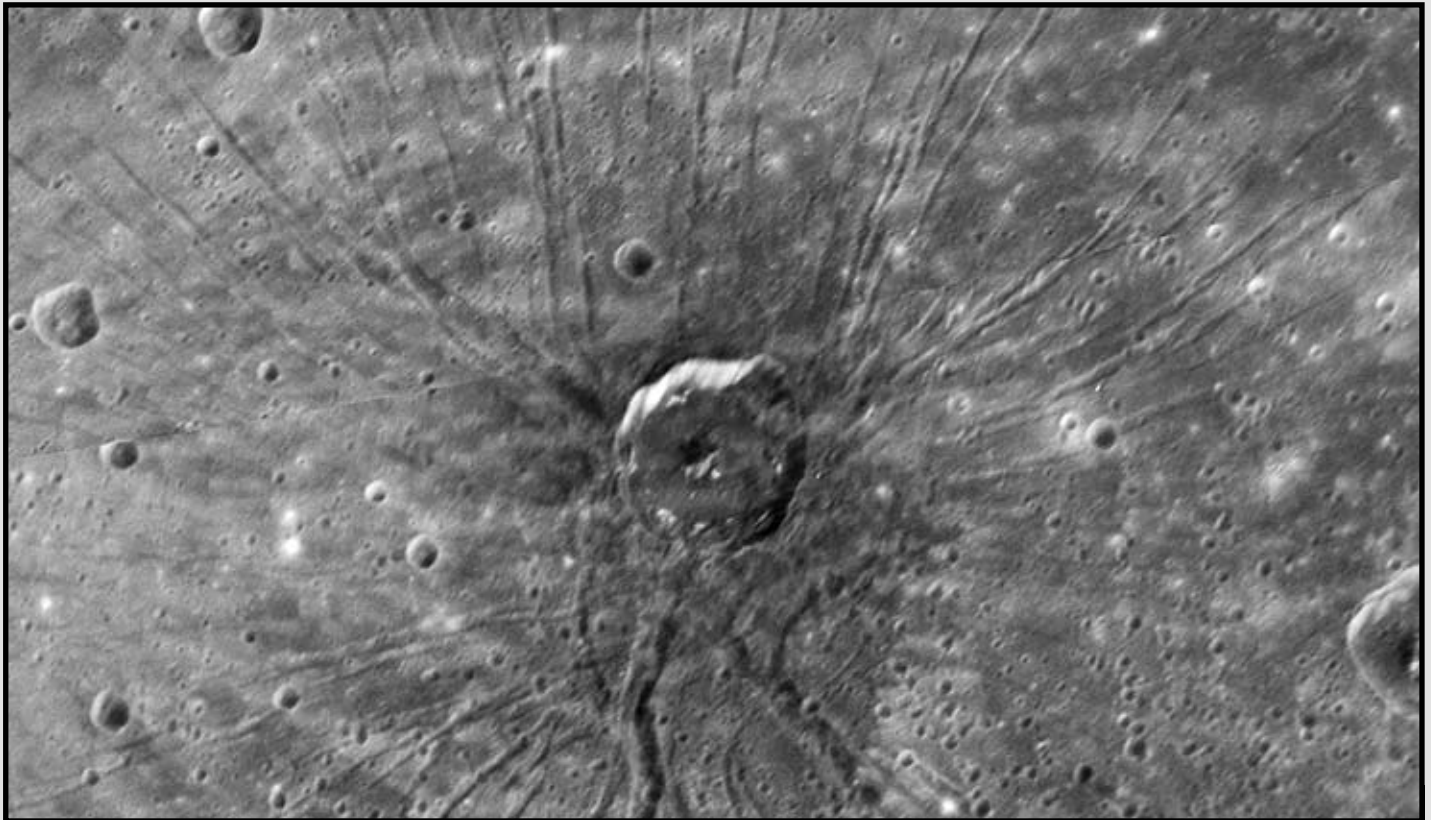
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'Spider' on the surface of Mercury



NASA's Messenger mission is taking a closer look at an unseen side of Mercury and has provided scientists with pictures that reveal a great deal of volcanic activity, deep impact craters and a unique feature, dubbed 'the Spider' in centre of the crater Caloris.

Caloris is Mercury's huge, 1 550 kilometre wide impact crater that was partially seen by Mariner, but has now been observed in its entirety by Messenger. Often in impact craters the centre is covered with dark lava, called maria but in the case of Caloris the interior of the crater is lighter in colours and is surrounded by a darker ring.

The Spider – in the centre of Caloris – has more than 50 troughs radiating from it and has created a new 40 kilometre crater. None of the scientists at NASA – or at any other of the space agencies around the world – have ever observed a feature such as the Spider.

"We don't actually know what it is but one possibility is that the formation of Caloris somehow created a plume of molten rock that rose beneath the basin's centre, pushing the basin floor upwards and cracking through the crust to form troughs," says Messenger team member, Louise Prockter.

Mercury was last closely observed by the Mariner 10 spacecraft in 1975 and the images it returned then suggested that lava once flowed across the surface of the planet. Prockter says the suggestion

"The Spider" – radial troughs within Caloris

The Narrow Angle Camera of the Mercury Dual Imaging System (MDIS) on the Messenger spacecraft obtained high-resolution images of the floor of the Caloris basin. Near the centre of the basin, an area unseen by Mariner 10, this remarkable feature – nicknamed "the spider" by the science team – was revealed. A set of troughs radiates outward in a geometry unlike anything seen by Mariner 10. The radial troughs are interpreted to be the result of extension (breaking apart) of the floor materials that filled the Caloris basin after its formation. Other troughs near the centre form a polygonal pattern. This type of polygonal pattern of troughs is also seen along the interior margin of the Caloris basin. An impact crater about 40 km in diameter appears to be centred on "the spider." The straight-line segments of the crater walls may have been influenced by pre-existing extensional troughs, but some of the troughs may have formed at the time that the crater was excavated. Credit: NASA/Johns Hopkins University Applied Physics Laboratory/ Carnegie Institution of Washington

of volcanism was "not accepted by everyone" but the new images have now removed all that doubt.

The side of Mercury observed by Mariner 10 was more heavily cratered than the side seen for the first time by Messenger.

She says that Mercury's surface is dotted with impact craters that are hundreds of kilometres across and yet the floors of these craters are so smooth that they must, at some time, have been filled with lava.

Photon control squeezes light

Researchers at the Max Planck Institute for Gravitational Physics and at the Leibniz University of Hanover have, between them, set a new world record controlling photons by placing them in a specific order. In doing this, they also produced a laser beam of exceptionally high quality.

By placing the photons in order, the photon 'noise' – caused by quantum mechanical intensity fluctuations – can be reduced by 90 percent. Using this 'quiet' or 'squeezed' light makes it suitable for quantum key distribution so that a message can be encrypted using a key whose security is guaranteed by quantum mechanics.

Roman Schnabel, lead researcher at the Max Planck Institute for Gravitational Physics.



Squeezed laser light is particularly valuable as its intensity and the number of photons can remain constant over a period of time. With standard laser beams – or everyday light sources such as a bulb – the photons are randomly distributed.

The squeezed laser light is used for optical data transmission or to measure gravitational waves with incredibly precise accuracy and allows scientists to observe, for instance, black hole collisions at the edge of the universe.

New thermo-electric device

Scientists are developing a new device that can convert wasted heat into electricity. This has profound implications for global energy supplies and of course for the South African market where perpetual electrical shortages are likely to last for at least the next eight years.

Researchers at the Lawrence Berkeley Laboratory and at the University of California, Berkeley have invented a thermo-electric device using silicon, which is one of the most abundant materials on earth and is the foundation of the multi-billion dollar semi-conductor industry.

According to Arun Majumdar, a mechanical engineer and materials scientist who holds joint appointments at the Berkeley Laboratory and at the University, the discovery was "serendipitous". He says that at this stage it is not clear why the device they made actually works but the results are "very promising".

The concept of converting heat into electricity is not new and about 90 percent of all power plants use fossil or nuclear fuels to produce mechanical energy that is then converted to electrical energy.

"The heat cools rapidly as it passes through the turbine," says Majumdar. "But the wasted heat from the power plant is still extremely hot. If, say, four percent or even seven percent of the heat

could be recycled or re-used, the impact on global power generation would be enormous."

He points out that while this may sound like a fairly simple engineering challenge it isn't easy to achieve. "For instance, if you heat one end of a piece of wire, heat will flow to the cold end of the wire and that's electricity. For the process to continue, one end of the wire must remain hot and the other cold," he says.

The problem facing scientists is that most materials that conduct electricity also conduct heat and this is especially true of silicon, which was dismissed as being unsuitable for thermo-electric conversion.

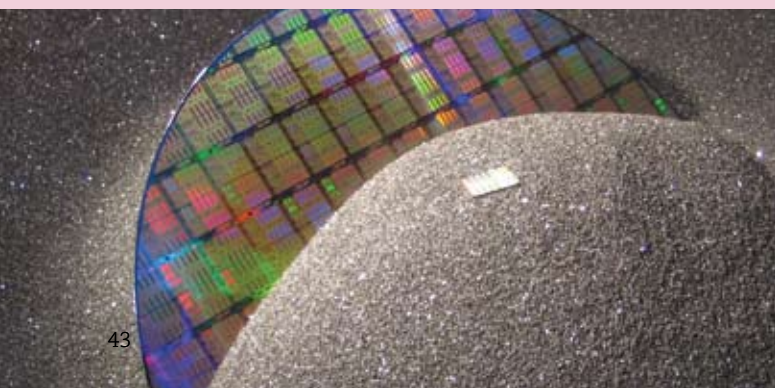
Majumdar says that he and his colleagues immersed a silicon wafer in a chemical solution hoping that it would be an easier and cheaper way to make nano-wires which, while they have a great many uses, are not easy to produce.

As they expected, a forest of nano-wires grew on the surface of the submerged silicon wafer. The scientists found that while the nano-wires could be produced, they were rough around the outside instead of having a smooth surface which is needed in nano-technology.

Majumdar thought that perhaps the flawed wires would have a purpose in some type of photovoltaic device but that didn't work either. He and his colleagues then tried to use the wafer as a thermo-electric device and bingo, the rough nano-wires allowed current to flow from the heat source towards the cold source. "What surprised us most of all is that heat did not flow from hot to cold", he says.

Majumdar concedes that there is still much work to be done before the physics is fully understood but believes that the rough surface of the wires allows the electricity to flow while dissipating the heat.

He says that this discovery could mean that it will be possible to generate enough heat from the human body to recharge a cellular phone battery. If this is the case then there are many thousands of other uses for this technology.



Onions with no sting – why bother?



Using biotechnology developed in Australia, New Zealand scientists have developed an onion that will no longer make people cry when it is being peeled. This has been achieved by 'switching off' the gene for an enzyme responsible for causing tears.

New Zealand's Crop and Food Research Institute hopes to have what it calls a 'prototype' crop, available within the next ten years. According to the Institute's senior scientist, Colin Ealy, work on the project started in 2002 after Japanese researchers found that an enzyme in the onion was responsible for making people cry.

He added that by stopping sulphur compounds from being converted to the tearing agent and then redirecting sulphur into compounds that affect health and flavour, the taste of an onion could be improved.

Ealy claims that the researchers are hoping to produce nice, sweet aromas associated with onions and stop the bitter, burning, pungent, tear-producing agents that make people dislike them.

Perhaps if they are successful a whole new variety of onion flavoured milkshakes, boiled sweets and even humbugs might emerge. Of course, anyone who cooks or enjoys salads will be mortified. Gone are the classic dishes of French Onion Soup, Cheese and Onion crisps or Cottage Cheese with Green Onions and Chives.

I reckon researchers could spend their valuable research time finding a way to turn off the enzyme that makes them so barmy.

Are there extra dimensions that are surrounding us?

The world's most powerful particle accelerator will start operating later this year and scientists are hoping that it might provide a glimpse or even proof of the existences and shapes of extra dimensions.

Researchers at the University of Wisconsin-Madison (UW-Madison) and the University of California-Berkeley claim that the signatures left by a new class of particles will help to distinguish between possible shapes and extra-spatial dimensions that have been predicted in string theory.

String theory describes the fundamental particles of the universe as tiny vibrating strings of energy and suggests that there could be six or seven unseen spatial dimensions in addition to the time and three space dimensions that human being usually see.

According to Gary Shiu, a physics professor at UW-Madison, the shape of a musical instrument determines the way its sounds. In string theory, the way the string vibrates determines

the pattern of particle masses and the forces we feel.

Shiu says that by determining that shape it should be possible to begin to understand the many possibilities for extra dimensions.

The new particle accelerator, the Large Hadron Collider, is due to begin operating in Switzerland later this year. By smashing atomic nuclei into each other at speeds close to the speed of light, new high-energy, highly unstable particles are created and these quickly lose energy.

"The patterns of this rapid decay act like fingerprints of the exotic particles and may shape the unseen dimensions," says Shiu. "The signature patterns from particles called Kaluza-Klein (KK) gravitons distinguish between different extra-dimensional geometries.

"In simulations, even small geometric variations lead to differences in KK graviton signatures," he says.



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Electric car that can ‘zap’ its opposition

ZAP is hoping to produce its \$30 000 three-wheeled electric sports car – that can do 0-100 km/h in under six seconds – by 2009. This does seem somewhat optimistic as the company has only just asked various sub-contractors to start designing the components.

The Alias model will feature two in-wheel motors producing 320 horsepower and it will have a range of at least 350 kilometres per charge. The company is considering incorporating a fast-charge capacity for the batteries as well as introducing a hybrid range extender, although these details have yet to be released.

ZAP and China Youngman Automotive Group – one of the leading bus manufacturers in the country – launched the joint venture for the Alias and the ZAP-X Crossover Utility Vehicle two years ago. According to company chairman Alan Lam, the Alias will go into production in the second quarter of 2009 and will be available through retailers in the US next year. The \$60 000 ZAP-X will be available in the second half of this year.



Elephant grass growing in Norfolk

Biofuels are considered by many to be a viable alternative to fossil fuels. At this stage, however, vehicles cannot run solely on these fuels although they are being blended into petrol and diesel in Europe and Britain. From April this year all diesel sold in Britain will contain at least 2,5 percent biofuel and this will rise to ten percent by 2020.

The interest in biofuels has prompted some farmers to introduce various alien crops to Britain and northern Norfolk; farmer Tom Green, for example, is growing elephant grass as a biofuel. It is used in conventional boilers.

Last year, Britain's largest power station at Drax in north Yorkshire used 300 000 tons of elephant grass mixed with its ordinary supplies of coal to generate power while reducing carbon emissions.

Green is now growing sugar beet and wheat that can be distilled and turned into liquid ethanol, which can be added to petrol. Other crops such as soya, rape and palm oil are refined and added to diesel.

Farmers in Britain, South Africa and South America are hoping that they will get better prices for their crops from the biofuels sector than are achieved on the food markets of the world.





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Great opportunities for engineers in South Africa

According to the Engineering Council of South Africa, about 300 professional engineers are leaving South Africa every year. These figures are based on the number of engineers who cancel their registration with the council.

According to ECSA's Johan Pienaar 14 900 engineers were registered with the council in 2005 and by November 2007 this figure had dropped to 14 811, even though almost 1 300 engineers qualify from South African universities each year.

A recent survey compiled by Allyson Lawless, a former president of the South African Institute of Consulting Engineers, 79 municipalities in South Africa do not have civil engineers, technologists or technicians on their staff and there currently more than 1 000 vacancies for these skills at municipalities throughout the country.

Eskom, too, has warned that it currently needs 400 engineers for immediate projects and expects to have a shortage of 6 200 technicians over the next five years.

According to recruitment firms the skills shortage means that engineers and technicians are demanding and getting much higher salaries than in the past. For instance, there is one post for a black female engineer that is offering a salary of R100 000 a month, excluding incentives and allowances.

'Bunnies' slaughtered by Panasonic's Evolta

Panasonic's Evolta batteries last longer than any others and that's official. At least the *Guinness Book of World Records* says so. The name is derived from a combination of evolution and voltage.

The batteries – including samples from Duracell and Energizer – were all tested under guidelines set by the International Electrotechnical Commission. The Evolta batteries have a 10-year shelf-life compared with between five and seven years for other batteries.

The batteries will only be available in South Africa later this year although they do go on sale in Japan from April.

I wonder whether Panasonic could come up with a quick solution to South Africa's energy crisis – one that doesn't take eight years to introduce and will last for at least ten years too.



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Africa's way of fixing phones



In some parts of Africa there remains an incredible ingenuity and ability to keep things working, no matter how badly battered they might be. This is the case at the Okau Cell Part and Repair Shop that is located on the back of a cab-less Toyota truck, where Jack Nendongo works in the dusty town of Opuwo in Northern Namibia.

His tools of the trade are a car battery, a petrol generator, a dozen different types of cell phone chargers and a motley collection of new and used covers for broken phones.

He also has a collection of screwdrivers and pliers that he uses to resurrect a phone that in other parts of the world would be discarded or destroyed.

He is the only cell phone repairer in Opuwo and he will not only fix a phone but, for a small fee, will also charge it for you.

It's a much needed service that he provides because there are more cell phones in the town than there are electricity points.

According to research done by the Massachusetts Institute of Technology's Entrepreneurial Programming and Research on Mobiles unit, cell phone usage in Africa has increased by about 65 percent a year for the past five years and shows no sign of abating. The Institute estimates that there are now at least 160-million cell phone users on the continent.

Nendongo is not averse to 'jump-starting' a cell phone using a car battery or repairing a phone that has been melted because it was left lying in the sun all day. Stock and parts are extremely difficult to get – particularly for the older phones and some customers allege that some independent repairers will take parts out of a customer's phone and replace them with old ones just to get fresh stock.

Batteries – the bug-bear of so many second-hand phone users – also pose a problem for many users but Nendongo claims that he can remove a battery's 'memory' by blasting it with a charge from a car battery. It seems to work and he swears by it – until, heaven forbid, he has a faulty Nokia battery that explodes instead.



Ban Bentley, Aston and Merc

The former chairman of Royal Dutch Shell, Sir Mark Moody-Stuart, has called for all gas-guzzling cars to be banned. Moody-Stuart wants vehicles such as the Bentley Arnage, Mercedes Benz SLR, McLaren and the Aston Martin to be re-engineered to provide better fuel economy.

He claims that the fact that heavy, gas-guzzling machines are taxed more to use the roads in Britain and Europe is no longer a disincentive for the people who can afford them. Moody-Stuart wants tough, new legislation that will force these cars to operate at about 40 or 50 miles to the gallon.

Referring to the introduction of catalytic converters, he says that the vehicle manufacturers had complained that these devices would "put the price of cars up astronomically", but that this has not been the case.

"My years in industry have shown me that manufacturers will provide solutions if governments demand changes through tough legislation," he says.

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Kite used to drag a ship across the sea

A commercial cargo ship is planning to use kite power to drag it across the Atlantic Ocean from Germany to Venezuela later this year. According to the designers, Beluga Skysails, the computer controlled kite, measuring 160 square metres could help to cut fuel costs by 20 percent and perhaps even more.

They claim that the kite will help to reduce carbon dioxide emissions. The global shipping industry contributes about four percent of the world's carbon dioxide, more than twice the amount produced by the aviation sector.

The kite ship will set out from the northern port of Bremerhaven in Germany, cross the Atlantic and dock at Guanta in Venezuela. According to the designers, the kite will be able to "harness the

full power of the wind" as it drags the vessel across the sea.

The maiden voyage is the first time that the wind kite will undergo practical testing.

According to Beluga Shipping's project manager, Verena Frank, the core concept is that wind energy can be used as auxiliary propulsion power. She says this must not be confused with sailing as there is no mast to hinder cargo-loading operations.

The towing kite resembles a para-glider and is shaped like an aircraft wing so that it can take advantage of the different wind directions. It is used at heights of between 100 and 300 metres above the surface where winds are stronger. It can cope with winds of between 7 and 40 knots and through its design and computer controls, does not rely on the wind being directly behind the ship.

Peaking power plant for KZN



The Department of Environmental Affairs and Tourism (DEAT) has approved plans for a 750 MW peaking power station that will be built at Avon in KwaZulu-Natal. Appeals from local residents to build the plant somewhere else have been dismissed.

According to DEAT minister Marthinus van Schalkwyk, the Department of Minerals and Energy had adequately considered the environmental impacts of this project and in his view it was "perfectly acceptable" in terms of the environment.

The appeals have delayed the project for almost three months.

The peaking plant will be built using two open cycle gas turbines that will operate during peak electricity demand or when base-load power plants require maintenance. The diesel-fired turbine is costly to run and will apparently be used sparingly.

The avon plant is located about 65 km north of Durban and about eight kilometres inland from the coast, adjacent to Eskom's existing sub-station.

The AES Khanya consortium is responsible for building, financing, designing, owning and maintaining the plant.

30 MINUTES WITH...

Angus Hay

Junior Vice President, SAIEE

PhD, FSAIEE, PrEng, MIET (London), CEng(UK)



Tell us a bit about your early years.

I grew up in Johannesburg, and attended Emmarentia Primary and Greenside High. My father was an Electrical Engineer, actively involved in the SAIEE, and worked for the South African Railways for many years, so I was exposed to both engineering and railways from a young age. My abilities and interest in maths and science enabled me to be placed in the school National Science Olympiad in

1983, which gave me an opportunity to attend the International Youth Science Fortnight in the UK, and to see something of the wider world of engineering through the then IEE in London.

I completed a BSc(Eng) (with distinction) at Wits University in 1987, and chose to stay a student somewhat longer, at the end of which I was awarded a PhD (Electrical Engineering) for original research work in digital transmission over open-wire lines.

Whilst a postgraduate student, I carried out a number of other duties in the Electrical Engineering department, including setting up some of the first local area networks on campus.

I did my military service in the South African Air Force, and worked on ground-to-air radios and tested new antenna systems in Impala and Cheetah fighter aircraft.

Where did you have your first job and how did you enjoy it?

I joined Transtel in 1993, and on my first day, was asked by Alf Schulze (then head of Transtel) what I knew about radio, since he urgently needed someone to take over a radio project. So, having studied wireline telecommunications technologies in depth, I found myself having to learn all about mobile radio systems, including radio site engineering, propagation prediction, frequency planning, and the art of project and contract management.

I took charge of several projects to deploy trunked radio systems for use in train and related operational communications in Transnet, starting in Johannesburg and Pretoria, followed by Cape Town and Durban, and eventually along some of the major long distance rail corridors across the country. Through these projects, I combined several interests – engineering, trains, travel and the outdoors – a stroke of good fortune!

I was part of the team that established the Transnet joint venture Fleetcall, which was awarded a licence as national public trunked radio operator. During this period, I also managed a successful technology transfer from our international supplier, Fyde Microsystems, and became involved in detailed system design and training. Leveraging this technology transfer, we supplied several other trunked radio systems, including a national public trunked radio network in Taiwan, and the system that is still used today by South African Airways at OR Tambo International Airport, for which we developed a software-based dispatcher system.

I represented Transnet on the International Railway Union (UIC)

permanent working group on radio, dealing with GSM-R (GSM for Railways) and related technologies. With the emergence of digital mobile radio standards, several industry colleagues and I established the Southern African TETRA Association (SATA) to promote TETRA (TErrestrial Trunked RAdio), a digital trunked radio system used today by the SAPS, and which will be used for public safety during the 2010 FIFA World Cup.

What route did your career take?

In the years that I was involved in radio in Transtel, we built it up from an engineering section into the commercial Transtel Wireless, part of Transtel's move from a support service of Transnet into a profitable business division. I acted as head of Transtel Wireless, before moving on to become Chief Technology Officer of Transtel.

As CTO of Transtel, I was responsible for co-ordinating engineering and planning across divisions, interacting with major suppliers on technology issues, advising the Chief Executive Officer on technology matters and aspects of regulation, identifying and analysing telecommunications technology trends, undertaking research and development work, and representing Transtel in various public forums, and on regulatory and technical committees.

In 2002, I first became involved in Transtel's plans for the creation of the Second National Operator (SNO). I was responsible for the design and planning of Transtel's part of the SNO network deployed jointly with Eskom Telecommunications, and later for the development of the network plan developed jointly between all of the shareholders.

What happened after that?

I joined the newly formed company, Neotel, in 2006 as employee number two, and took on the role of Executive Head – Strategy, with responsibility for strategy and business planning. In August 2006, we launched the first international telecommunications services. Having built a national Next Generation Network, with optical fibre reaching into the major metros of South Africa, Neotel announced its first enterprise service in November 2007, and will launch consumer services in the first half of 2008. In the lead-up to the enterprise service launch, I had responsibility for various aspects of the new business.

Most recently, I have been appointed Chief Technology Officer, with responsibility for Neotel's technology choices, network architecture, strategic planning, various commercial aspects of the network, and industry partnerships.

What else do you make time for in your busy schedule?

My leisure interests include scouting, hiking and skiing (when I can get near snow). Last year I led the SA team of adult volunteers to the Centenary World Scout Jamboree in the UK. My wife, Michele, a university lecturer with qualifications in English and Classics, has supported me throughout my career, but has ensured that I realise that there is more to life than just engineering.

From the President's Pen

Ian McKechnie,
President SAIEE



It seems just yesterday that I was inaugurated as SAIEE President in March 2007, and yet here it is at the beginning of February 2008 and I am penning my last President's column for my term of office. I initiated this column in the interests of enhanced communication with our membership and other interested readers, and I hope that you have found the content informative (and dare I suggest, interesting).

My focus for the year was on the SAIEE "Making a difference" – to our members, our industry and profession, and to our country. It was also a year of consolidation as we bedded down our new administrative and business structure from 2006 and enhanced our operations and effectiveness. We also continued to bed down our monthly Institute magazine *WattNow* which was launched with the first issue in November 2006, and I want to encourage your support of this publication, particularly through your businesses and the advertising opportunities offered, but also through sponsored distribution (for example to less privileged learners).

Positive outcomes have already resulted from our enhanced operations and structure, for example in our financial management and results, our CPD activities and our continued centre growth programme. Well done to our Innes House team, our centre secretariats and committees, and our council members, committees and section members.

During the year we continued with our pilot outreach programme in the Bergville area, following up our initial careers workshop participation with a full week-long National Science Week programme and sponsorship of a maths and science extra-tutoring programme for Grade 12 learners. We have participated in another careers workshop over the first weekend in February – particular thanks to Vaughn Stone and Chris Ramble from our KZN Centre and Viv Crone (immediate past President) for their efforts. The challenges in disadvantaged areas such as this are enormous, and the contribution made through participation in programmes such as these are rewarding and, whilst small, can indeed make a difference. The challenge to our Institute is to roll out such activities to other areas through our local centres.

In fact, a general challenge to the Institute is to further directly and actively involve our 5 000 plus members around the country in Institute activities and affairs. We are trying to do this in various ways, such as expanding our footprint of local centres and related local activity, and through the provision of "virtual meeting places" such as our recently launched Discussion Forum on our website at www.saiee.org.za.

We have just concluded the process of awarding bursaries for 2008, and I am pleased to report that the value of bursaries awarded has more than doubled compared to the previous year. We have also awarded two bursaries on behalf of a technology company who ap-

pointed the SAIEE to administer their bursary scheme – please contact Stan Bridgens at the SAIEE on 011-4873003 if your company is interested in having the SAIEE administer a bursary scheme on your behalf.

I recently had the opportunity at the end of January to visit our newest official centre, the Southern Cape Centre, based in George and including areas such as Mossel Bay. I had the opportunity to meet with the local committee and discuss the centre role and activities, and then to meet centre members at a public screening of a newly produced DVD of the Bernard Price Memorial Lecture of 2007, which was presented by Skip Hatfield of NASA. I am pleased to report that, with the enthusiastic committee under the leadership of chairman Neël Smuts and his vice chairman Les Stuart, the centre is in good hands and has a rosy future.

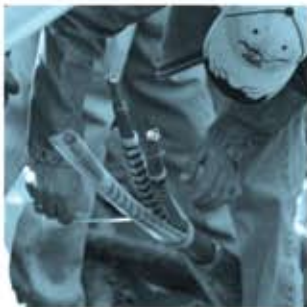
We are actively continuing with our efforts together with local core groups of members to get formal centres established in Bloemfontein (Free State/Northern Cape), Secunda (Mpumalanga) and Sasolburg, and anticipate that these will soon come to formalised fruition. I hope that members in these areas will get actively involved in these initiatives.

The recent power crisis has impacted on and affected all of us, and the SAIEE is taking the initiative in making a constructive contribution towards the issues and problems. For example we are, as I write this, planning "coping forums" for the industrial, commercial and private sector consumers and hope to have had at least the first one by the time you read this. We also planned a Generation Technology conference since last year which is scheduled for 19 February, which has been quite timeous – we have had an excellent response as at the time of writing. We will be continuing to make constructive contributions towards managing and resolving this crisis and to exercise a technology/engineering leadership role. We have a wealth of expertise and experience within our membership base and I want to encourage your inputs and participation.

We face many infrastructural, engineering and educational challenges in our country in our efforts to be a winning nation, and the current power crisis is just one manifestation of these. Many of these are within the ambit of the SAIEE and our mission and objectives, and we need to stand up and be counted, and to build on the momentum being created. As I mentioned above, to do this we need to involve a broader base of our membership directly in our activities and I want to urge you individually and collectively to take up the challenge. As I have said a number of times – a little bit of individual effort collectively goes a long way.

I want to use this opportunity to wish my successor, Vic Wilson, all the best for the coming year.

To conclude with some personal comments. My wife, Melonie, and I have thoroughly enjoyed the privilege and honour of this past year of my SAIEE Presidency. It has been a great experience to meet and interact with members around the country, and to have the opportunity to participate in and to lead the activities of our august institute. There have been many highlights, not the least of which was the Bernard Price Memorial Lecture tour, which had record attendances around the country. Thank you for the opportunity of serving as SAIEE President.



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Sci-Bona Discovery Centre

At the start of the 20th in 1901 the population of Johannesburg was about 100 000 and the power generation capacity was around 1 000 kilowatts. This was inadequate for lighting and electric trams. Plans were made to build a power station with a target date of 1905.

The first generator was started up in 1906 followed by a second machine a few weeks later. Three more generators were completed over the next few months but breakdowns soon occurred and blackouts became the order of the day. It is interesting to note that in 1907 the system was fairly chaotic and now, 100 years later, we have a similar situation!

The cause of those early problems was the use of unreliable gas engines to drive the generators. The system was converted to steam turbines to drive the generators and steam is still used to this day as the prime driving force for electricity generation. Steam power stations appeared in President Street (1922), Jeppe Street (1928), Orlando (1943) and finally Kelvin (1957). Kelvin station is situated on the East side of Johannesburg and is a well known landmark with its tall cooling towers which belch water vapour while it generates power to augment Eskom.

The original gas power station was then referred to as the "Electric Workshop" and the building has been beautifully refurbished into an interactive science centre which is now called "Sci-Bona Discovery Centre". The Centre was officially opened on 11 June 2003 and has grown in excellence until it is now tremendously impressive and is being utilised by many thousands of school children and their parents. The statistics for 2007 are impressive and climbing: schoolchildren 42 302, teachers 2 071, members of the public 10 229, special events 1 563; Total 56 022.

The centre is interactive and is aimed at igniting sparks of interest in science and mathematics that will lead young minds into professions of science, engineering and technology. The interactive demonstrations allow the young scientist to 'drive' the exhibits and understand the scientific principles. One has only to see the interest and sheer delight on the young faces to realize that the centre is succeeding in its objectives.

The Chief Operating Officer is David Kramer, who, with his talented and dedicated team, is continually installing new and brilliant demonstrations. The SAIEE intends to work with David to support his endeavours particularly in the electrical and electronics fields. The Sci-Bona Discovery Centre, located in the Newtown Cultural Precinct, is well worth a visit.



Cheetah fighter aeroplane



Robo-cup robot soccer player

BP lecture makes it to Southern Cape

The 2007 Bernard Price Memorial lecture by Skip Hatfield of NASA, entitled "NASA's Constellation Program and the Vision for Space Exploration" was presented at the SAIEE's Southern Cape Centre in the form of a DVD screening in George on 25 January 2008. An interested audience of approximately 35 people, made up of SAIEE members and their guests, enjoyed the event.

Due to various constraints it was not possible to include George in the lecture schedule in October, but the main lecture at Wits University was recorded, and this recording, including the question and answer session, was presented to the Southern Cape Centre. This DVD has

already been subsequently booked out for a group in Plettenberg Bay, which is what was intended in the making of this recording – to make the lecture content more widely accessible. DVD copies may be ordered from the SAIEE – contact Mike Crouch at 011-4873003 or email him at crouchm@saiee.org.za.

This DVD is also particularly appropriate for schools.

SAIEE President, Ian McKechnie, used the opportunity to visit the new Southern Cape Centre for the first time. This gave him the chance to meet and interact with the local committee as well as with local members and guests.

Obituary – Dr Francis J Hewitt

by David Proctor, George Nicolson and Willem Botha

Dr Francis John Hewitt, brilliant scientist and administrator, former Deputy President of the CSIR, died in Kelowna BC, Canada on December 22nd 2007 at the age of 88 years.

Born in Grahamstown in 1919, he matriculated at St Andrews College, and aged 19, graduated from Rhodes University having obtained the degrees BSc and MSc in the same year.

Frank was awarded a scholarship to Cambridge University but joined the SA Air Force and was assigned to the Special Signals Services, a unit headed by Dr B F J Schonland and charged with developing radar. They built their radars and then operated them in various theatres of war. The Unit served in Kenya, Sinai, West Africa and along the coast of South Africa. Towards the end of the war, Hewitt was appointed as South African Radar Liaison Officer and served on the committee with Robert Watson-Watt and Sir Stafford Cripps (of whom Churchill had said "There, but for the Grace of God, goes god.")

At the end of hostilities, Dr Basil Schonland founded the South African Council for Scientific and Industrial Research and appointed Hewitt as Principal Research Officer of The Telecommunications Research Laboratory (TRL); this was based in the Department of Electrical Engineering at the University of the Witwatersrand in Johannesburg.

The lab was staffed *inter alia* by nine former members of the Special Signals Services. While Hewitt himself used radar to study interstroke processes in lightning, for which he was awarded his PhD degree, staff member Wadley developed a new ionosphere sounder, used for observing the behaviour of the various layers of the ionosphere. Wadley also developed a revolutionary new radio receiver, which was stable and accurately determined radio frequencies, as well as a new signal generator and the Tellurometer, a device for accurately measuring distances as long as 60 km (accuracies of 5 cm were obtained). Hewitt played a pivotal role in promoting these devices and arranging for their manufacture and patent rights. The Tellurometer revolutionised surveying practice throughout the world and initiated a major industry in South Africa.

After the launch of the Russian Sputnik I, staff at the TRL observed and tracked this first ever artificial satellite and improvised a technique to measure the Doppler shift on the signal as it passed overhead. Jules Fejer used that data to predict correctly the lifetime of that satellite. (Russian, British and US predictions were not nearly as accurate.)

A team at TRL designed and built a large radar installation named JB51 for use by SAAF. Another, headed by Dr. Hewitt's sister, Joyce, provided an ionospheric prediction service so necessary for radio communications in those days. In 1960 TRL was upgraded to the National Institute of Telecommunications Research which was housed in a new building on the Wits campus and Hewitt was appointed its Director. Here, Dick Hölischer developed an infra red version of the Tellurometer with sufficient accuracy for cadastral use.

At Hewitt's suggestion, a revolutionary new radio system was developed by David Proctor to obtain time-resolved, three-dimensional images of lightning flashes otherwise hidden by cloud and rain. For the first time, lightning flashes could be seen in their entirety, and the behaviour of lightning could be studied in detail. Hewitt also initiated a project to study thunderstorms by radar. The radar group developed a commercially viable parametric amplifier for use with the JB51.

With the advent of the space age, TRL was approached in 1957 by the US Naval Research Laboratory to operate a Minitrack Facility set up at

Esselen Park to track artificial satellites which the US planned to launch as its contribution to the International Geophysical Year, 1958.

Later in 1958 NASA was established to operate the US civilian space program and proposed that a "Deep Space Instrumentation Facility" be established in South Africa for tracking spacecraft launched to the moon and distant regions of the solar system. Hewitt and his men scoured the countryside for a suitable location that would shield the receiving antenna from man-made radio disturbances. They found the ideal site at Hartebeesthoek, where the 85 foot diameter dish was installed in a deep valley in 1961. The Minitrack station, managed by Willem Botha, was moved and upgraded to a Satellite Tracking and Data Acquisition Facility on an adjacent hilltop. Hewitt skillfully handled all the negotiations and the necessary interface with NASA.

In 1964 Hewitt was appointed a Vice President of the CSIR and promoted to Deputy President of CSIR in 1969. In these positions he presided over many of its technical and scientific functions, tasks that he carried out with skill and aplomb. It was then that he negotiated with the Science Research Council of the UK to form a joint venture that established the South African Astronomical Observatory (SAAO) near Sutherland in the Cape Province (now the Northern Cape). This merged the former Royal Observatory in Cape Town and the Republic Observatory in Johannesburg into a world-class astronomical institution with headquarters in Observatory, Cape Town.

In 1973 political considerations forced NASA to close their Deep Space Station. Hewitt arranged for the abandoned hardware to be converted to a Radio Astronomy Observatory headed by Dr George Nicolson. When the STADAF station closed two years later it was converted to the Satellite Remote Sensing Centre under Willem Botha. Hewitt played a pivotal role in securing local funding for these two facilities, which have both expanded and continue to operate.

Frank Hewitt was a true internationalist in the field of science. His position as South African Radar Liaison Officer at the end of World War II brought him into contact with many of the future leaders in the growing field of Radio Science. He represented South Africa at General Assemblies of the International Scientific Radio Union (URSI) and the Committee on Space Research (COSPAR). He established a National Committee for the International Astronomical Union (IAU) to bring astronomers together at a critical time when various foreign-funded observatories in South Africa were closing their facilities, prior to the establishment of the SAAO.

He was President of the South African Institute of Electrical Engineers in 1964 and was awarded Honorary Doctorates by Rhodes University and by the University of Witwatersrand. The South African Academy for the Advancement of Science awarded him the South Africa Medal in 1987.

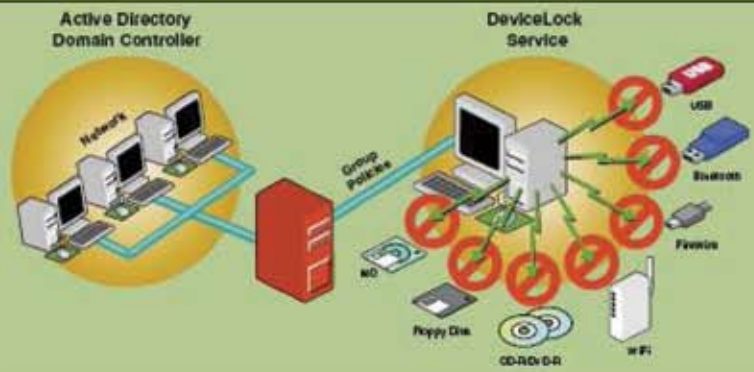
Hewitt was endowed with both theoretical and manual skills. He had been a 'hands-on' scientist and his brilliant and analytic mind inspired others. Ever the gentleman, he was kind and polite, and it was a pleasure to serve him.

He is survived by his wife Betty, whom he married in 1946, his sister, two sons, a daughter, four grandchildren and one great-grandchild.





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A damaging security breach can start with as little as an employee copying sensitive files onto a flash memory stick to catch up on some work at home. The combined effect of many such leaks has flood potential, especially given the high capacity, high transfer speed and multitude of forms personal storage devices have today. One thing is for sure, when copied off your network, the information is fluid, on the move, and you have no control over whose hands it ultimately falls into.

DeviceLock is a flexible and full-featured solution to enforcing device-related security policy.



Contact: sales@qapla.co.za

For More Information



HONDA
The Power of Dreams



We're delighted that the Accord got the lowest score in its class.
(Drag coefficient 0.26)



So what if the Accord has the best drag coefficient in its class? Well, for a start, it means improved fuel consumption and we all know how important that is these days. Cutting cleanly through the air at high speeds also helps to give you a quieter, smoother ride. Having the best drag coefficient is also an indication that the Accord is a superbly engineered car, which you'll only truly appreciate when you get in and drive one. www.honda.co.za **ACCORD** Precision engineering for driving perfection.