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Green effect of clean energy on minimising emissions

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Just trying to please the people always fails

It strikes me that those people responsible for drafting the Integrated Resource Plan 2010 have made the same error that every civil servants makes: trying to pass the buck.

A plan is something that one should be expected to be able to stick to. We have building plans, we have engineering plans and we have plans for everything that is built for human use or consumption.

So why is the Integrated Resource Plan 2010 any different?

Because the Department of Energy says that it's not actually a plan, but more than a set of ideas and that, in essence, it should not be held accountable for the plan if it doesn't achieve what it says it wants to.

Other more intelligent and more eloquent people than me call these things 'brain-storming' or 'think-tanks' or 'ideas' but they don't try to pass them off as an Integrated Resource Plan 2010. Unless they are public servants at the Department of Energy.

Now some of you might say that I'm knit-picking and that the plan represents exactly what South Africa needs to do to meet the ever-escalating demand for electricity in this rapidly growing country.

But that's exactly what the IRP 2010 doesn't do. Instead it lists a set of things that might be done and fails to cast in stone anything that will be done. So we are none the wiser than we were nine months ago when Eskom was telling us that it was definitely going to go ahead with its building programme.

I think the Department of Energy has frankly failed all of us. We need a coherent and sensible plan of action and we need the department – as the custodians of energy policy in this country – to lay out that plan for the engineering community to execute.

And that's exactly what we haven't got.

We need to be told things in simple engineering terms such as:

- Baseload capacity will be increased with the commissioning of a new (either coal or nuclear) power station in (some part of South Africa);
- Renewable energy will comprise a combination of hydro-electric power from (pick a neighbour); wind power (pick a site) and solar power from (Upington or some other spot). The combination will generate (pick a number) of megawatts each year.
- Public-Private Partnerships will be based on the tariffs set out in the (name-it-yourself) schedule;
- (Pick an amount) will be spent on improving the transmission and distribution infrastructure to all municipal areas in South Africa.

That's an example of a plan. Not the wishy-washy, non-committal piece of paper that passes for the IRP 2010.

The other, more important fact is that the engineering community needs to have a clear and precise timeline for what must be achieved and by when. It doesn't need an anomalous document that postulates what the country will do if Kusile doesn't go ahead. What good is that to man, woman or beast?

So as it stands, my own view is the IRP 2010 is nothing more than a half-baked discussion document that sets out very little that is concrete and that has failed to deliver on timelines, on any of the crucial engineering aspects of increased generation capacity and on any of the facts that make such documents critical for the future of the country.

In fact as an academic work, I think it's equally abysmal because it commits one basic error: it's trying to be all things to all people and we know where that leads to as well.

Read it with interest – as I did – and then you try to list, in simple terms, exactly what it is that the Department of Energy has committed to achieve. I'm pretty sure you'll come to the same conclusions as I have.

There's just no commitment there at all.

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Published monthly by
Crown Publications cc
2 Theunis Street
Bedford Gardens
Johannesburg
Tel: (011) 622-4770
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veronicab@crown.co.za

Circulation and Subscriptions:
Norma Massey
normam@crown.co.za
R240 (incl. Vat) per annum
Postage extra outside RSA

CROWN PUBLICATIONS

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

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

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ISSN: 1991-0452

Printed by: Shumani Printers, Cape Town

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Tolls are essential fund new road network

Fears that the toll roads – all part of the Gauteng Freeway Improvement Project – will increase motoring costs for commuters to unaffordable levels have been discounted by the South African National Roads Agency Limited (Sanral) who says that tolls are unlikely to be more than about R350 a month for most users.

Project manager at Sanral, Alex van Niekerk, says that only about two percent of users would end up paying more than a thousand Rand a month. He discounts reports of tolls reaching R3 000, saying that such sums were exaggerated. The final structure for the tolls is expected to be announced before the end of the year. Apparently the freeway upgrade cost Sanral R80-million a kilometre and Van Niekerk says that tolling the roads was the only way to raise the funds to be able to undertake the urgently needed refurbishment.

Discounts will be available to road users who travel in off-peak periods and this would serve to create a more even distribution of vehicles using the highways. There will also be a frequent-user discount and all public transport operators, including buses and taxis would benefit from discounted rates.

Sanral expects to raise R1,63-billion in 2010/11 and this will rise dramatically to R6,56-billion in 2012/13. Exactly how it has reached these figures without knowing what the tolls are is a mystery.

Online advertising on the rise?

South African organisations are embracing the advertising and marketing opportunities the Internet provides, but James Edwards of apurimac – a digital advertising company - warns that the fundamentals of effective campaigns have not changed.

He claims companies too often lose their core marketing and advertising messages and opportunities because executives focus too heavily on the medium, particularly in the online space. Speaking at the Pan African Media Research Organisation's (PAMRO) meeting in Gaborone, Botswana, Edwards says the African continent is fertile ground for online advertisers and marketers.

This is backed up by figures from Yahoo!, the largest Internet portal in Africa. Its statistics show that Egypt has more than 9,5-million unique users, followed by Nigeria with over 4-million and South Africa with 2,75-million.

"Exciting delivery channels have opened up via the Internet and mobile devices but the basics of advertising and marketing still apply – getting a strong message to the right audience," he says. "Organisations should use the appropriate tools for the appropriate audience."

Edwards says South Africa has a sophisticated online community and that digital reach is further enhanced by the high market penetration of mobile phones. "Any effective online or mobile strategy should set objectives and target markets and then set out to reach them through the most appropriate channels. The great advantage of digital channels is that they are cost-effective, measurable and tightly targeted.

"Some caution should be exercised in the mobile space, however. Mobile phones have more than 60 percent penetration in Africa and around 98 percent in South Africa. While those statistics are compelling, only a small percentage of these users have, or actively use, the advanced web browsing capabilities. That said, nearly all handsets have an SMS facility which is a great channel to market if used properly," he says.

As far as the Internet goes, Edwards says cheaper bandwidth is driving traffic upwards and making the web more accessible to a broader audience. "High-capacity undersea telecommunications' cables that link Africa to the rest of the world are already having a positive effect on Internet connectivity and pricing. The West African Cable System (WACS) due to go live in the next year will increase bandwidth and competition, thereby bringing prices down," says Edwards.

Google to invest in electrical power

Technology company Google has tied up with a New York financial firm, Good Energies, to invest in a transmission backbone for future wind farms along the Atlantic Seaboard at a cost of $5-billion. The 550 kilometre underwater spine could remove some obstacles to wind power development in the United States.

Google and Good Energies have both agreed to take 37,5 percent stakes in the project and may bring in additional investors. Trans-Elect, a Maryland-based transmission line company that proposed the venture will build and run the project.

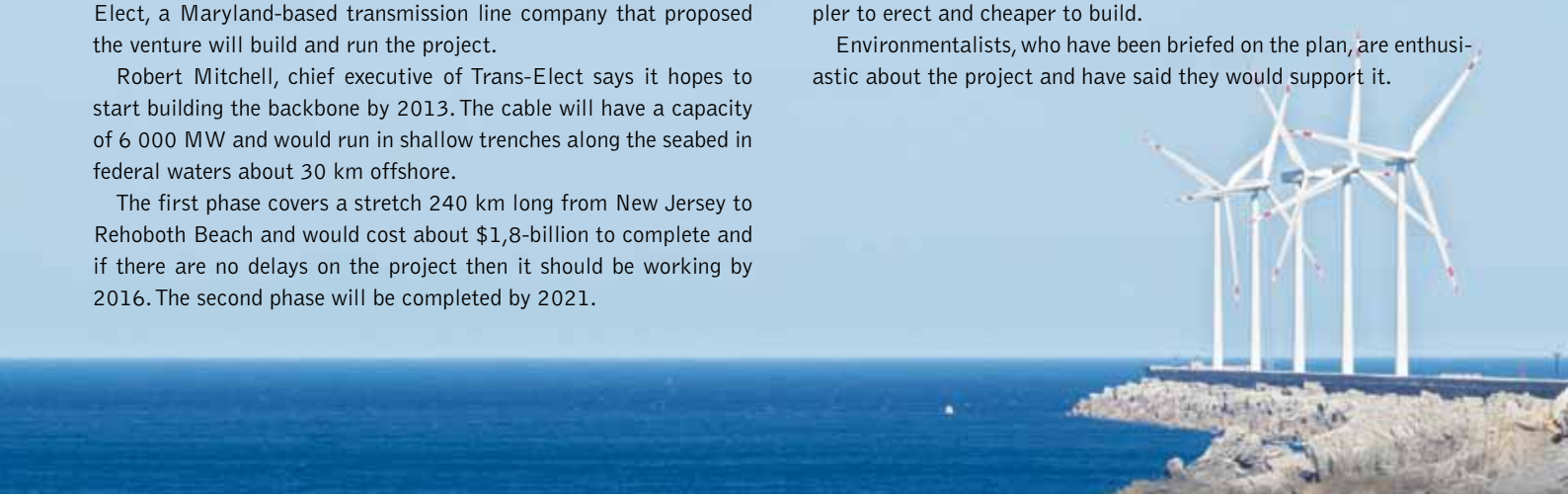
Robert Mitchell, chief executive of Trans-Elect says it hopes to start building the backbone by 2013. The cable will have a capacity of 6 000 MW and would run in shallow trenches along the seabed in federal waters about 30 km offshore.

The first phase covers a stretch 240 km long from New Jersey to Rehoboth Beach and would cost about $1,8-billion to complete and if there are no delays on the project then it should be working by 2016. The second phase will be completed by 2021.

However, analysts have warned that, with this project being the first of its kind anywhere in the US, there are bound to be bureaucratic delays and some technology problems.

Energy experts are predicting that there will be a rapid increase in the number of wind farms being set up in the US using offshore turbines that can benefit from the strong Atlantic winds. Trans-Elect says that the backbone will mean that wind farms could be far simpler to erect and cheaper to build.

Environmentalists, who have been briefed on the plan, are enthusiastic about the project and have said they would support it.



Hospital upgrades ahead of NHI

The Department of Health is likely to start spending billions of Rands on upgrading local hospitals throughout the country and Health Minister Aaron Motsoaledi claims that it will amount to more than the government's total expenditure on the 2010 World Cup.

The hospitals that will initially benefit include Durban's King Edward VIII, the Nelson Mandela Academic Hospital in the Eastern Cape, the Dr George Mukhari and Chris Hani Baragwanath Hospitals in Gauteng and the Limpopo Academic Hospital.

The plan to spend billions on upgrading the hospitals is part of a ten-point programme needed in preparation for a National Health Insurance (NHI) plan that is due to start in 2012 and will probably take about 14 years to implement.

The programme is expected to cost at least R128-billion in its first year and this will increase to a staggering R376-billion by 2025. Government is looking at a number of ways to fund the insurance scheme. These include:

- A surcharge on taxable income on all individuals;
- Additional payroll taxes for employers and employees;
- And increase in the Value Added Tax rate;
- Removal of the tax credits for people with private medical aid.

Olive Shisana, chairwoman of the ministerial advisory committee dealing with implementing the NHI says that tax deductions might start in 2012 even though only rural people might benefit initially. The government needs at least R11-billion to start implementing the NHI by 2012. Apparently the NHI will start with task teams visiting people in rural areas so they can assess their health needs and provide transport to existing facilities.

Shisana is hoping that by 2012, all vacant posts in the public health facilities will be filled. According to Motsoaledi, the Government Employee Medical Scheme will be phased out in favour of the NHI.

He claims that concerns over how the scheme will be funded are immaterial. "The government has a source of money," he told nurses attending the Democratic Nursing Organisation's national conference in Bela-Bela in October.

Stormcatcher – a tank to harvest rain

The severe drought in the Eastern Cape has prompted private individuals and businesses alike to think about water security, and one local business has made use of a new rainwater harvesting innovation that could point the way to future water sustainability.

Looking for a fast, cost-effective but permanent solution to the water shortage problem, General Motors in Port Elizabeth installed Rain Harvesting Systems' new Stormcatcher – a segmented underground tank that stores harvested rainwater.

Still a relatively new concept in South Africa, rainwater harvesting is used extensively in water-stressed countries, such as Australia, or those with progressive water security legislation, such as Germany and parts of the United States.

Rainwater is collected from stormwater run-off, roofs or through permeable paving and then stored in a range of tank systems before being plumbed back into a building.

Rain Harvesting Systems installs a range of systems suitable for anything from private homes to large industrial sites. The Stormcatcher is made up of segmented sections of 8mm-thick high density polyethylene, which has been reinforced with steel ribs to protect it from underground pressure. The shape of the tank allows upward ground water pressure to escape around it, instead of exerting force from below.

Apparently the tank withstands loads of up to 16 kiloNewtons per square metre without any additional reinforcing. It takes just three days to install.

Simotion D from Siemens with a new performance class

The Siemens Drive Technologies Division has extended the upper performance segment of its Simotion D range. The new generation of Simotion D4x5-2 multi-axis controllers features extended functions such as a quantity structure of 128 axes, Profinet interface and technology I/Os as well as a computing performance increased by a factor of three.

The Simotion D motion control system for production machines covers all levels of performance, from simple positioning tasks to demanding applications with extremely short cycle times or large numbers of axes. Thanks to its scalability, Simotion offers a high degree of flexibility, also with regard to changing demands on machine automation. The Simotion D drive-based multi-axis control system not only offers PLC, motion control and technology functions, but also an integrated drive control based on the Sinamics S120 series of drives.

With the new Simotion D445-2 DP/PN and D455-2 DP/PN versions the performance range has now been extended upwards. Compared to the previous generation, the maximum quantity structure has been doubled to 128 axes and the memory capacity expanded. This has increased the PLC and motion control performance by a factor of three.

With Simotion D4x5-2 the previously optional Profinet IO interface has now been integrated on the modules. This frees up one slot that is then available for other expansion options. The onboard interface is equipped with an integrated three-port switch and facilitates the construction of different network topologies such as line, star or tree structures, without the need for additional external switches. The interface not only supports real-time (RT), but also isochronous real-time (IRT) data exchange and can be operated as a controller and/or device.

Apart from the Profinet interface, the Simotion D4x5-2 also has two Profibus and two Ethernet interfaces, as well as 28 digital I/Os, of which 16 can be used for technological tasks such as the output of output cams with microsecond resolution.

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Proteas take on 31 other teams

Mind Sports South Africa (MSSA) held its award ceremony for the team that will officially represent South Africa in the 2010 IeSF Grand Finals in Daegu, South Korea.

The venue for the award was the Old Edwardian Society, a sports club steeped in sporting history and home to many top sportsmen who have represented South Africa over the years. The MSSA 2010 Protea Team is without doubt the strongest team to represent the country so far says MSSA president, Colin Webster.

"There is no doubt that the standard of play in South Africa is improving exponentially and soon we will rival the tops teams in Europe and Asia," he says.

At the award ceremony, Webster stressed the importance of players complying with the Code of Conduct and emphasised the importance of the gamers behaving in an appropriate manner at all times so as to be a credit to this country and its people.

He says the competition facing the South Africa team is tougher than ever and this is compounded by the fact that the number of nations competing at these games has grown from just eight in 2008 to 31 this year.

The team representing South Africa comprises, for the FIFA section, Abu Bakar Ebrahim and Rolando de Aveiro and for the WarCraft III: The Frozen Throne section, Magiel de Langeand Matthew Putter.

From left to right: Matthew Putter, Rolando de Aveiro, Abu Ebrahim, Magiel de Lange.

Early gifts for school principals

Christmas has come early for more than 2 200 school principals in Gauteng who were each given a fully configured BlackBerry smartphone by Vodacom Business. The phones were handed over by the Gauteng MEC for education, Barbara Creecy who says that the department designed a special application for principals that was loaded onto the phones.

"The application, developed by Vodacom Business and its partner, AfriGIS, will allow affordable, manageable and reliable two-way communication between the head office, district offices and 2 200 public schools in the province on key matters that affect principals," she says.

"This application will enable principals and IDSOs to log incidents at schools such as violence against learners, non-payment of educators, as well as urgent infrastructure needs."

In addition to the BlackBerry smartphones, the IDSOs were also given a laptop computer with wireless broadband connectivity. The Gauteng Department of Education has introduced its Teacher Laptop Initiative (TLI), which is managed by the Education Labour Relations Council (ELRC) on behalf of South African Democratic Teachers Union (SADTU) and Combined Trade Unions – Independent Trade Unions (CTU-ITU).

Chris Lazarus of Vodacom Business says the smartphone initiative is the first step towards addressing the digital divide that exists in South African education.

"Education and telecommunications are fundamentally linked through the schools. Huge changes in technology over the past ten years have enabled mobile communications to benefit even the most remote schools and now with incident reporting system embedded on the BlackBerry, principals are able to better resolve urgent issues at their schools," he says.

More than 80 000 teachers are employed in Gauteng

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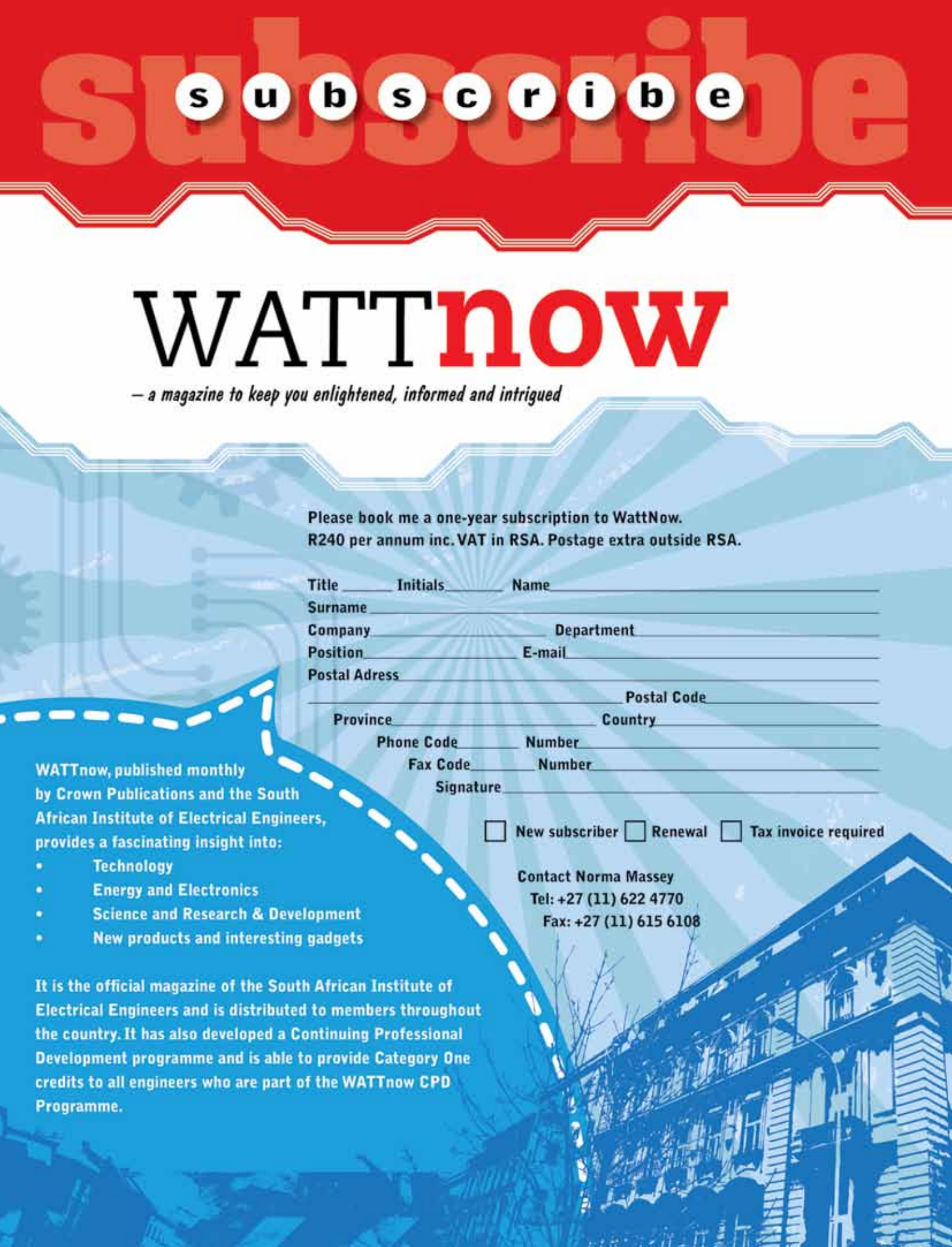


Bandwidth may be flooding Africa

As bandwidth floods into Africa as new cables are laid and connected, one of the central questions at the Capacity Africa conference held in Kenya in October was what this might mean for pricing. According to Aartee Sundheep a consultant at Ovum, the result might be a dramatic drop in prices with cuts of between 80 and 90 percent.

"One of the central themes of the conference was the imbalance between rapidly increasing international submarine capacity versus a last-mile data access bottleneck due to limited and expensive connectivity. For some of the late international capacity entrants, this could pose significant downward pressure on their estimated return on investment and may even force consolidation in this market," he claims.

Indeed, there is already a lot of cable connecting Africa, including Main One, SAT-3, SEACOM, EASSy, and TEAMS, as well as a number of larger systems set to come online during the next year, such as WACS and ACE. International, capacity prices of which are already on a steeply declining curve, but most people paint a very rosy picture about the future pricing.

Privately, though a number of senior people point out that there is a significant risk of massive oversupply, which may yet lead to savage price reductions, poor returns, and even the collapse of some of the new cable investments.

"We see a lot that supports this line of reasoning. While mobile subscriber growth is beginning to sate the appetite for voice access, this is not the case for data. Last-mile broadband access supply is limited and very expensive in key urban centres, and non-existent beyond them," he says.

Ovum's report entitled Broadband pricing in emerging markets: a comparison of DSL, WiMAX, and HSPA suggests that Africa has some of the highest broadband prices in the world which, together with the lowest income group, makes them the least affordable.

Moreover, despite the growing number of 3G networks, the price points of laptops and smartphones keep them out of reach for most of the average users. Even where devices and connectivity are available, there is a lack of local content and applications to accelerate usage.

"This means that in the short- to medium-term there is a developing imbalance as the supply of international capacity is not met by equal demand due to limited and expensive local connectivity, a lack of affordable devices, and limited local content. Basic economics suggest these markets will move towards prices lower than many business plans estimate right now," says Sundheep.

A number of regional telecommunications companies have already highlighted the cost pressures in the region caused by such things as vandalism or even deliberate sabotage of terrestrial network infrastructure.

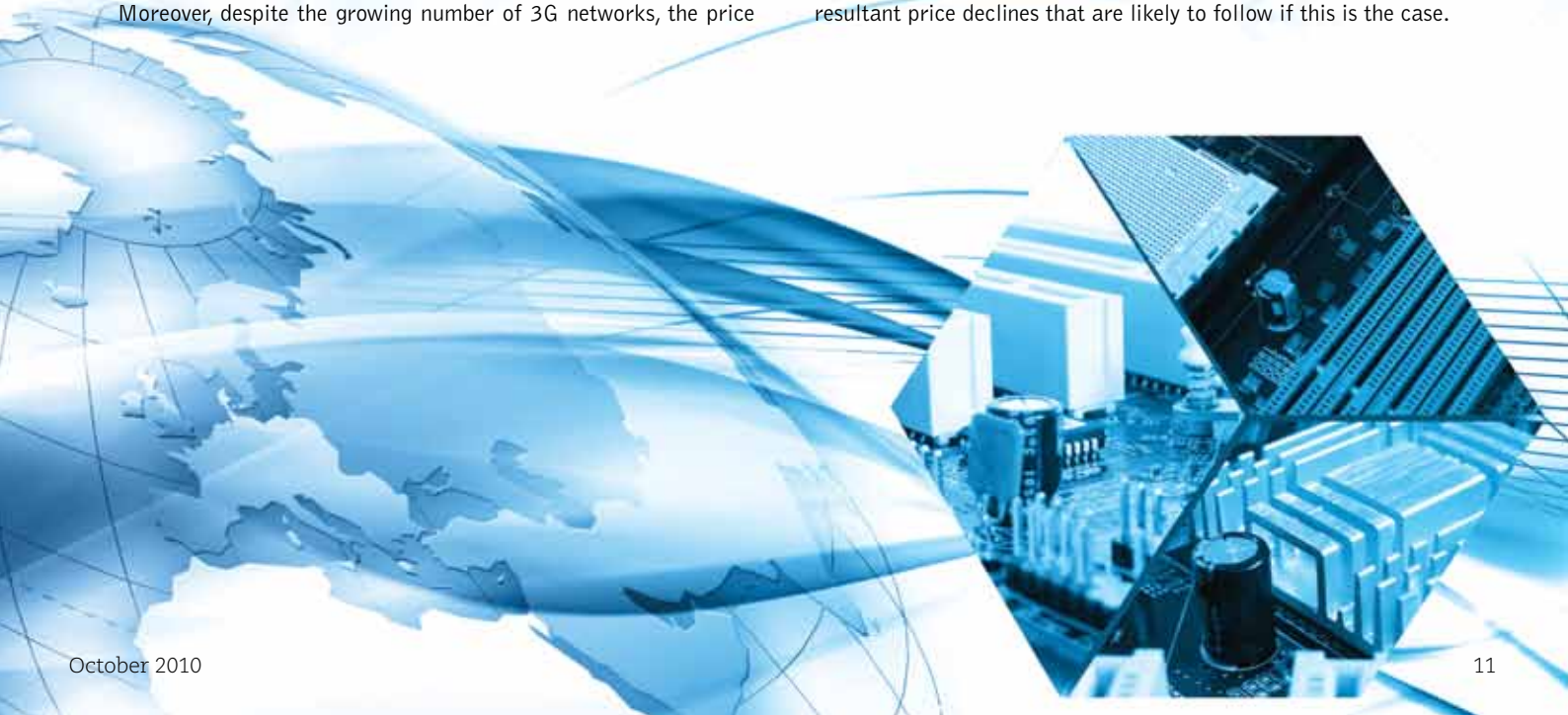
"This not only increases the cost of repair and replacement, but also results in the need for greater levels of redundancy in order to ensure availability within agreed service levels," he says.

This is making the challenge of rolling out and maintaining terrestrial connectivity that much harder. In addition, the task of ensuring cross-border connectivity appears to be slowed by political and regulatory hurdles that exist in front of operators in some countries.

Moreover, an estimated 70 percent of the African territory will continue to be served purely by expensive satellite services in the medium-term, even after the terrestrial cable is rolled out. These unique challenges look set to keep supply modest and prices relatively high.

He says that increasingly, the chief executives of telecommunications companies are emphasising the importance of quality along with the products, its pricing and its place.

Sundheep says African bandwidth wholesalers are struggling with the political, economic and infrastructural challenges while they are also faced with the potential over-supply of bandwidth and the resultant price declines that are likely to follow if this is the case.



Green effect of clean energy in minimising global warming

By William Yuill, Gabrielle Coppez, Sunetra Chowdhury and SP Chowdhury of the Electrical Engineering Department at the University of Cape Town

Global population growth is a fundamental driver resulting in the increase of global energy production and consumption. Fossil fuel prices will continue to increase as the cost of extraction swells. In addition, fossil fuels emit greenhouse gases (GHG), which are environmentally destructive, adversely affecting human health.

The generation of electricity relies heavily on the burning of fossil fuels. A paradigm shift in the way energy is produced and utilised has resulted in a global impetus, focused on decreasing GHG emissions and society's carbon-footprint. This indicates that in order to comply with various treaties and to reduce the environmental impacts, the way that electricity is generated, distributed, transmitted and utilised, must undergo significant transformations if global sustainable development is to occur.

Global concern for negative climatic impacts, fuel price volatility and energy security for fossil fuels, ensures that the global energy sector try to make a drastic shift towards using renewable energy sources and alternate forms of energy.

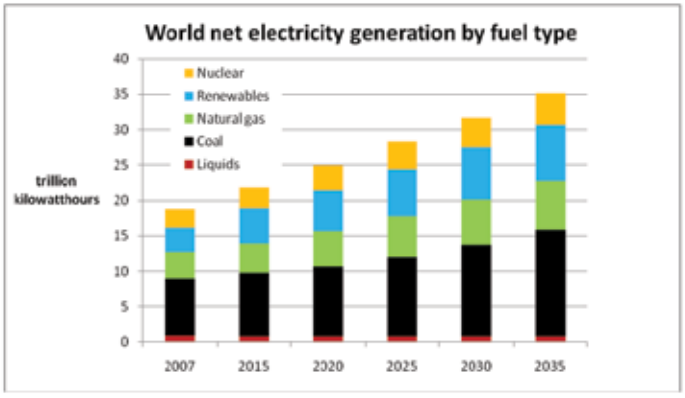
This paradigm shift means that the electricity grid is on the verge of a significant transformation. It seems there are many plausible outcomes that are too broad to serve as useful guides for effective action. In order to integrate renewable energy into an infrastructure so heavily dependent on fossil energy, some planning considerations are required.

The current energy infrastructure depends heavily on fossil energy. Electricity generation has increased from 15 379 Terrawatt-hours (TWh) (2000) to 20 093 TWh (2009). It is estimated that 8 000 million tons of carbon equivalent a year is created by the burning of fossil fuels and 50 percent of that total is a result of power generation, and 40 percent as a result of oil-based transport.

For rationally managed affluent societies, it is a realistic goal for them to lower the energy intensities of their economies. Reducing global greenhouse gas (GHG) emissions will be challenging when it appears that economic growth is coupled with a rising need of primary energy. There exists a large energy gap between affluent nations and industrialising countries in the sheer amount of energy required, and the composition of energy sources from which the electricity is derived.

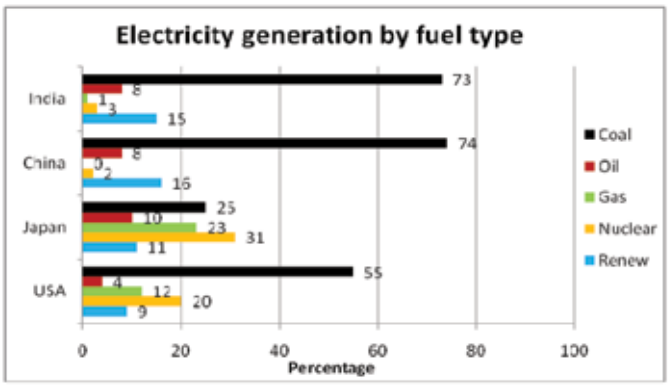
Globally, 87 percent of the total energy is generated by fossil fuels of which 28 percent, 21 percent and 38 percent are derived from coal, natural gas, and oil respectively while six percent is generated from nuclear plants, with the remaining seven percent produced from renewable resources.

Total Produced Energy Supply (TPES) has changed significantly during the period from 1973 to 2008. OECD (Organisation for Economic Co-Operation and Development) countries' total share fell from 61 percent to 44 percent. Asia and China have, and are experiencing an economic boom, with these regions significantly increasing shares from six percent and seven percent to 11 percent and 17 percent respectively. Asia incorporates both India and Japan, both with rapidly increasing GDPs in recent years. However, a lot of the fossil fuels and renewables are burnt directly for energy and not converted into electricity.



Graph 1: World net electricity generation by fuel (data courtesy of IEA International Energy Outlook 2010 – Highlights)

Coal remains a predominant source for electricity generation with a share never less than a predicted 39 percent until 2035. Renewable share of world electricity generation increases from 18 percent in 2007 to 23 percent in 2035, making it the world's fastest growing resource. Much of the increase is attributed to the growth of hydro and wind power (54 percent and 26 percent respectively). Most of renewable generation technologies are not economically competitive with fossil fuels over the projection period.



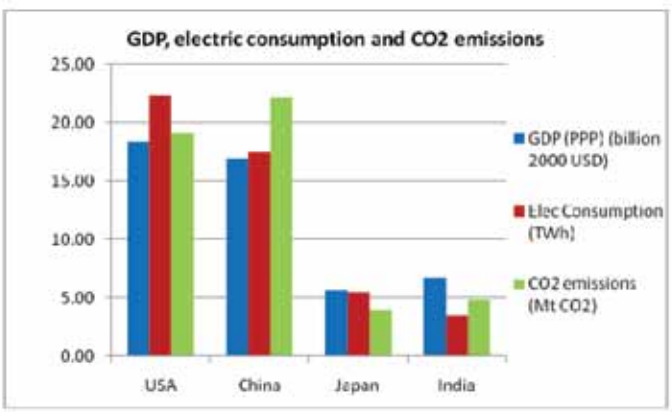
Graph 2: Electricity generation by fuel (data courtesy [3] pg 9: figure 4)

It is clear that coal is a dominant, indispensable source of electricity generation for developed and developing countries. Coal is cheap and plentiful and therefore easy to use.

Countries such as China and India, consisting of large populations and undergoing economic development, will continue to derive most of their electricity from coal. Clean coal technologies are briefly discussed later in the paper.

Global economic recession drove energy consumption lower in 2009 with global consumption of major primary sources (oil, natural gas, coal, nuclear and hydro power) declining by 1,1 percent. Energy consumption declined in all regions except Asia Pacific and the Middle East.

According to International energy agency, China's energy usage has overtaken that of the USA, making it the world's biggest energy user. The state media was quoted in saying that China would spend about five trillion Yuan on clean energy in the next decade and reduce its dependency on coal from 70 percent to 63 percent by 2015.



Graph 3: GDP (PPP), electric consumption and CO2 emissions of USA, China, Japan and India (data courtesy of IEA Key World Energy Statistics, Energy Indicators table, pg 48-57)

The development of clean coal technologies, carbon capture sequestration and integrated gasification combined cycle (IGCC) being examined by these technologies have not been commercially successful and carry potentially high hidden economic costs in terms of social and environmental damage along with the costs and viability of disposing of removed carbon and other toxic matter.

This technology is not a final solution for carbon dioxide reduction but provides an achievable solution in the near term while more desirable alternative solutions to power generation can be made economically practical. In addition, carbon capture sequestration consumes a vast quantity of water and this ultimately translates into higher energy usage.

An additional 125 MW would need to be added to a 550 MW plant in order for it to both capture its carbon and deliver 550 MW of electricity. IGCC is a less water intensive process but available only in a small minority of generators.

With 850 to 900 Gigawatts (GW) of installed hydro-electricity plants worldwide, energy from river water accounts for about a fifth of the world's electricity supply. With a more predictable load factor, lower operating costs, and longer expected plant life than all other modes of electricity production, hydropower has become the fastest growing major resource of 2008 and 2009. Global leaders, in terms of the percentage domestic electricity obtained from hydro power, are Norway and Brazil who obtain 98,5 percent and 79,8 percent respectively. China, USA, and Brazil had 149 GW, 100 GW and 77 GW respectively of installed capacity.

Wind capacity growth was led by China with 25,9 GW and the USA with 35,2 GW, which accounted for a combined 62,4 percent of global growth. Wind capacity has grown from 24 GW in 2001 to 160 GW in 2009. Problems with wind technology are the variability in the wind and difficulty in accurately predicting wind flows for proper generation.

However, it is far ahead of solar- based techniques in terms of operational reliability and unit costs.

Although solar and geothermal generation are possibly the most abundant sources of energy, using them is proving to be difficult. In both cases, the efficiencies of the technologies have pushed up unit costs and decreased operational reliability.

Geothermal increased by a mere 3,8 percent during the 2008-2009 period, increasing by only 31,2 percent since 2000. Geothermal capacity is currently 10,7 GW. Solar has grown significantly in recent years, growing by 47 percent over 2008-2009, with a current capacity of 22.9 GW.

Although nuclear power is not a renewable fuel, nuclear energy must be considered. Although in the United States and Europe a shift to nuclear is far from assured, China and India are currently pursuing major electrification schemes to increase their generation capacity.

As climate change concerns and awareness of the hidden costs of fossil fuels are acknowledged, a nuclear generation renaissance looks appealing. Nuclear energy has been around for over half a century. In that time, the technology has not changed. Currently new reactor designs fall into three categories:

- New light-water reactors

SAEEC

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- Modular reactors
- Generation IV reactors

One of the leading contenders for the next generation belongs to Westinghouse and is known as the AP1000. These reactors have significantly improved on the safety features of standard pressurised-water reactor (PWR). Four AP1000s are being constructed in China. Construction on Sanmen 1 began in March 2009 and will be completed in 2013. In addition Europe's Evolutionary Power Reactor (EPR) will be the world's largest PWR. These reactors have the advantage of the highest efficiency for converting thermal energy into electrical energy of 36 percent opposed to typical values of 33 percent to 34 percent. Four EPRs are now under construction, one each in Finland and France and two 1650-MW units in Taishan, China.

Some disadvantages are concerns over storage of spent fuel; concern of corrosion of metal due to superheated water; negative view of public of nuclear as a dangerous energy generation source.

Over the next few decades, design and planning should focus on the deliveries of particular energy services, rather than indiscriminately increasing the supply. Focus should be placed on slow substitutions of primary energies, rather than on the expectations of discovering new energy sources and technologies.

The way forward is to integrate renewable energies into the grid. Although current renewable energies lag conventional energy (nuclear, hydro, coal and gas) in terms of economic competitiveness, the worldwide interest in green energy has developed several support schemes to promote renewable energy.

The four support schemes used are as follows:

- Feed-in tariffs – most worldwide applied mechanism forces consumers to acquire renewable energy at a predetermined price or pay a premium on energy spot prices.
- Quotas and tradable green certificates – minimum shares of renewable energy are imposed on consumers or producers, followed by penalties for non-compliance. Quota mechanics are applied in Chile and parts of the US. Green certificates pioneered by Netherlands are used in the UK, a few European countries and in parts of the US.
- Auctions – Bidders are given the opportunity to bid on a quantity of renewable energy. The winner is selected, based on the lowest price offered.
- Fiscal incentives and tax credits – used practically everywhere as a complementary support mechanism. It includes exemptions or rebates on taxes, tax refunds, charges etc.

Spain and Germany have been successful in increasing their renewable energy capacity, while minimising the negative impact to electricity tariffs. These two countries have three major policies with regard to renewable integration: reducing greenhouse gas emissions; decreasing reliance on imported fuels; renewable sector job creation. Spain has reduced total power emissions by 20 percent, reduced its energy importation by eight million tons of oil equivalent and created between 90 000 and 110 000 jobs in the renewable sector.

In order to successfully integrate renewable energy into the grid, the governments of Spain and Germany are taking an active stand in the promotion of renewable to create favourable licensing and investment conditions.

Spain has taken advantage of feed-in tariffs accompanied by obligation to distribution system operators to purchase all renewable production, except in cases where there were technical limitations, to promote the installation of renewable generation.

Brazil, Chile, Costa Rica, Ecuador, Mexico, Panama, Peru and Uruguay have explicit support schemes favouring, primarily, technology-specific auctions and quota mechanisms. Tax credits and fiscal incentives are used extensively.

Although introducing intermittency should increase volatility, risk and reserve requirements, in cases where there is an over-capacity of gas-fired generation or large hydro potential, these effects can be mitigated. Such a case is experienced in Brazil, where the seasonality in renewable production (wind, bioelectricity and hydro) brings economic benefits.

However, renewable projects of some developing countries are held back because financial instruments and tools available are insufficient to finance projects.

It is apparent that all countries must be selective in technology choices, and carefully assess and develop different support systems for different technologies, so that the negative impact to electricity tariffs can be minimised. In power systems with a high penetration of wind generation, such as Germany's, 7.5 GW of upward reserve and 6 GW of downward reserve are contracted to deal with intermittencies in firm supply.

Additional integration of storage capacity using technologies such as pumping plants, gas storage, district heating systems and electric-vehicle-to-grid systems, will provide flexibility and a source of efficiency for renewable energies.

With the increased penetration of central renewable resources and the variability of electricity markets, the value of Flexible AC Transmission System (FACTS) devices will grow. FACTS represent mature technology, enabling the control of AC transmission system parameters and thus increasing the power transfer capability and improved voltage regulation.

Changes in generation and load patterns may make flexibility extremely desirable.

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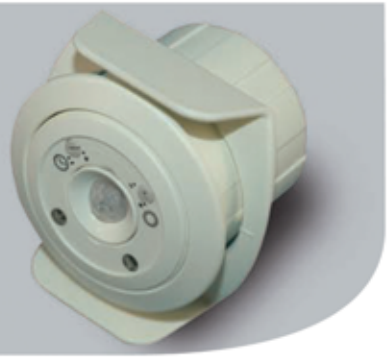
- Lighting consumes an astonishing 19% of the world's electricity generation. The resulting CO_2 is equivalent to 70% of global emissions from passenger vehicles and is three times more than emissions from aviation.
- However, lighting offers various opportunities to reduce your energy bill.

3 efficiency solutions for your building:

1 Light only when you need it
– Occupancy Sensing

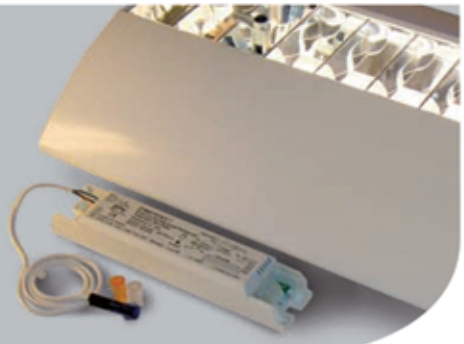


Have you ever noticed how often the lights are left on when a room is not in use? Major improvements in sensitivity and reliability have transformed the primitive "Motion Sensing" approach into a high-comfort Occupancy Sensing.

Occupancy Sensors automatically turn lights on when a room is occupied and off when a room is vacant. Saving energy could not be easier.

Typical applications include offices, conference rooms, bathrooms and storage areas.

2 Use only as much light as required
– Dimming, especially Daylight Dimming



In most buildings the lights are on at full intensity all day even when plenty of daylight is available. This is a waste of energy and causes unpleasant overlighting.

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EPV

EVECTO ENERGY

In the foreseeable future, large central power plants will continue to serve as the bulk power source, with many new ones being fuelled by renewable resources. In order to integrate renewable energies into the grid, the grid must be upgraded on both a distribution and transmission level.

Transmission will see the advent of distributed generation and storage, demand response, advanced metering infrastructure, distribution automation, two-way power flow and differentiated power quality. Grid revisions in terms of access, planning, security, investment philosophy, regulation and revenues and network operation technologies must be undertaken.

The advances in intelligent electronic devices (IEDs), instrumentation and Ethernet-based communication media, coupled with the availability of cheaper automation products and the standardization of communication protocols, have led to the widespread automation of power systems, especially in the transmission and distribution sector.

The National Energy Technology Laboratory (NETL) has identified five foundational key technology areas (KTAs). Foremost of these KTAs will be the integration of communications, using broadband, secure, low-latency channels connecting transmission stations and control centres.

Integrated communications will enable advances in other KTAs such as sensing and measurement, advanced control methods, advanced components and decision support.

The inability of utility companies to expand their generation capacity in line with the rising demand for electricity, combined with the rapid increase in the cost of fossil fuels, and the rising penetration of renewable energy, have accelerated the need to modernise the distribution network by introducing technologies that can help with demand-side management and revenue protection.

Industry experts believe that the smart grid will emerge as an integration and interconnection of smart micro-grids. Each micro-grid could be scaled in accordance with the diversity of the load, the mix of primary energy sources, and the geography and economics of a particular area. A micro-grid would operate side by side with the old grid. Over time, functionality and load would shift from the old grid to the newer micro-grid, giving improved command and control functions across all levels.

The aim of the smart grid is to enable utilities to make more efficient use of their existing assets through demand response (DR), peak shaving, and service quality control. DR is a key feature of the smart grid, whereby third parties or consumers can reduce energy consumption during peak usage or other critical energy use periods. Large investments are made in peak production periods, although these periods only occur for short defined periods of the day, resulting in a large amount of generation capacity going unused. In the United States, more than half of the electricity produced is wasted due to power generation and distribution inefficiencies.

By the end of 2011, Whirlpool will be on track to deliver at least 1 million smart appliances to the U.S. market capable of responding to DR signals. The idea behind this movement is to optimise the energy mix by integrating energy efficient appliances into the grid to achieve energy conservation and a reduction in global emissions. Studies show that residential energy in the US accounts for up to 38 percent of consumed energy.

Therefore focus will be placed on residential energy as a primary means of enabling DR. By providing a variable load, smart appliances connected to the smart grid will be ideal complements for management of variability of renewable energy resources such as wind and solar power.

From a utility aspect, the use of smart appliances will enable:

- Automatic reduction in energy consumption without inconvenience to the consumer.
- Precise control of appliance power to share load amongst participating consumers.
- Real-time demand side prediction of required supply.
- Minimise the purchasing of spinning reserve capacity.
- Delay the instalment of additional grid generation capacity.

The smart grid will enable consumers to interact with the energy management system to adjust their energy use and reduce their energy costs. Time-of-use pricing will enable significant energy bill savings by deferring the loads to times when there are lower electricity costs.

As the world emerges from the economic recession, global fuel consumption is set to rise, potentially increasing GHG emissions. The electricity sector can contribute to cutting emissions by integrating renewable energy into the grid.

However, the increasing adoption of renewable energy sources will have to be carefully analysed and regulated if they are to compete in global markets.

Carbon tax, a tax based on emissions, may increase the competitiveness of renewable technologies compared with traditional fossil fuel prices. This may change the development of renewable energy worldwide.

By noting what leading countries have done correctly in terms of investing in renewable energy, other countries can construct uniquely tailored schemes for renewable integration. Improvements in transmission and distribution infrastructure will be expensive in the short term, but sustainable energy sources will pay off on a medium to long term, in terms of reducing emissions, decreasing reliance on imported fuels and renewable sector job creation.

So there's the plan – but don't hold government to it

By Paddy Hartdegen

While Eskom is warning all South Africans that electricity supplies are likely to be threatened for the next few years until new generation capacity is introduced to the national grid, EDI Holdings is expressing its concerns that the distribution infrastructure is on the point of collapse unless R25-billion is injected into it.

Getting to the bottom of South Africa's electricity needs, its future generation capacity, its renewable energy plans and its distribution infrastructure is like trying to untangle a piece of candy-floss into a single strand of sugar.

So let me rather put down the facts that are known right now, deciphering those that can be deciphered and leave the rest where they are: a matter of conjecture.

The confusion starts, for instance, with the latest release of a document for the Department of Energy entitled the Executive Summary of the Daft (Believe me, it's their wording not mine in the official document) Integrated Electricity Resource Plan for South Africa – 2010 to 2030 IRP 2010.

The plan reads like one of the student papers put forward as part of a minor treatise in order to get as many marks as possible for the end-of-year exams and while it contains some sensible recommendations, it is riddled with contradictions too.

The paper states that the biggest challenge in all long-term planning lies in finding a sensible balance between divergent views and expectations of the different parties involved and goes on to suggest that scenario planning is an effective tool to find the balance between "could be" and "must be" outcomes.

So far, so good.

It goes on to say that the primary objective of the IRP 2010 is to determine the long-term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing and cost. That's pretty reasonable too.

Then comes the proviso: "All long-term plans should be considered as indicative rather than cast in concrete." So what this plan is saying, I guess, is that this is what we'd like to do but we are not prepared to commit ourselves to doing it.

Not now and not ever.

Worse still, nobody in terms of that plan will be accountable should it not be done because, after all, it was just a plan and not cast in concrete.

It goes on to say that the proposed IRP aims to achieve a balance between an affordable price for electricity to support a competitive economy, ensure the economy is sustainable, create jobs and meet nationally appropriate emissions targets not only for South Africa but for the southern and central African regions as well.

For the sake of some kind of uniformity IRP 2010 supports economic growth of about 4,6 percent a year for the next 20 years. This is well below the government's own targets of between six percent and seven percent. However, using

Transmission infrastructure collapsing

The government urgently needs to intervene to prevent the country's municipal electricity distribution infrastructure from collapsing according to Phindile Nzimande, chief executive of EDI Holdings.

The government needs to spend at least R25,7-billion on maintenance just to take care of the backlogs and EDI's plan to do so is apparently gathering dust on a desk somewhere.

Nzimande says that the agency was ready to start maintenance work in May this year but because no funds were allocated to the programme, no work has been done. She says its impossible to guess how long the distribution network will remain stable.

She says that EDI drew up an urgent business plan to tackle essential maintenance and provide action plans to improve the state of municipal infrastructure but nothing has come of these plans.

The report entitled Approach to Distribution Asset Management investigated six metropolitan councils and six secondary cities. The report showed:

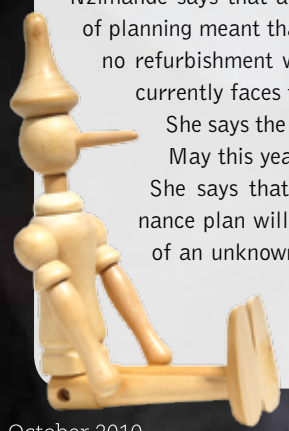
- There are no proper asset management plans for electricity transmission and distribution;
- Municipalities and Eskom made no provision for investment in existing and planned distribution networks, creating a backlog of maintenance work estimated at R27,4-billion;
- That the average age of the networks is forty years or more;
- The existing regulatory framework made it difficult to enforce licence conditions on electricity providers;
- There was a lack of co-ordination between utility companies and the municipalities.

Nzimande says that a dearth of skills, a shortage of money and a lack of planning meant that maintenance programmes ground to a halt and no refurbishment work was done, creating the massive backlog that currently faces the country.

She says the plan was supposed to have been implemented from May this year by 12 municipalities and metropolitan councils.

She says that without government intervention, EDI's maintenance plan will be left to gather dust in some ignominious corner of an unknown desk inside a building that suffers constant electricity interruptions.

Perhaps that's why it's never been read or implemented.



the 4,6 percent average figure the Department of Energy has used for its IRP 2010, it suggests that 52 248 MW of new capacity will be needed to meet projected demand and provide adequate reserves.

It also assumes that 3 420 MW of electricity will be saved through effective demand-side management of the electricity resource. The IRP 2010 recommends that a Revised Balanced Scenario is adopted for the country's future electricity generation and distribution based on:

- Affordability and availability of funding;
- Lowering carbon emissions;
- Uncertainty of new technologies and their costs, lead-times and operation;
- Water usage;
- Job creation;
- Security of supply.

It points out that this is a capacity plan for the next 20 years and seeks to answer how the increased demand for electricity will be met in the future. But then it goes on to say that it is not a plan that deals with the overall energy needs for the country or the impact that electricity will have on South Africa's infrastructure either.

Moreover, as part of the plan, the Department of Energy provided another document entitled Medium Term Risk Mitigation that deals with the immediate risks the country faces in terms of a shortfall in generation capacity.

So the more important document – at least in terms of the immediate future – is that of Risk Mitigation. It wants to avoid any form of power supply rationing or curtailment between 2010 and 2017 by imposing demand-side reductions and improving Eskom's efficiencies and, where possible, providing additional power from sources other than Eskom.

Like many good academics, the researchers at the

CPD Overview

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

WATTnow publishes articles in each issue that qualify readers for Category One CPD credits, which require engineers to respond to in-depth questions posed on articles that are specially designed and validated to provide CPD. Engineers using the system will accumulate between 0.1 and 0.3 CPD credits if all the questions are answered correctly. Ten such articles are published annually so at least one CPD credit can be obtained by this method. The articles in **WATTnow** are independently validated by the SAIEE, which determines the exact value of each credit applicable to each issue of the magazine.

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Department of Energy took a consultative approach to the development of the plan and then set about creating a Least Cost Scenario. This scenario was bound to have a number of shortcomings, so the Department also created its Balanced Scenario (the one it recommends).

The Balanced Scenario seeks to achieve a trade-off between:

- Least cost investment;
- Climate change mitigation;
- Localisation and job creation;
- Regional development for the Southern African Development Community;
- Diversity of energy sources;
- Energy efficiency and greater demand-side management.

It then sets about modelling the different sets of scenarios by testing input options (and more particularly policy options) and not testing those against real-world conditions. The reason for this, it says, is that a scenario is not a plan but a glimpse of an extreme future where an outcome or an input is amplified to assess what effect it will have on other variables.

So it would seem that this IRP 2010 is not actually a plan but rather a set of ideas. It points out that if Kusile and Medupi, Eskom's two new power stations, come on stream as per the original schedule, then in 2020, South Africa will need additional base-load capacity and this will come from imported hydroelectric power.

After that, additional base-load power will come from combined cycle gas turbines (CCGT) (using liquefied natural gas) and then from imported coal and fluidised bed combustion (FBC) coal before using pulverised coal to increase base load capacity.

Peaking capacity, it says, is exclusively provided by open-cycle gas turbines fuelled by diesel.

Then the report goes on to say that cancellation of the Kusile project would require alternative capacity to be built in 2017 with FBC and CCGT project coming on stream in 2016 to make up for the capacity loss caused by the cancellation of Kusile.

In fact the cancellation of Kusile and Medupi would mean that the FBC coal unit would have to come on stream in 2015 and CCGT units in 2017 and 2018 to make up for the reduced capacity.

The Department also says that the government's limit on emissions of 275-million tons of carbon dioxide means that base-load generation must shift away from coal to nuclear or gas.

However, the nuclear capacity in terms of the plan is limited, with one unit coming on stream every 18 months, but only after 2022. It says, therefore, that wind power will have to be used for base-load capacity to reduce emissions and meet the targets.

The Department painstaking works through each of the scenarios (many of which have been discarded by local electricity experts):

- Alternative emissions limits and decommissioning of older power stations;
- Dramatically increasing wind power to meet emissions limits;
- Introducing a carbon tax (R165/MWh in 2010 Rands escalating to R332/MWh in 2020 and R995/MWh in 2040);
- Regional development and importing electricity from Mpanda Nkua and commissioning of Cahora Bass North;
- Enhanced demand-side management with 6 TWh in savings enforced by 2015;
- Improved energy efficiency that will lead to savings of 35%, driven in part by higher prices;
- Reducing water usage at power stations;
- Climate change mitigation;
- Localisation and regional development scenarios.

Like any good students presenting a paper, the Department of Energy then sets out its scores and weightings for each of the scenarios examined and concludes that the Balanced Scenario represents the logical course for the country.

But to confuse matters, the Department says that after discussions with government stakeholders it was decided that emissions from imported coal would be excluded from domestic emission accounting and, more importantly, that a solar build programme was required alongside a wind power plan.

Now things start to get a bit more confusing: in terms of the plan, the Department of Energy expects that 4 500 MW of power will be generated by wind, while solar capacity, by 2019, will be a paltry 600 MW. But, it says, the Balanced Scenario provides ample opportunity for private investment in electricity generation from renewable programmes, CCGT and regional options.

However, the IRP 2010 excludes transmission infrastructure entirely and as a result, it says, the imported hydro-electricity could be more expensive than local coal-fired power.

It also points out that the real price of electricity will probably reach 100c/kWh by 2020, putting South Africa among the most expensive electricity producers in the world and making local beneficiation of materials uncompetitive in world terms.

"There is a real risk that if mineral beneficiation in South Africa stagnates or contracts due to high prices, this will lead to stranded new generating capacity, which in turn will cause prices to rise even higher for remaining consumers to make up the loss of revenue," says the report.

It goes on to say that the Balanced Scenario provides an expansion plan that balances the requirements for reduced greenhouse gas emissions with future electricity prices, requirements for localisation and regional development.

The report concludes that the Balanced Scenario provides for a significant reduction in carbon emissions while allowing a marginal increase in the price of electricity to the consumers. It also contends that the increase in renewable capacity does not come at the expense of security of supply, but regional development may pose a risk because of increased reliance on, for instance, power generated from water in the Zambezi River to the north.

It wants the government to make a decision this year on:

- The current Eskom build programme (12 GW);
- Conclusion of the first

phase of the renewable energy feed-in tariff programme (1025 MW);
- Support of co-generation and own generation over the next seven years to support security of supply (1 500 MW);
- Conclusion of the open cycle gas turbine project (1 000 MW);
- Renewable energy projects to provide on-shore wind of up to 4,3 GW and 600 MW solar power by 2019;
- Commitment to developing the Mpanda Nkua project in Mozambique;
- Undertaking feasibility studies to develop a gas infrastructure so support power generation and other uses;
- Expanding South Africa's nuclear power capacity.

The IRP 2010 must be considered against the backdrop of the Medium Term Risk Mitigation (MTRM) plan where Eskom has warned that there is likely to be a 9-TWh gap, equivalent to the continuous operation of one 900 MW unit for a year.

Eskom operations and planning division managing director, Kannan Lakmeeharan, says the risks contained in the MRTM are serious. Eskom estimates that South Africa will use 228 TWh during 2010/11 financial year, up from 218 TWh, and that demand will grow at an average of two percent a year. If the growth rate used by IRP 2010 shows economic growth of 4,6 percent, is the two percent that Eskom forecasts sufficient to support that? And if the government's target of growth of seven percent a year starts to be realised, surely all the electricity forecasts can be tossed out of the window?

In terms of the MTRM plan, Eskom will have to achieve an 85 percent energy availability factor but will be hard pressed to do so because of essential maintenance work and the poor quality of coal received at many of the power stations.

The MTRM is based on the assumption that the Medupi unit will be synchronised to the grid by May 2013 rather than the official schedule of May the previous year.

This plan also asserts that investment in non-Eskom generation is urgently needed through co-generation and own generation projects as these could produce between 1 000 MW and 1 500 MW by 2014.

Lakmeeharan believes that the goals for co-generation and own generation are realistic and that renewable generation of 1 025 MW, using funds approved under the current renewable energy feed-in tariffs, could be brought into operation from 2012.

The MTRM documents want several issues to be resolved by government including:
- Costs and rules for transporting energy via the national grid;
- Transparency of energy transport tariffs;
- Appointment of a single buyer for electricity;
- Standardised power purchase agreements;
- Simplification of the grid-code requirements for small generators;
- Providing assistance to municipalities to refurbish and re-commission idle generating plants.

Of course many people might wonder about the vast anomalies that seem to appear in both reports.

For instance, Minister of Energy, Dipuo Peters, recently told a group of 400 international and local investors who gathered at Upington that R150-billion is needed to create the world's biggest solar park generating 5 000 MW (but her own department includes only 600 MW of solar power and that only comes on stream in 2019). She told investors that government wanted to have the solar park (generating 5 000MW of

What the IRP includes

The IRP 2010 includes a number of recommendations in the Balanced Scenario and these can be summarised as follows:

- The continuation of Eskom existing building programme that will see two new coal-fired power stations coming on stream;
- The construction of a 100MW Sere wind farm;
- Introduction of Phase One of the renewable energy feed-in tariff that will provide 1 025 MW of power;
- Completion of the open cycle gas turbine project to create 1 020 MW;
- A decision needs to be taken on building nine new 600 MW nuclear power stations starting in 2023;
- A new range of projects to provide 3 800 MW of electricity from wind farms starting in 2014;
- A 600 MW solar power programme (the 5 000 MW solar park is not part of IRP 2010 yet);
- Importation of about 3 500 MW of hydroelectric power;
- Completion of the closed cycle gas turbine, using liquefied natural gas to provide 1 896 MW of power;
- Own generation or co-generation projects that will provide 1 253 MW;
- About 5 000 MW of coal-based power from re-commissioning projects;
- Some demand-side management programmes (although no specifics have been put forward on what these will save).

power) fully operational by 2020 and pointed out that the project was part of a government plan to create 300 000 jobs in the renewable energy sector by that time.

Apparently government has set aside 9 000 hectares of land for the solar park outside Upington where conditions are perfect for solar energy because it seldom rains, has few clouds and, unlike the Sahara, no dust storms. Special adviser to the energy minister, Jonathan de Vries says an initial 1 000 MW phase will be built using a mix of solar technologies. This capacity is certainly not included in IRP 2010 or, more correctly, only 600 MW is expected from solar power throughout the country by 2019.

Peters says there is "flexibility" in the IRP 2010 document to accommodate the solar park at Upington and she reconfirmed government's commitment to renewable energy.

Richard Worthington, climate change manager of the World Wildlife Fund, claims that in terms of the IRP 2010, South Africa only starts to rely on renewable energy resources from 2019 and he says this is woefully inadequate. In terms of electricity theft (something not covered in the IRP 2010 or the MTRM) Eskom has now launched a new campaign to combat electricity theft that is costing the country about R4,4-billion a year.

Brian Dames, chief executive of Eskom says that legislation and regulatory measures need to be strengthened to allow for prosecution of those people who steal electricity or the cables that carry it.

The government has embarked on an information campaign – known as Operation Khanyisa – that is aimed at reducing electricity thefts and getting people to report illegal users or cable thieves.

Eskom says it is spending about R200-million on trying to combat energy losses and is supporting the government's initiative. Dames says about 40 percent of the electricity theft is in the residential communities and the balance of 60 percent comes from business, commercial and non-residential sectors.

Most of the electricity theft occurs in Gauteng.

Dames says that eventually Eskom is hoping to be able to bring charges of fraud, racketeering and being part of an organised crime syndicate, against the electricity thieves as this makes it easier to prosecute people and get lengthy jail terms imposed on them.

There is no mention of a buy-back programme for electricity in the IRP 2010 but Eskom says that has reached an advanced stage in concluding contracts to buy back electricity from the middle of next year.

After the rolling blackouts of 2008, many major organisations – including shopping and retail centre developers – embarked on a major installation programme of standby power generators.

Liberty Properties, for instance, announced that all its centres in major areas had installed standby power capable of producing 550 MW countrywide.

Eskom's Andrew Etzinger, says the power utility wants to be able to negotiate agreements with industrial and commercial customers to provide flexible and non-essential loads to enable Eskom to cut off or reschedule such loads in return for compensation to the industrial or commercial operations.

He says it's part of a larger 'virtual power station' concept that will give the power utility the flexibility to temporarily reduce system demand by up to 2 500 MW by the middle of 2012.

This could be augmented by smart metering for residential consumers that would enable Eskom to remotely switch-off energy consuming appliances such as geysers at certain times. It's interesting that there is no mention of smart metering in the IRP 2010 although it is a fundamental component of demand-side management.

It would not be hard for anyone to point out the many holes that may, or may not, exist in the IRP 2010 but then that's the whole reason there are the public hearings on this document.

And it's at these public hearings that many key ideas are likely to be expressed. The major question is whether they will actually have any bearing on the eventual plan or whether, as is so often the case, government will choose to ignore public opinion. There is no doubt that all South Africans are facing changes in the way they use electricity and the prices that they will have to pay for it. The more important factor, though, is the consistency of supply and while Eskom appears to have a very clear idea of what that is, the government seems to be less certain, less convincing and less committed.

After all, government doesn't want to have its plans cast in concrete.

Cape students showcase their skills

A green building management system was one of the winning software innovations at the BSG Information Systems EXPO held at the University of Cape Town where student software developments were showcased.

Chief executive officer of BSG, Greg Reis praised the work of the students and says his company has a deep sense of the challenges facing South Africa and remains convinced that education is a key to unlocking the many challenges facing the country. The winning third year team comprised Kate Dawe, Nick Kuilman, Richard Pilkington and David Sheepmaker who developed the management system for a Bandwidth Barn, an incubator for entrepreneurs under the umbrella of the Cape information technology initiative.

Their innovation, a tenant management system allows tenants to liaise directly with the building administration about complaints and maintenance issues, book the communal boardrooms and automate the office rooms in order to cut down on electricity and provide electrical analysis.

Team leader Nick Kuilman said the group's determination to help the environment kept them going until they found a sponsor for their project in Open Box Software and the Cape IT initiative.

"Our idea was to reduce electricity that buildings use, to help the energy crisis," he says.

The team decided to revolutionise various systems within the building. For example they transformed a paper-based booking system for the five boardrooms, to an electronic one and linked this to e-mail invitations to enhance efficiency.

They also examined ways to assist the 60 tenants in the building to resolve issues more effectively. So instead of various streams of communication to the building manager, they changed this to a single stream. With regard to energy, they decided it made sense to reward tenants who were conscientious users of electricity and diligent at making savings. Rather than the current situation, where all tenants are charged on a pro-rata basis, they used Bluetooth technology to track a user's activity which helped them to create graphical analyses to show how much electricity was used by each tenant.

Another student team which won a certificate of excellence has the Western Cape Provincial Government as their sponsor. They developed a system called itGov, a web-based fault and performance management system.

The system is designed as a solution for basic service delivery fault-reporting in the Western Cape. It is easily accessible, with an intuitive, easy to use interface and requires no registration. The system records relevant fault data to provide management with accurate, reliable and real time performance statistics. The main objective of this system is to improve service delivery throughout the Western Cape region.

The team consisted of John Hill, Mei-miao Chen, Jonathan Chiat, Khaalid Gaffoor and Tasneem Jaffer.

John Hill says the team had "incredible access to municipalities when they realised we did not have any other agenda apart from wanting to help them."

There were three key objectives for developing the system:

citizen interaction, accountability and performance management.

They developed a software system to enable ordinary people to report and track a fault, such as a burst pipe or pothole or any other municipal failure. By logging onto the system, they were given a reference number to track their fault and an interactive process was initiated to enable them to check the status of the fault as work progressed. Accountability was built into the system through linking the fault to a specific team assigned to resolve it. If they did not have the capacity to deal with it, an external contractor was contracted to do the work.

To ensure that the work had been done, it was essential for the person who reported the fault to check that it had been fixed.

Team member Jonathan Chait says: "We aimed to create a system which was simple, stable, clean and relevant. Based on feedback we received from the Western Cape government, we have done that."

Other software innovations included the following:

Team Name: Impulse

Sponsor Name: Training Workshops Unlimited (Cape Mental Health)
Project Title: TWU Inventory Management System
Description: Training Workshops Unlimited comprises various workshops such as Garden Pot Centre and Athlone workshop. These workshops specialise in different goods and the system we are building helps to automate the management of this inventory, mainly those in the raw material state and the actual finished products.

Team Name: Phoenix

Sponsor Name: Cape of Good Hope (CoGH) SPCA
Project Title: SPCA Content Management System
Description: The CoGH SPCA is a non-profit organisation that is the oldest and largest SPCA in South Africa, based in Grassy Park. The project is a web-based content management system that facilitates online adoption applications and enables the public to report and

search for their lost pets. This system will also allow them to manage the records of animals and pet owners.

Team Name: Mergich Solutions

Sponsor Name: Thandokhulu Secondary School
Project Title: VirtualFunda
Description: VirtualFunda allows high school learners to model fundamental science concepts while creating study notes to help aid in learning via a desktop application as well as provide a web interface to provide extra learning resources and a platform from which tests and quizzes can be taken. VirtualFunda also allows for mentors to answer any questions that the learners may have about the concepts they study.

Team Name: Revolutionary Solutions

Sponsor Name: Refugee Employment Management system
Project Title: Adonis Musati Project
Description: The Refugee Employment Management System (REMS) will keep track of refugee information such as personal details and employment status. This system will allow for potential employers to register on line. If the employer qualifies to be a registered employer of the Adonis Musati Project they will be able to employ refugees for that particular skill that the employer is looking for. The REMS will enable volunteers to interact with the system through uploading of refugee CVs.

Team Name: e-Magine

Sponsor Name: Help2Read
Project Title: e-Magine IMS (Inventory Management System)
Description: The Help2Read IMS is a custom inventory management system that enables Help2Read to effectively maintain their inventory as well as loan out this inventory to the supported schools and ensure effective monitoring of these loans.

Team Name: static8

Sponsor Name: Volunteer Centre
Project Title: Volunteer Management system
Description: The main goal of the Volunteer Management system is to make referrals of volunteers to the organisations. The system will handle the registration of volunteers, organisations and personnel. It also offers a forum, calendar, news and events and online help for users. Efficient reporting functionality assists managers to improve the decision-making processes.

Green Building team: David Sheepmaker, Kate Dawe, Richard Pilkington and Nick Kuilman.

Dialing-up an IS solution: Khallid Gaffoor, John Hill, Mei-miao Chen and Jonathan Chiat.

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New applications provide income stream for phones

There are currently more than 4,6-billion mobile phones in the world and many countries have more cell phones than people. There will be more smartphones than PCs in most countries by 2013 according to Richard Mullins, a director at Acceleration.

He says that advertising to mobile phone in 2009 accounted for less than two-billion dollars of the $460-billion spent globally on advertising and blames this on the fact that Internet browsing on a cell phone is not yet a mainstream activity in most countries.

"While mobile display and mobile search will grow, their reach, and the time users spend with them, remain relatively low so marketers don't have much to gain yet," he claims.

The end result is that it is still difficult for most marketers and publishers to make money out of the mobile channel. Mullins says this is complicated by the fact that too much importance is attributed to mobile display ads while the real advantages that the mobile channel offers are ignored.

One of the most important of these is the fact that the mobile world offers a robust infrastructure for distributing mobile applications as well as a culture of paying for online content that is largely lacking in the traditional Internet.

He says the mobile applications' market is expected to grow from seven billion downloads in 2009 to over 50-billion downloads in 2012. The total value of this market by then will be more than $17-billion a year and more than the projected total global CD sales for 2012. Interestingly, a massive proportion of mobile applications are paid-for rather than free, with massive disparities between the different device platforms. For example 75 percent of all applications downloaded through the Apple iPhone store are paid for, as are 85 percent of those downloaded from the Nokia store and 76 percent from BlackBerry.

Android-based phones buck the overall trend - since 57 percent of the applications downloaded are free. This is hardly surprising, considering that the Android platform is more open than the tightly controlled stores of the competing handset operating systems.

"What this does show us is that the mobile market is still quite fragmented and complex, which makes it hard to achieve the scale one needs to be truly successful. You can't simply develop an application that works for the BlackBerry and also works for the Android operating system," he says. Mullins claims that the problem of inconsistent operating systems will fade away over time as smartphones become more like small computers that support cross-format standards. And, he claims, the opportunities in the future could be immense, allowing advertisers to deliver relevant content to users.

Nissan shows its new leaf

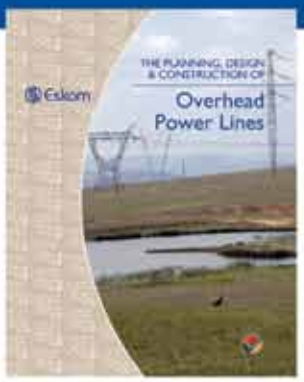
Nissan hosted a group of tertiary education students at the Nissan Technology Square, an environmental and safety technology exhibition at Sandton City where its flagship electric vehicle, the LEAF (Leading Environmentally-Friendly Affordable Family car) was on show.

It is due to be launched in Japan, the United States and Europe in December prior to a global rollout in 2012.

Visiting technology expert Takahiko Uchimura, from Nissan in Japan, said that engineering students were important for the future of automotive industry growth.

"Nissan regards students as key in the development of a sustainable society for future generations," says Uchimura, who joined Nissan as a graduate from Yokohama National University, starting out in vehicle safety technology in 1981 and now in the Technology Development Division. "We are looking at a new generation of engineers to take Nissan into the future."

More than 15 000 engineers are employed at Nissan's global research and development centres, which develop technologies according to specific market needs.



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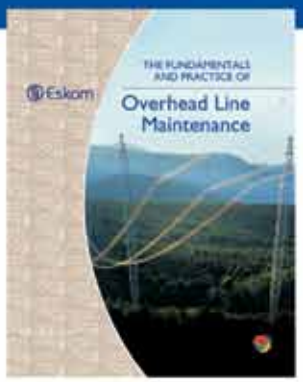

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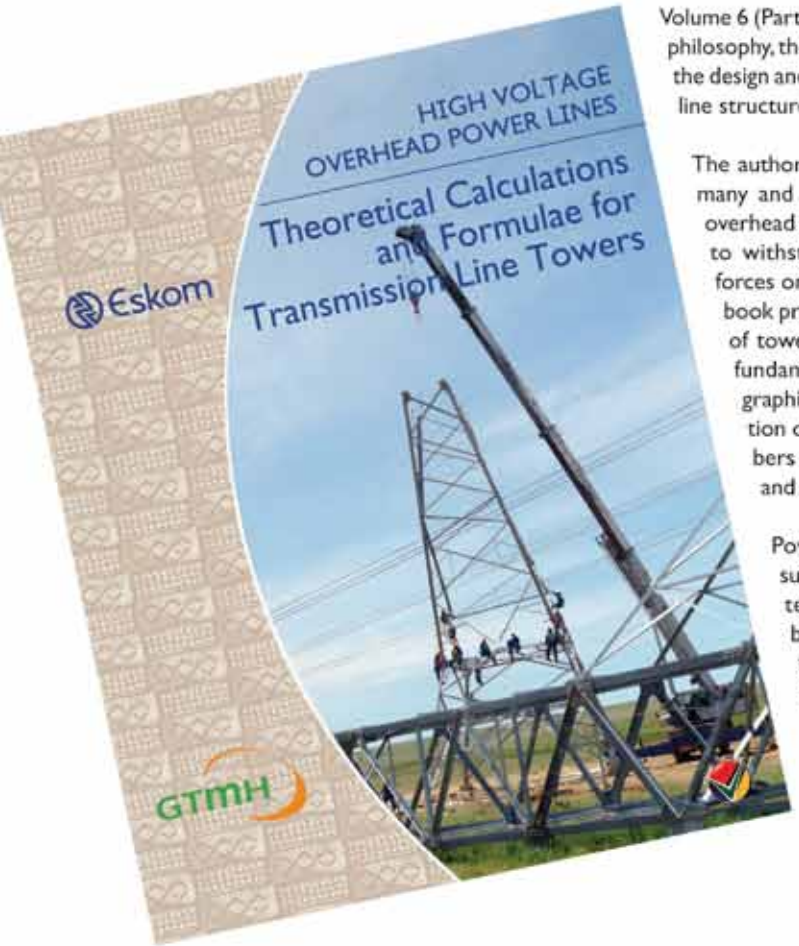

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Power line towers are routinely subjected to full scale mechanical testing and the book concludes by describing the procedures followed at major test stations around the world.

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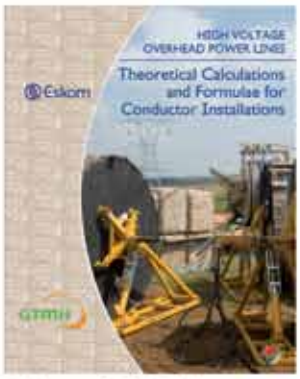

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Now there's ultra broadband Ethernet

A breakthrough in network architecture using ultra broadband Ethernet will be able to deliver between 100 megabits a second scaling up to 1 gigabit per second while having ultra-low power requirements and low latency characteristics.

Developed by United States company Adtran, the Ethernet architecture allows service providers to deliver products that use a lot of bandwidth without incurring the high costs of installing fibre optic cables directly into homes around the United States.

Adtran claims the ultra broadband Ethernet is extremely flexible, can be installed virtually anywhere and enables operators to use deep-fibre service models including Gigabit Ethernet, GPON and Next-generation PON backhaul.

Jay Wilson, senior vice president and general manager of Adtran's carrier networks division says that from a performance perspective, fibre-to-the-home has been the goal for most service providers over the years. "However," he warns, "the economics of this do not make sense."

He claims that ultra broadband Ethernet is the solution that these service providers have been seeking as it meets the performance and operational standards at a fraction of the cost of fibre. "This allows service providers to expand broadband penetration rates quickly," says Wilson.

He says that ultra broadband Ethernet trials are underway with Tier 1 operators in America, Europe and Asia. The product line will be commercially available during the first half of next year.

Adtran is a leading global provider of networking and communications equipment and has a portfolio of 1 700 solutions for use in the last mile of today's telecommunications networks. Its products are used for voice, data, video and Internet communications on a variety of network infrastructures.

A solar keyboard for just R900. . . but wait, there's more. . .

Is anyone out there interested in spending almost R900 on a keyboard? If so you might like to buy the solar powered wireless keyboard that is going on sale in South Africa in January next year.

Made by Logitech, the company claims that this keyboard will work for up to three months in total darkness (where I guess I should be writing this). Logitech says it contains no polyvinylchloride and is sold in recyclable packaging.

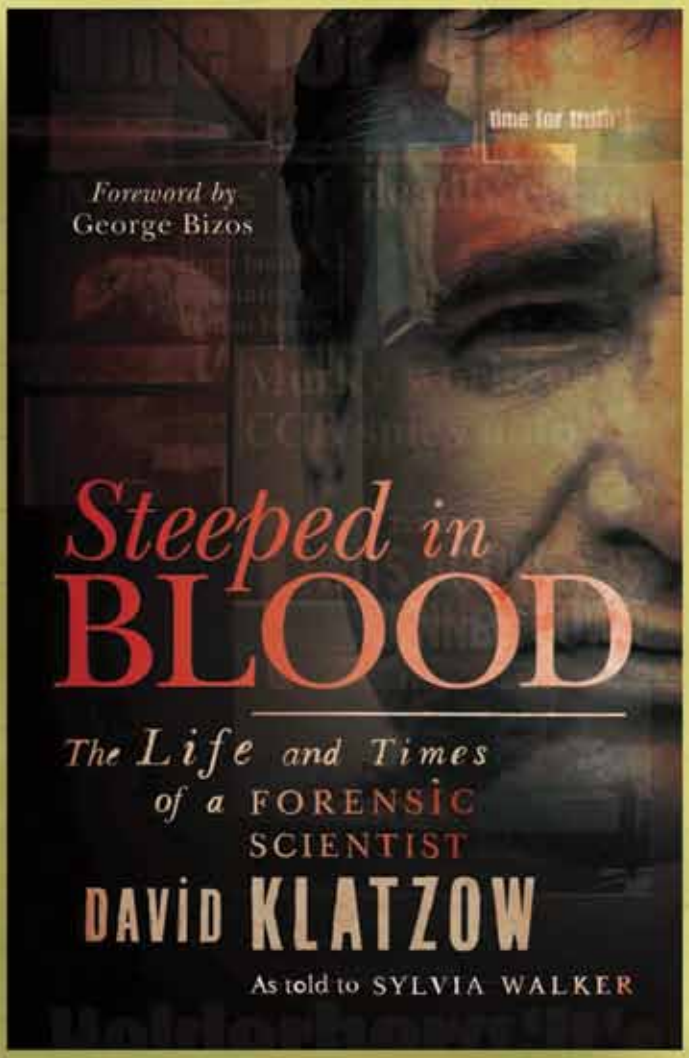
It apparently has an integrated solar panel built into it and communicates wirelessly with the computer. The application that drives it includes a lux meter to let you know how much power is being used and how much it has in reserve.

The keyboard is 7,5 mm thick, giving it a slim profile. The profile edges are rounded, which is just as well otherwise it might slice through the hands that are typing on it.

The keys have a concave design (as do just about all keyboards these days) apparently to support the shape of a person's fingertips while the rounded edges make it more comfortable to use.

The Logitech K750 wireless solar keyboard includes 128-bit AES encryption. The receiver is apparently sufficiently small to be left permanently plugged into a laptop computer. Up to six different mice and keyboards can be used with the same receiver (presumably not at the same time, as that might make navigating on a web page precarious at the least and harrowing at worst).

Fortunately it doesn't just rely on the sun for its power and can be recharged from indoor lights so perhaps your energy saving bulbs can save even more energy.



Steeped in Blood – The life and times of a forensic scientist

Bloody crimes of passion, political assassinations, sinister poisonings, investment fraud and mass mining disasters ... Dr David Klatzow has seen it all. During his extraordinary twenty-six-year career as South Africa's foremost independent forensic scientist, he has investigated countless high-profile and notorious cases.

Steeped in Blood provides gripping accounts of dozens of these matters, including the infamous deaths of Brett Kebble and Inge Lotz, the Helderberg aeroplane crash and the frustrating investigations of the brutal apartheid years. From the Gugulethu Seven and Trojan Horse massacres to the assassination of David Webster, Klatzow's investigations reveal his fierce determination to unveil the truth in spite of overwhelming state obstructions, police bungling and cover-ups. Unfazed by controversy and unwilling to accept no for an answer, Klatzow's tenacity, fearlessness and forensic know-how are used to brilliant effect in these fascinating cases.

AVAILABLE: OCTOBER 2010

This book exposes a demanding and sinister world where the rewards are equalled only by the frustrations, and where the truth is always elusive. But the truth is out there, and David Klatzow will find it.

About the Author - David Klatzow

Dr David Klatzow is an internationally recognised forensic scientist. He is an expert in the field of pyroforensics and an authority on blood alcohol. Before branching out into the world of forensic science, he was a lecturer in biochemistry at the University of Durban-Westville and medical biochemistry at the University of the Witwatersrand.

About the Author - Sylvia Walker

Sylvia Walker is a marketing manager in the financial services industry with a passion for writing and a keen interest in the world of crime. Her first book, Dealing in Death, was published in 2009 and focuses on tik and the plight of parents who live with addiction.

• ISBN: 9781868729227 • Format: Softcover

Mobile responsibility?

Multinationals companies need to take more responsibility for managing mobile costs and services according to a report compiled by telecommunications analysts at Ovum. The report claims that multinational organisations are struggling to manage the ever growing cost and complexity of business mobility and many have little idea how much they are spending globally.

However, Ovum has found that while most are quick to lay the blame on the mobile operators, they could do much more themselves to bring the situation under control.

Pauline Trotter, Ovum analyst and author of the report, says the major mobile service providers have invested in improvements over the past two years to support companies wanting international mobility. In particular they have improved areas such as expense management, device management and help desk support.

"However, our research shows that multinationals continue to be unimpressed by their offerings. We think this judgment is harsh as, while managed mobility services are still immature, companies need to take responsibility for some of the problems themselves," she says.

Apparently most of the companies feel that the service provided in individual countries is unsatisfactory as they do not feel providers are meeting their needs. They want to see global managed services similar to those provided by fixed-line telecommunications companies.

She concedes that this may be unrealistic, given the structure of the mobile industry, as managed mobility providers can only provide a global offer through strong partnerships and these will take time to build.

"Many multinationals have a fragmented approach to procurement and this is also a major barrier to a more efficient approach. Only when their service providers take a more holistic approach will they ever be able to provide a partial solution, no matter how much they invest in improvements to their services," says Trotter.

Satellites can help convict environmental criminals

Geoinformatic systems could be widely deployed and used to fight criminal activities that relate to wildlife, claims Damaris Mateche of the Interns Environmental Security Programme, based in Nairobi, Kenya. CITES estimates that every year as many as five million wild birds, 30 000 primates, 15-million furs, 12-million orchids and eight million cacti are sold on the international market, making wildlife crimes second only to the drugs trade in terms of cash values.

This is compounded by the illegal exportation of electronic waste where informal networks of criminals are making a fortune, according to Interpol's Pollution Crime Working Group. Then there is the additional criminal activity of bottom trawling in the seas, which is destroying thousands of tons of fish, crustaceans and coral reefs every year.

Geoinformatics, says Mateche, can be used to acquire, analyse and visualise spatial data to combat the criminal activity. He says this technology can be used to visualise spatial relationships between natural landforms, to observe environmental and ecological damage and document human activities that indicate environmental crimes are taking place. "Geoinformatics is a powerful tool in managing environmental damage and enforcing laws," he says.

He refers to a case in Madagascar where illegal logging of precious hardwoods exploded in the aftermath of a military coup in that country in March 2009. The coup displaced the increasingly autocratic, but democratically elected, Marc Ravalomanana, and triggered the collapse of the rule of law.

Park rangers abandoned their posts after increasing pressure from criminal syndicates operating in the north-eastern parts of the country. Loggers moved in to harvest millions of dollars worth of precious rosewood and ebony from the protected areas.

The logs were transported to the ships in nearby ports and taken to Mauritius or Reunion before being ferried to China. The harvesting of Rosewood in particular is outlawed internationally, so many of the logs were buried in stockyards or on beaches.

Mateche points out that while loggers were able to mask their illegal activities in Madagascar and evade detection by concealing contraband or by paying bribes, timber stocks and ships carrying timber were clearly visible to the rest of the world via high-resolution satellite imagery. International law enforcement agencies were able to monitor stocks and the movement of illegal timber. There has now been a case brought against the suppliers and buyers of the timber using the Lacey Act, and federal agents in Tennessee raided a factory and confiscated the Rosewood.

Satellite imagery, combined with chemical signatures of the wood were used as evidence in this case. Further prosecutions are expected in other parts of the world.

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Software to help you get your own back

New software that will identify a stolen computer as soon as it logs on to the Internet is available from a company in Cape Town. CyberSentry runs in the background on laptop computers and will enable users to track lost or stolen computers using the global positioning system, and IP trace.

"CyberSentry installs a small file on a computer and includes an e-mail address as a reporting address. If the computer is stolen, it communicates with that e-mail address to identify its position," says Brett Powell, director of special projects at the software company, Intertel.

The computer has to be connected to the Internet in order to send any messages back to the e-mail address originally used but once connected it will keep tabs on what it is being used for and where it is being used.

The software also allows the user to remotely delete files in a way that makes them irrecoverable.

Powell says that anyone who takes proper care of a computer is unlikely to lose it, but thefts do happen and at least this software provides some help in locating a stolen machine.

"In most cases, the loss of the computer itself is a small irritation when compared with the loss of data and information that is truly debilitating for the owner," he says.

He says the software is compatible with all operating systems and adds that his company is now considering sponsoring a reward system for the return of computers that have been taken.

MacBook Air – thin, slim, light and fast

The new MacBook Air is the thinnest computer in the world and it has features taken from the popular iPhone and iPod and incorporated in the new machine that was unveiled by Apple chief executive, Steve Jobs, in October.

The computer is available with either an 11-inch or a 13-inch monitor and the entry-level model costs $999.

It comes with all-flash storage, making it more responsive and reliable. It features a trackpad with full multi-touch support while its large battery lasts for at least five hours on the 11-inch model and up to seven hours on the larger 13-inch model.

Jobs points out that the MacBook Air is designed around its flash storage using flash chips that are incredibly small yet powerful and doesn't have any moving parts, making it more reliable, very fast and extremely quiet. Users have a choice of 64 GB or 128 GB of flash memory.

The MacBook Air uses the 1,4 GHz Core 2 Duo processor with 3 MB of shared L2 cache on the 11-inch and 6 MB of L2 on the 13-inch, allowing the user to do anything that a normal, bulkier and larger computer can do at speeds that rival other top-of-the-range models.

The NVIDIA graphics card has a 320M graphics processor with 48 processing cores, making it considerably faster than the previous models. In fact playing Call of Duty on the MacBook Air is 2,2 times faster on the 11-inch model than on the older MacBook Air and 2,4 times faster on the 13-inch model.

It has a port that allows the MacBook air to be connected to a 27-inch Apple LED cinema display (or any of the other displays made by the company too).

It has two USB ports, a headphone jack, a built-in omni-directional microphone, a camera, stereo speakers and 2 GB of on-board memory that can be expanded to 4 GB. It has a full-size keyboard and a multi-touch trackpad that can be used in the same fashion as an iPod, iPhone or iPad.

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CROWN PUBLICATIONS

New inverters for photovoltaic plants

Siemens' industry automation division is expanding its product portfolio with the central inverters Sinvert PVS600, PVS1200, PVS1800 and PVS2400. These four new models cover the 600 to 2400 kilowatt (kW) output range and enable operators of photovoltaic (PV) power plants to tune their inverters precisely to the capacity of the modules employed in the plant.

In this way, the yield and efficiency of the entire PV plant can be optimised. The planning process is supported by Sinvert Select, the cost-free Siemens software application, which is capable of calculating suitable combinations of inverters and PV modules. Sinvert PVS inverters have a peak efficiency of over 98 percent, making them some of the most efficient inverters currently available on the market. Equipped with extensive monitoring capabilities, the inverters can also detect faults in the photovoltaic array and thus minimize downtimes.

Even a 0.2 percent increase in efficiency significantly boosts the operating yield of a PV power plant. With rated outputs of 1200 kW and above, the master-slave technique guarantees an even load distribution on all components and extends the service life of the inverters substantially.

The new Siemens inverters support grid frequencies of 50 and 60 Hz and are thus suitable for operation on any power grid in the world.

The inverters are controlled locally by touch screen. Furthermore, the operator can use standardized communication interfaces to integrate the Sinvert PVS models into a Scada system (Supervisory Control and Data Acquisition) in order to transfer the inverter data to a control centre. Extensive monitoring capabilities (symmetry monitoring, for example) allow the inverters to promptly detect faults in the photovoltaic array without having additional sensors on the modules.

Lightning is a frequent cause of module or cable failure, and the longer the defect remains undetected, the higher the loss in yield. Depending on its configuration, the Sinvert PVS inverter immediately notifies service personnel of any faults via Internet or SMS, thus minimising failure times and loss of earnings.

Like all units in the Sinvert PVS range, the new models are optionally available as a turn-key product, installed in a photovoltaic container with all the necessary medium-voltage components.

Grant worth $25-million given to SA researchers

Researchers specialising in the field of nuclear medicine have received a grant of $25-million in support of a breakthrough in the production of a cancer treatment. NTP Radioisotopes' chief technology officer Gavin Ball says the researchers are able to produce molybdenum-99, a radioactive atom, using low-enriched uranium.

South Africa is currently the only country in the world producing low-enriched uranium commercially. Ball says the molybdenum-99, in its decayed form, technetium-99m is injected into cancer patients about 20 minutes before they are scanned.

Under the scan the technetium-99 lights up the cancerous cells in the body showing doctors exactly where these cells are growing. South Africa is one of four countries making molybdenum-99. The others are Canada, Belgium and the Netherlands.

Ball is expecting researchers from other production plants around the world to visit NTP's manufacturing facilities at Pelindaba, west of Pretoria, to learn how they have perfected the manufacturing process.

He says that 20 researchers employed by the company – which is an arm of the South African Nuclear Energy Corporation – have been working on perfecting the technological breakthrough for the past three years.

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Insects are incredibly bright say researchers

Insects may have brains the size of a grain of sand, but they have superhuman powers: they can fly, see in ultraviolet light, and precisely navigate across vast distances without a map. Some can count, recognise human faces – even learn faster than a human infant. And, as anyone who has tried to swat a fly knows, they are cunning and evasive. But how do they manage such incredible behaviour with brains that are made up of a few hundred thousand neurons, or brain nerve cells, compared with the 50 – 100 billion neurons of a human brain?

Images are providing researchers with insights into these amazing creatures. Take locusts, for instance: where humans can 'expand' their minds through pharmaceuticals, these crop-destroying pests literally expand theirs by a third, using nothing.

This happens when they cease to be individuals and become a swarm. No-one knows why, but a larger brain may help them compete for food.

Fruit fly brains are the size of pinheads, but they are more complicated than the most advanced microchips. One group of researchers, using ultra-high-resolution microscopes and supercomputers, estimates that it will take a decade to unravel the circuit diagram of a fruit fly's brain:

"The insect brain is the ultimate micromachine," says David Adler of the Howard Hughes Medical Institute. "That's the main reason why researchers are so interested in insect brains. All we can build are simple machines that appear to be smart yet can't think for themselves," he says.

The honeybee has an advanced brain that actually learns, even though it's just a cubic millimetre in size: "Bees are fantastically smart," says Prof Lars Chittka of Queen Mary University of London. "They can even learn numbers."

For researchers, the advantage of insects is that their brains are capable of controlling all of their behaviours yet are small enough to study. The secret, it appears, is not brain size but the complexity of connections between their limited number of neurons. Because all brains appear to work in similar ways, matching insect brain circuits to particular behaviours could help locate similar circuits in the much more complex human brain. That could be important for regenerative medicine and bionic human limbs. And researchers have recently found powerful molecules in locust brains that are toxic to bacteria – including MRSA and E-coli – and could lead to new treatments for drug-resistant bacterial infections.

More research into comets flying by

The Deep Impact spacecraft will fly past the Hartley-2 comet at a distance of just 700 kilometres as part of the National Aeronautics and Space Administration's (NASA) attempts to analyse comets and assess the threat they pose to Earth.

Hartley-2 is about a kilometre wide. The spacecraft will use its telescopes and other instruments to carefully examine the comet's surface and to record gases. It has been taking images of the comet since September.

In October, Hartley-2 came within 18-million kilometres of Earth, the closest it has been since Australian astronomer Malcolm Hartley discovered it in 1986. It is a relatively small but very active periodic comet that orbits the sun once every six-and-a-half years. The Deep Impact spacecraft is part of the EPOXI extended mission that is exploring celestial targets.

It is only the fifth comet that NASA's researchers have been able to get a close look at. Five years ago, Deep Impact released a probe into another comet, Tempel 1, giving scientists a glimpse of its interior. The scientists at the University of Maryland who studied the results of the impact discovered water ice in three small areas on the surface of the comet.

At the time, lead author, Jessica Sunshine (what a name for an astronomer) said: "These results show there is ice on the surface but not very much and definitely not enough to account for the water in the coma [the cloud of gas and dust that surrounds a comet]."

The scientists concluded that the water vapour that escapes from comets is contained in ice particles found below the surface and not on the surface of the celestial bodies.

The diffuse coma of Comet Hartley 2 was more than 1° wide on October 13th, when Nick Howes took this image with a 4-inch apochromatic refractor in Wiltshire, U.K. Stars are shown by short exposures in the blue and green channels; the comet is shown as a full-color long exposure. Howes has also been remotely operating the 2-meter Faulkes North Telescope in Hawaii. Using this he has measured the rotation rate of the comet's nucleus to be 19 ± 1.5 hours. Image: Nick Howes.

Plenty of water on the Moon

An empty Centaur casing that was used by the National Aeronautics and Space Administration to bomb the Moon revealed that there was water there, along with a whole host of chemicals that could be useful to humans landing on the surface.

The LCROSS venture sent an unarmed rocked casing plunging into the centre of the Cabeus crater close to the South Pole and heated the rock from 40 degrees below freezing to a blazing 1 250 degrees above in a matter of seconds.

Scientists have been analysing the data from the Lunar Crater Observation and Sensing Satellite (LCROSS). Principal scientist Anthony Colaprete of the Ames Research Centre in Mountain View says the Cabeus crater is one of the coldest places in the universe as it has been in a permanent shadow for billions of years.

He says these craters form a polar network of cold traps where volatile chemicals abound. The chemicals are thought to have come from asteroids crashing into the Moon's surface.

The Moon's southern polar region is believed to be full of water in the deeply-shadowed craters and the Lunar Reconnaissance Orbiter, another NASA spacecraft is now mapping the entire region.

The LCROSS put a 30 metre hole into the crater's bottom to reveal volatile chemicals, including silver, mercury, calcium and magnesium. Colaprete estimates that at least five percent of the crater's rocks contain water ice along with mercury, sodium, sulphur, methanol and formaldehyde and these are all important precursors for life.

In this artist's concept, LCROSS observes the impact of its booster into the lunar pole, just before it also crashes. Credit: NASA

Wits University's new hub of learning

The University of the Witwatersrand has opened its R80-million professional development hub and, according to Professor Patrick FitzGerald, deputy vice-chancellor: finance and operations, it is one of six key capital projects underway at the university.

He says the university will spend R1,2-billion to develop its infrastructure and the new hub is an integral part of this capital investment campaign.

The hub has teaching and support facilities for a thousand students and lecturers. An automated audio visual system enables video conferencing throughout the facility while all class rooms, laboratories and offices have high speed Internet connections, LCD display screens and projectors. The professional development hub will be home to Wits Enterprise and Wits Language School. There are more than 250 short courses on offer at the centre. Wits Enterprise is the commercial arm of the university and will seek to link Wits academics with external stakeholders.

It offers a wide variety of business services that allow external stakeholders to access the knowledge product at the university, providing contracted research, specialised expert consulting and technology transfer and licensing.

The Wits Language School will respond to the demands from the market for translation work and interpreting services, foreign language courses and increasing proficiency in English. The training and conference venues are available for hire by members of the public or companies needing such space.

NRF gets R255-million fund injection

The Department of Science and Technology is to provide R255-million to the National Research Foundation to support skills development in South Africa.

The Foundation has been mandated to support and promote research at universities through funding, human resource development and to assist in developing initiatives to increase innovation throughout the country.

Apparently R100-million will be spent on human resource development and R42-million of this amount will be used to increase bursaries for honours students. R11,2-million is earmarked for post-doctoral fellowships and R10-million is to support or increase the graduation rates of masters and doctoral students.

Another R25-million is allocated to support women and young researchers and R11,8-million will go towards improving the academic qualifications of people working at universities.

About R100-million will be spent on scientific equipment and on providing emergency repairs and maintenance to existing equipment at national research facilities.

In terms of rural universities, the Department of Science and Technology is to provide R55-million for broadband services to the University of Limpopo and the Walter Sisulu University in the Eastern Cape. This money has been allocated via the South African National Research Network.

Huge demand for time with MeerKAT

Scientists from different parts of the world are apparently queuing up to South Africa's MeerKAT radio telescope and although the telescope is actually five years away from being fully operational, it has been allocated more than 43 000 hours of observing time.

The powerful radio telescope will be used to search for planets that could hold intelligent life somewhere deep inside the Milky Way or perhaps even beyond that. MeerKAT is being built in the radio astronomy reserve in Carnarvon in the Northern Cape.

It will comprise 64 dishes, each one 13,5-metres in diameter and it is a smaller version of the Square Kilometre Array, a major project that South Africa is hoping to win. Australia is also bidding for the SKA in competition with South Africans.

In October last year the MeerKAT sent an invitation to world astronomers to apply for telescope time and so far 21 proposals, involving more than 500 astronomers, have been received.

Director of the SKA S Africa Project, Bernie Fanaroff says that surveys of radio pulsars and hydrogen gas in the deep universe were the first to be allocated telescope time. Then another 8 000 hours have been allocated to a proposal to test Einstein's theory of gravity and investigate the physics of enigmatic neutron stars. Five thousand hours have been dedicated to two proposals to survey the distant universe.

Fanaroff says that the South African astronomers will work in collaboration with the National Aeronautics and Space Administration to search for extra-terrestrial intelligence. Information from NASA's space probes that have been sent to distance planets will be downloaded to MeerKAT. The engineering test bed of seven dishes is operating successfully at the Carnavon site where the completed and fully functioning MeerKAT radio telescope will eventually be built.

MeerKAT will provide an array in the southern hemisphere that will be optimised for deep and high-fidelity imaging of extended low-brightness emissions, the detection of nano-jansky radio sources, the measurement of polarisation and the monitoring of radio transient sources.

It will be the most sensitive centimetre wavelength radio telescope in the southern hemisphere. It will explore phenomena such as cosmic magnetism, the evolution of galaxies and clusters of galaxies, the influence of dark matter on galaxies and clusters and the nature of transient radio sources. Teams working on MeerKAT will come from the local and international astronomical and scientific communities. The scientific programme will be a mixture of blind and directed surveys, conducted by large project teams. Smaller experiments will be designed by individual principal investigators working with smaller teams.

SANEA

The South African National Energy Association

Energy People Working Together

The South African National Energy Association (SANEA) has as its vision "Energy People Working Together".

SANEA strives to promote the sustainable supply and use of energy for the greatest benefit of all and to be acknowledged as a credible centre of knowledge, expertise and opinion on energy matters.

SANEA is a non-partisan, diverse energy association with international networks through the World Energy Council (WEC). WEC has member committees in over 90 countries. SANEA is playing a pivotal part in the future of energy in South Africa, bringing influential role-players together with a view of identifying and implementing sustainable and effective solutions, providing factual and relevant data and knowledge,strengthening the energy network in South Africa and globally, and enhancing awareness of energy issues in South Africa.

We want you to partner with us – Join SANEA as a member and let your voice be heard!

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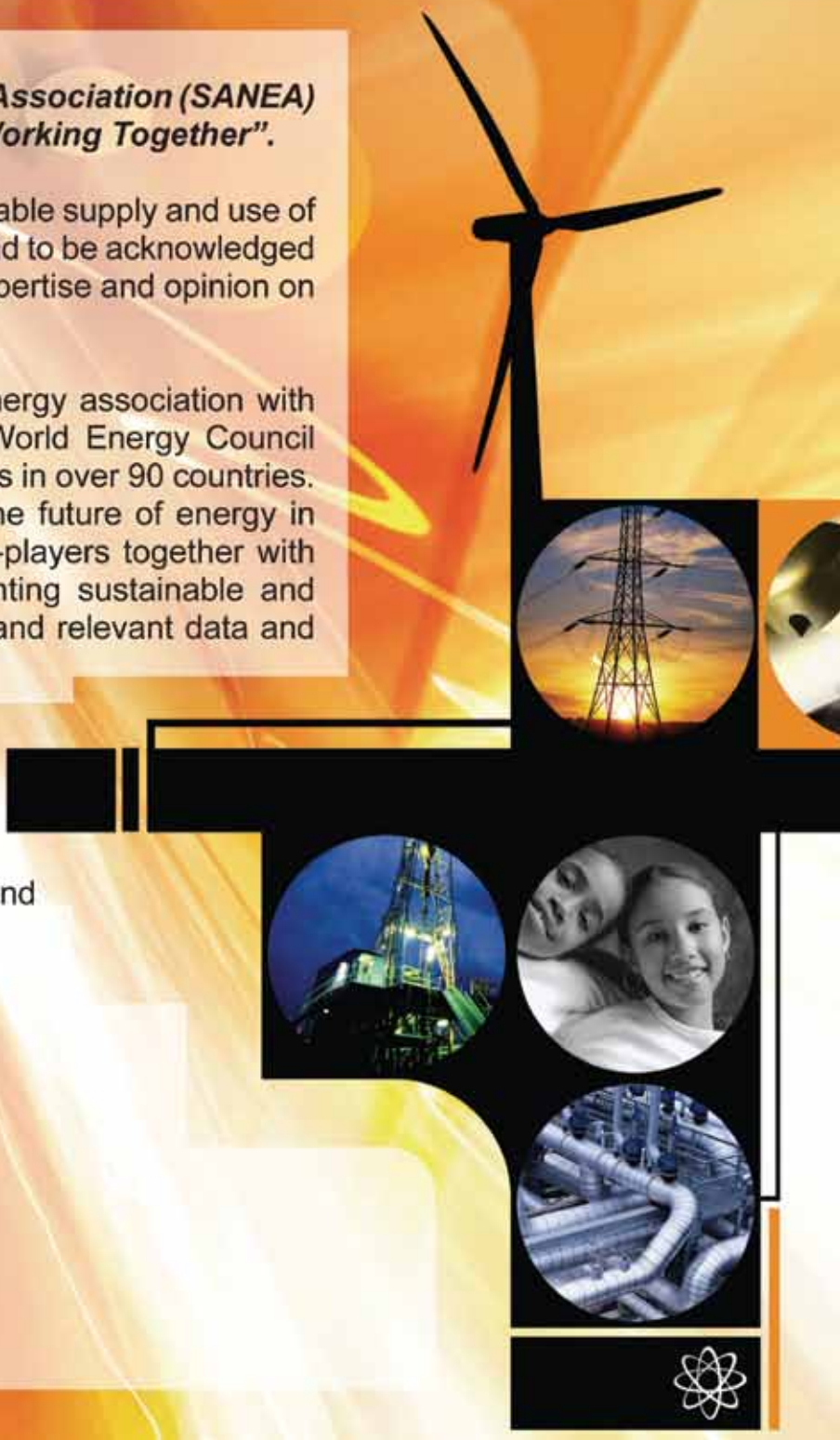


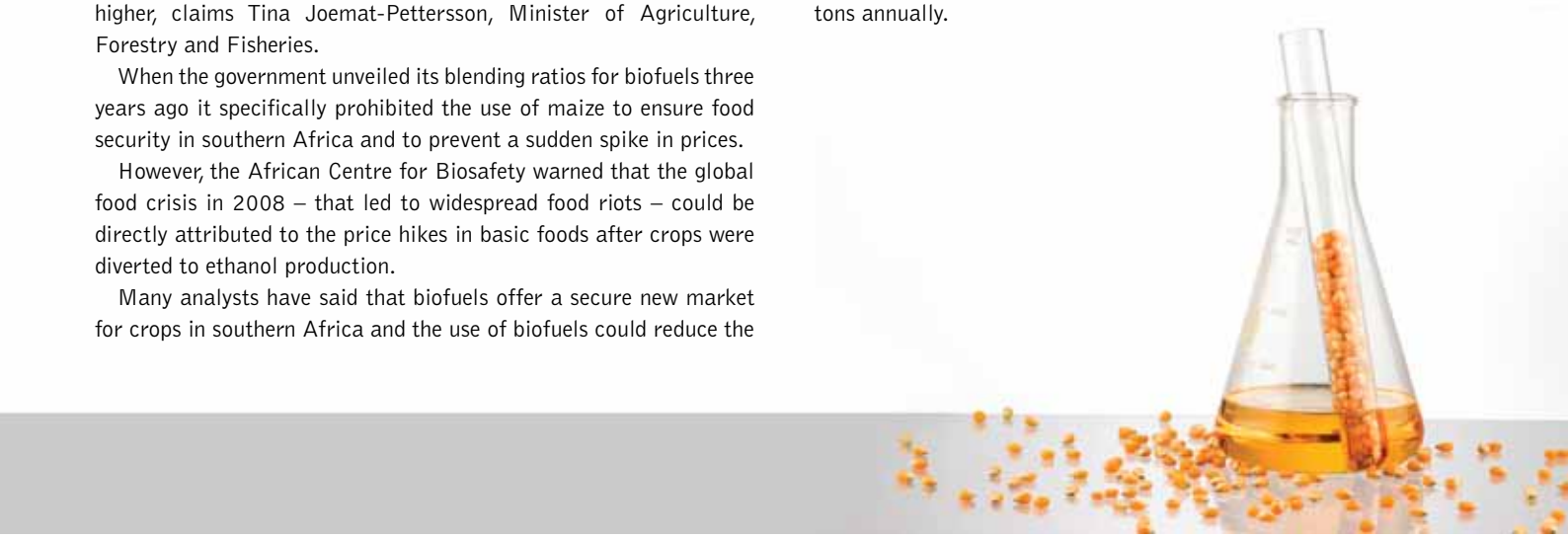
Calls to use maize for biofuels

South Africa should allow maize to be used as a feedstock for biofuels because the country currently has a surplus of maize and because of this, the use of maize would not push food prices higher, claims Tina Joemat-Pettersson, Minister of Agriculture, Forestry and Fisheries.

When the government unveiled its blending ratios for biofuels three years ago it specifically prohibited the use of maize to ensure food security in southern Africa and to prevent a sudden spike in prices.

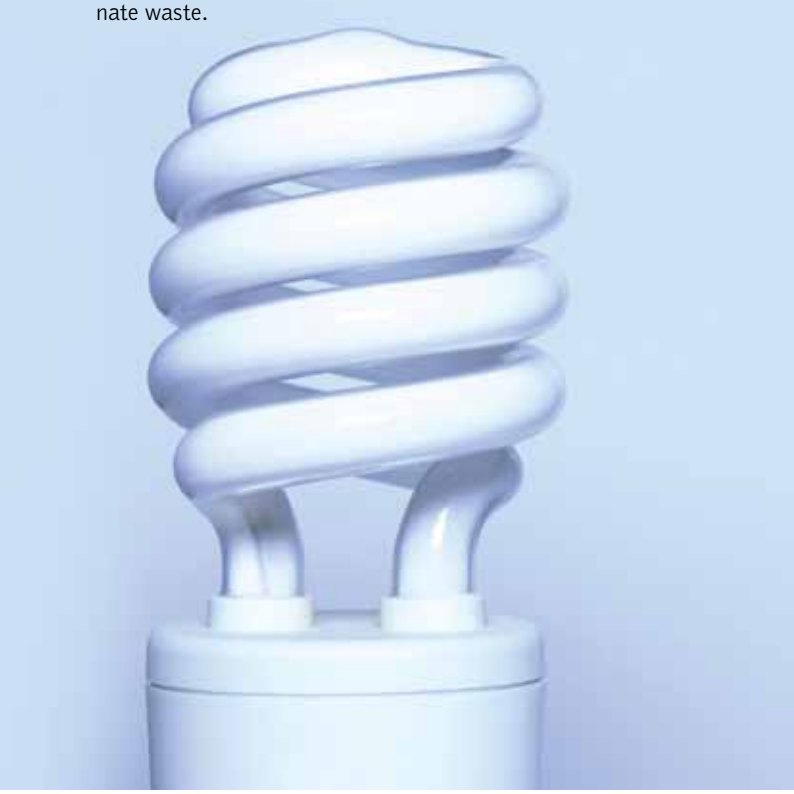
However, the African Centre for Biosafety warned that the global food crisis in 2008 – that led to widespread food riots – could be directly attributed to the price hikes in basic foods after crops were diverted to ethanol production.

Many analysts have said that biofuels offer a secure new market for crops in southern Africa and the use of biofuels could reduce the demand for electricity throughout the region. South African farmers are expected to harvest just over 13-million tons of maize this year while local consumption amounts to between eight and nine million tons annually.



GM gets award for energy savings

General Motors South Africa (GMSA) won the SJM Flex Environmental Award for 2010 for achieving its objective to eliminate waste.



The company has, for the past ten years, applied a number of measures to conserve natural resources and to reduce, reuse and recycle waste, claims Michael Pearton, GMSA's vice president of manufacturing operations.

He says environmental responsibility is one of the company's six core values and is in line with the company's philosophy of continuous improvement every year. In the past year the company has reduced its carbon dioxide emissions by 159 tons using humidity controls and optimised air flow at all its paint spray booths.

The consumption of water was reduced by 26 percent last year through various initiatives and improved the efficiency of water usage by 32,4 percent per built claims Pearton. Similarly the company's demand for electricity was reduced by seven percent in 2009 and a further 12,9 percent this year.

Furthermore, Pearton says, waste has been reduced by 44 percent this year compared with 2009.

The company also distributes about 75 kilograms of food waste to a pig farm in the area each day and it also recycles its plastic, paper and metal waste.

Specifically marked recycling containers have been placed in strategic locations at GMSA's plants in Struandale and Kempston Road, at the vehicle conversion and distribution centre in Aloes and in all office areas to ensure waste is easily and properly disposed of.

The company's waste management programmes comply with the South African government's Environmental Management: Waste Act, 2008 (Act of 59 of 2008).

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JOJEN SUPPLIES

R150-billion solar park for Upington?

If you believe the forecasts of the South African government then Upington could soon produce about 5 000 MW of electricity from a solar park near the town. In fact the pre-feasibility study done by the Clinton Climate Initiative says the region has the best conditions in the world for solar power.

Energy Minister Dipuo Peters has been trying to raise the R150-billion that she believes it will cost to put up the solar park in the Northern Cape. She says the development will be privately funded and power will be sold to Eskom. More than 400 investors from India, South Korea, Spain, the United States and South Africa travelled to Upington where Peters outlined some of the details of the project.

The government hopes the solar park will help to reduce South Africa's substantial carbon emissions from its coal-fired power stations that generate most of the country's electricity. About 9 000 hectares of government land has been earmarked for the project.

The arid Northern Cape region is on the edge of the Kalahari Desert and provides some of the strongest sunshine in the world according to Dick Berlijn, director of the project development firm, Subsolar.

According to Peters, the solar park project is just one of a number of projects planned by the South African government as part of its goal to create 300 000 jobs in the green energy sector.

Zambia, DRC could benefit from new power projects

A 40MW hydro-electric plant is likely to be built in Zambia by the Copperbelt Energy Corporation, which plans to invest $120-million in the Kabompo Gorge project. A feasibility study has been completed and the company is now awaiting a concession from the government to go ahead with the new plant.

According to Michael Tarney, managing director of CEC, a number of other new projects are being planned to provide electricity to Zambia and to the Democratic Republic of Congo.

The new power plant would not only help to stabilise electricity production in the country but would provide the essential power needed to establish new mines in the Copperbelt.

He says the country expects to produce about a million tons of copper a year for the next three to four years and this implies that stable, additional sources of electricity are urgently needed.

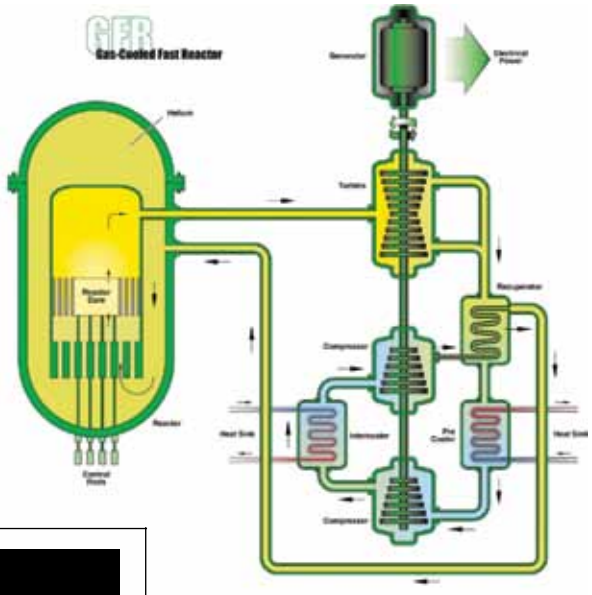
In a separate development, delegates attending an African investment conference in Johannesburg were told that Lake Kivu was capable of producing energy worth $50-billion a year.

Project promoter, Phillip Morkel, estimates that Lake Kivu will generate 1 000 MW of energy a year for the next 50 years while the Ruzizi River, which runs from Lake Kivu, was capable of generating a further 500 MW of hydropower.

Estimates are that the lake, which is 500 m deep in parts, has about two-trillion cubic feet of methane trapped beneath it, along with about ten-trillion cubic feet of carbon dioxide.

This gas field has yet to be developed and Morkel says that it will cost about $3-billion in infrastructure development and a further $2-billion to build an energy plant capable of using Lake Kivu's resources.

Modular reactor project gets R20-million



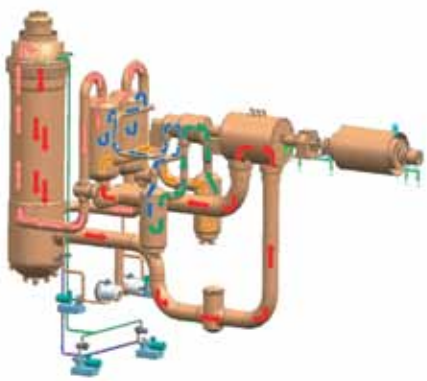
The government has allocated R20-million to the seemingly defunct pebble bed modular reactor (PBMR) project even though Public Enterprises Minister, Barbara Hogan has announced that the government will not pursue this technology.

Apparently the R20-million allocation is to maintain a scaled-down skeleton staff so that the intellectual capital can be retained. The PBMR has been beset by a host of funding problems and has not had any meaningful equity partners over the years.

According to Lesetja Kganyago, part of the money will be used to pay the South African Nuclear Energy Corporation for what he calls the unforeseeable and unavoidable expenditure incurred by it for the dismantling and decommissioning of the fuel development laboratories used to make fuel for the nuclear reactor.

The announcement was made as part of the government's adjusted estimates for national expenditure and included R214-million for floods in KwaZulu-Natal, R200-million for Denel and R430-million for the Department of Local Government to assist struggling municipalities throughout the country.

The government also provided R25-million for support provided during the recent public sector strike but it did not provide details on exactly what this support was.



DBSA provides loan of $105-million

The Development Bank of Southern Africa (DBSA) has agreed to lend $105-million to Zesco for its Kariba North Bank hydropower station that will be built at a total cost of $430-million.

Dr Bane Maleke, divisional executive at the bank, says that the loan will mean that the capacity of the power station can be increased from the original 720 MW to 1080 MW.

He says it is part of the bank's goal to support the countries in the Southern African Development Community and facilitate regional integration so the economies of the region can thrive.

He points out that the demand for renewable energy in the southern African region has increased dramatically and says that Zambia has significant hydroelectric potential amounting to at least 6 000 MW, of which less than 2 000 MW has been exploited. During the construction phase, Zesco estimates that about 300 jobs will be created. Power will be supplied to the local communities in the Siavonga district where the project is located.

Maleke says that the bank will aggressively promote projects that foster regional integration and closer co-operation in the region.

Solar power plant for rain-soaked Britain

Solarsense UK is operating Britain's new 200 kW solar power plant set atop a cowhouse on Worthy Farm in Glastonbury. It is the largest private solar power plant installed in the country so far.

The grounds at the farm are used as a venue for Europe 's largest open-air music festival, attended by roughly 200 000 people from all over the world.

In Glastonbury two SolarMax TS series central inverters convert the direct current from more than 1 100 solar modules into grid-compliant alternating current.

The yield is enough to supply 40 households with energy. In addition, the solar plant eliminates 100 tons of carbon dioxide emissions every year.

The plant has an inclination of five degrees south and the expected annual yield is 160 704 kWh.

Structure your plant with new software

Global specialist in energy management, Schneider Electric South Africa, has announced its PlantStruxure architecture, a new collaborative system that allows industrial and infrastructure companies to meet their automation needs, and at the same time improve energy management.

The product integrates both hardware and software components throughout the plant, providing what Schneider claims is a complete process management solution that allows companies to optimise energy usage and increase efficiency while improving productivity.

"Today, industrial companies face a multitude of challenges on different fronts, including increased competitive pressures, a volatile global economy, tighter compliance and regulatory requirements and higher costs of materials," says Schneider's Wilhelm Swart, industry and automation division, vice president.

The company says its software allows easy collaboration between plant and operation managers and engineering and maintenance teams providing high process availability and functional safety at each level for industries such as oil and gas, chemical, petrochemical, power and mining.

"Traditionally, process automation, energy or production management systems have had separate domains. Manufacturers and the industry in general are increasingly moving to single environment that includes production and energy management systems and business information," says Swart.

Smart metering and a new power plant

At this year's Metering Europe conference and exhibition in Vienna, Siemens presented a holistic smart metering solution as a key component for setting up smart grids. This solution consists of an automated metering and information system and an Energy IP metering management system.

The Siemens' smart metering solution provides a future-oriented basis for smart grid applications, which will help to handle the increased feed-in of renewable power. The core tasks include remote reading and management of all meters in a supply area. Gas and water meters communicate bidirectionally via smart meters. Existing ripple control systems can be replaced with the new technology.

Furthermore, utilities can use the systems to record network parameters such as over- and under-voltage, short-term and long-term failures, and power quality indicators either from the medium-voltage network or at the end-customers.

On the basis of detailed information such as ground-fault and short-circuit displays, and measurable asset indicators, network operation as a whole can thus be optimised. Additional services such as gas and water metering are also possible.

A range of solution modules support network-wide process automation. This includes integration of the meters, data concentrators and transaction servers of the automated metering and information system, and the linking up of utility systems to the Energy IP data hub – the metering management system.

Solutions for telecontrol of the low-voltage network, monitoring of network quality and support for mass installation of electronic meters complement the portfolio. Special IT solutions ensure network-wide process integration based on a service-oriented architecture, which exchanges measured data, alarms and control data bidirectionally between SAP, Energy IP and third-party systems such as load management, outage management or job order processing.

The metering management system is the neural hub of the smart metering infrastructure. This data and process integration enables utilities to optimise their administrative business processes and at the same time to intensify customer support. In a separate development, away from smart metering, Siemens also announced that it has received an order from Nigeria for construction of the Geregu II gas turbine power plant in Ajaokuta, located approximately 200 kilometres south of the capital Abuja.

The plant has been ordered by the Nigerian utility Niger Delta Power Holding Company (NDPHC). The gas-fired power plant is scheduled to start operating in 2012 and will cost about EUR230-million.

Geregu II is a follow-up project to the Geregu I power plant, which Siemens built in 2006. The company will supply three SGT5-2000E gas turbines, the electrical equipment and an SPPAT3000 instrumentation and control system for the 434-MW plant, which it will build as a turnkey project.

The power plant market in Nigeria offers good prospects for plant vendors. An installed power plant capacity of approximately 6 000 MW is the mid-term target.

"After construction of the Afam and Geregu I power plants the order for Geregu II marks a further milestone for Siemens in Nigeria and in Africa," said Michael Suess, CEO of the fossil power generation division of Siemens Energy.

"With the latest project, the number of Siemens heavy-duty gas turbines in Nigeria will increase to eight," says Suess.

In March this year Siemens received an order from Dangote Cement Works to build a power plant about 100 kilometres north of Lagos.

The plant will supply power to a new cement works and will have an installed capacity of 113 MW from three SGT-800 gas turbines. It will start operating early next year.

Electricity will grow in importance as an energy carrier in the future. Already today the grids can hardly handle the amounts of power flowing through them. What's more, the energy mix will become increasingly environmentally friendly and decentrally generated — posing even more challenges for the infrastructure because eco-electricity from the sun and wind flows into the grids irregularly, which makes them unbalanced. Aside from expanding the "electricity highways," the solution could be the smart grid: With such an intelligent network, the energy system is equipped with IT and communication technology to make it transparent and controllable.

Hi Paddy,

I have just read your article SA attitudes must change in Mar 2010 issue of WATTnow - brilliant!

You have identified the most important issue facing not only SA, but the rest of Africa and many other countries - lack of maintenance.

Not that I am a maintenance or production engineer, in fact I am a project engineer having been involved in new capital projects all my life.

You could typify me as typical of the silent majority, never having sent a letter to a newspaper or commented on an article in any magazine. So you can rightly feel honoured, your article is the first I have ever commented upon, and I do read an awful lot and wide variety of topics, and have many times felt the urge to send in a reply.

The reason for the late reply is due to the fact that I only received the March and April issues yesterday, having received the May issue 2 weeks ago. I have been working in Qatar for many years now and it typically takes post three to six months to arrive here. The local letters from Qatar we receive promptly, but from overseas it takes long, somehow I think the problem lies here.

Somewhere at one of the many state bureaucracies, staffed by locals who typically have work hours from 8-12 or 8-1, but do very little work in that time, the post heaps up for months and then gets cleared out once in a while it seems (probably when they get a poor Nepalese or Indian in to clean up the office).

Qatar has money pouring in from oil and gas revenues and much of it gets wasted on big projects where most of the work gets done twice, once to do a shoddy job and the second time around to fix it with another shoddy job.

No new road has a 100 metre stretch that is without damage of one form or another. Big high rise buildings with impressive glass facades and design have no parking bays and the pavement outside is usually in a terrible state.

Have a look close up and you will see the bad workmanship. When something doesn't work, it gets replaced by a new unit – forget maintenance. Often a new road is built and two years later it gets ripped up for a bigger wider road or to install sewerage pipes or power cables that were not installed due to bad planning, or more correctly, no planning or foresight whatsoever.

To summarise, here in Qatar the attitude is – do not worry, the state has plenty of money to pay for work done over and over again. Forget about planning ahead or maintenance, in a few years it will be replaced in any case. So why do a good job that will last for 20 years since it will be replaced, broken down or dug up in the next five years. And it will be replaced with a more modern piece of equipment anyway, allowing the old one to be chucked out and replaced by the latest stuff.

In any case, that means more jobs for more people.

So whereas South Africa does not have the money, here they have too much money and attitudes are even worse because of that!

I enjoy your magazine more than the old Elektron, being much more readable and less highly technical with content on day to day issues and new products such as cell phones, the environment or Internet and so forth.

I always find articles that the kids and wife must read as well and they also find them interesting and readable!

Finally, what I particularly like about your articles in WATTnow is the 'no nonsense tone' (vat nie kak van kabouters) and that you speak up and address the real problem issues and underlying causes in SA. (eg Transnet Logistics issue in Mar'10 issue). It is high time someone has the guts to address issues usually not talked about because they are politically sensitive "in staatsbelang/landsveiligheid" or that may offend some races, big institutions, companies, political parties, people and so on.

If it is a problem, talk about it! Not bringing it out into the open and addressing it will not provide solutions or make it go away. It will just get bigger and bigger and even more problematic.

Enjoy spring in SA
Hennie Lourens

Dear Paddy

The article; Derek Woodburn's quest for his personal grail' In WATTnow September 2010, refers.

I know Derek; we were at College together in the early fifties, and in fact share a birthday.

Please help me out of my misery; am I missing the point, am I dumb, or am I having a senior moment, regarding the above-mentioned article.

What gave rise to his frantic and extensive search extending over four years, and his international pilgrimage to obtain a copy of his article on Silica-gel ?

- He presumably wrote the article pre-2006 and didn't keep a copy for himself, or 'lost' his copy and is now trying to obtain a copy.
- He was anxious to see his article in print.
- As a published author I find it strange that a writer cannot reconstruct a two-page document, unless complicated scientific data was lost.

I take it that now that he has a copy we will see it published sometime in the future

Greetings
Felix Bosch Senior Member (Retired)

[I think, for posterity, Derek wanted a copy of the printed article as it appeared in Chemical Technology and not a typewritten copy that he'd compiled – Paddy]

Mentorship

The SAIEE is offering mentorship and advice to young engineers.

The offer comes at a time when our country is suffering a shortage of skills, and we believe that mentoring is an essential requirement in the training and development of the next generation of engineers.

If, as a member of SAIEE, you believe that you need a mentor you can request a mentorship service from the Institute.

The service will be of particular benefit to those young engineers working under the leadership of busy and pressurized engineers, who may not have the time to spend with the young engineers discussing and planning their career paths.

This service is particularly relevant to young engineers who are working in an environment devoid of engineers or with non technical managers. The young engineer may feel frustrated because he or she cannot benefit from the wisdom of an experienced engineer.

It will give a young engineer, the mentee, a chance to talk to a mentor, who will be his or her advisor, teacher and role model, away from the work environment. His or her mentor, matched to a similar profile, will understand the mentee's work and personal situation, having been there him- or herself.

The mentee will be able to discuss problems and frustrations with his independent mentor, who would have no stake in the outcome, and who would be able to provide an unbiased opinion and advice. The mentee might not be able to do so with his superiors, particularly if he is unhappy, and is considering an alternative career.

The mentor and mentee could arrange to meet regularly, but not too often, say a few times a year, when both should have enough time to listen properly to what the other has to say.

The mentor could recommend to the mentee what course of action to take without being too prescriptive while the final decision and the consequences remain with the mentee.

Among its more than 5000 members the SAIEE has many experienced engineers who are willing to act as mentors. They are are spread across the country and include engineers who are experienced in steelworks, furnaces, rolling mills, mining, manufacturing, electrical generation, transmission and distribution, through to light industrial, process control, instrumentation, telecommunication, robotics, automation, software development and engineering management of these sectors.

So if you feel that you would benefit by talking to a mentor, please contact Ansie Smith on the number below. She has a database to match the profiles of mentors and mentees.

Prospective SAIEE Mentors
If you feel you that you have the time and interest to help mentees, please contact Ansie Smith on smitha@saiee.org.za or 011 487 9050,
In addition you gain CPD credits, for when you are required to re-register.

Green waste gets R52-million injection

Evolution One Fund, a R700 million clean technology private equity fund, has injected R51,8-million into EnviroServ in support of its black economic empowerment initiative.

EnviroServ is one of the largest waste management companies in South Africa and owns and operates five of the six hazardous waste landfills in South Africa. In November 2008 EnviroServ was de-listed from the Johannesburg Stock Exchange (JSE) and has until now been owned privately by ABSA Capital Private Equity Limited and the company's management. The company has clients and operations located throughout the Southern African Development Community and in the Middle East.

Company chief executive, Des Gordon, welcomed the investment saying it brings substantive value to the company as the first clean technology and environmental private equity fund in Africa. "We are looking forward to working with the Evolution One Fund on future co-investment opportunities," he says.

Inspired Evolution Investment Management is acting as an advisor to Evolution One Fund and Inspired Evolution raised $94-million for deployment into clean technologies focussed on new energy and the environment in areas throughout South Africa and SADC region. The fund's investment focus is on providing expansion capital to enterprises involved in cleaner energy generation and energy efficiency, cleaner manufacturing processes and technologies, improving air quality and emissions control, water quality management, waste management, agri-business and natural products.

Inspired Evolution is seeking new and compelling investment opportunities in South Africa.

Faulty water works – but no report released

Details of the sewage treatment plants that are no longer working in South Africa will not be made public, former Water and Environmental Affairs Minister, Buyelwa Sonjica said in a written reply to a Parliamentary question.

She says that all that is available for the public is the Green Drop Report published in 2009 that outlines the performance and state of the 449 waste water treatment works in the country.

The report was compiled from data collected from the 852 municipal waste-water treatment works but only 449 submitted information and the balance were not audited or checked at all.

That report outlined how serious the water problems are in South Africa. Sonjica claims that the information will not be released because it is highly technical and will lead to additional administrative challenges and serious misinterpretation.

That sounds mighty like a cover-up to me because, in truth, the reason the report is not being released is more likely to be because of its condemnatory nature that points out that the drinking water being supplied by the councils is not compliant with the necessary standards.

At least that's the inference that can be drawn from her refusal to release the fully detailed report in the light of increasing fears that South Africa's water quality is deteriorating seriously in a number of regions including the Free State, Eastern Cape, Limpopo and Mpumalanga.

Reports blaming outbreaks of different illnesses and diseases on the quality of water being piped to people are received regularly, prompting increasing concern among water experts that the municipalities are failing in their primary duty to supply quality water to residents.

Democratic Alliance spokesman, Annette Lovemore says that Sonjica's refusal to disclose the details of the report was "unacceptable" because there is a health risk facing the people of South Africa and "they need to be told about it. . ."

Sonjica confirmed that a number of municipal waste-water treatment works had not been issued licences or permits to operate but she refused to say how many of these there were.

Aspiring scientists take top honours

Aspiring scientists have taken top honours in the Eskom Expo for Young Scientists National Finals held at the University of Pretoria, where the winners of the Best Female Project, grade 12 learners Kulani Mayimele and Reitumetse Makhetha of Welkom High School, scooped the prize as the overall winners of the four Eskom categories, securing a trip to an international science fair.

After an extensive adjudication process, involving hundreds of projects from schools in 26 regions in South Africa as well as learners from Reunion and Thailand, the winners of the three remaining categories were grade 10 learners Nthando Mabika and Siyabonga Mthembu of Amanola High School in KwaZulu Natal (Eskom Best Development Project); Heinrich Dittrich of Hoërskool Hoogenhout in Mpumalanga Highveld (Eskom Best Energy Project); Franco du Toit and Rudolph Jansen of Pretoria Boys High School in Northern Gauteng (Eskom Best Energy Efficiency Project). Each received a Dell Inspiron Mini 10 netbook.

Grade 7 learner Natasché du Plessis of Sabie Laerskool in Mpumalanga Ehlanzeni, won a DsTV decoder and installation from MultiChoice as a special prize.

The purpose of the overall winners' project was to develop a system of health care technologies to assist the medical environment, with the main focus on a working system of computer programs to assist clinics in managing congestion. The learners created an electronic dispensary and medical library, which will provide relevant information to patients.

The Best Rural High School was awarded to Mahhushe Senior Secondary in Mpumalanga Ehlanzeni and the Best Rural Primary School was Kabega Park Primary in Port Elizabeth. Each of the schools received mobile science kits valued at R25 000.

"The Eskom Expo for Young Scientists continues to foster a love for science and technology among South African youth. The competition provides the opportunity to become original and innovative designers of scientific projects, and creates a platform for growth, and serving as a catchment for future scientists, researchers and engineers," says Dr Steve Lennon, divisional executive for Eskom Corporate Services, and the patron of the Eskom Expo.

In its thirtieth year, the Eskom Expo for Young Scientists, a non-profit organisation and the biggest science fair competition in the country, showcased science projects selected from more than 50 000 learners throughout South Africa.

The competition provides the opportunity for learners and schools to exhibit research, design, entrepreneurship, innovation and inventiveness at 26 regional expositions, with entrants judged by a panel of experts.

The winners in each region are invited to compete in the national finals.

Targeting grade 6 to 12 learners, the Eskom Expo has established itself as a perfect vehicle for South African youth to demonstrate their inventiveness and creativity,

Nthando Mabika and Siyabonga Mthembu – Multipurpose machine (Eskom Best Development Project). An engineering (mechanical, aeronautical and industrial) project which designed a multipurpose engine which generates energy without any fuel by processing timber.

Heinrich Dittrich – Power Plants on our Roads (Eskom Best Energy Project). An alternative energy project aimed at generating electricity using the pressure that cars apply to the ground with the mechanical energy produced converted into electrical energy.

with projects focusing on the fields of science, technology, engineering, mathematics and innovation (STEMI).

The adjudication is conducted by judges who are experts in their fields, utilising a comprehensive set of criteria based on several elements including: originality of the project; scientific method; clarity of presentation; presentation of data and material; thoroughness of research; depth of knowledge; visual appeal of the poster; and personal interview.

"The competition attracts entrants from both rural and urban schools within South Africa and beyond and has become so much more than a showcase for experiments and learners' school projects. It is producing some innovative technological processes and developments that can be utilised to advance our country.

"We recognise South Africa's development and future growth is inextricably linked with scientific innovation.

The youth of today harbour the potential to generate new processes, foster growth and change how we live for the better, which is why we continue to support an event that facilitates these advancements," says Lennon.

A plant sciences' project investigating which fungi species has the most positive effect on the growth of the Pinus taeda (pine trees) in the Klipkraal plantation in Sabie, and the impact on the growth of the seedlings if they are inoculated with ectomycorrhizal fungus spores.

For more information contact Priscilla Moodley on 011 894 1365 or Dr Steve Lennon on 011 800 6404.

College Bourbon, Diane Abbadie, Loic Begue, Lou Hoarau, Roland Macoral.

Franco du Toit and Rudolph Jansen – Geyser Research Project (Eskom Best Energy Efficiency Project).
An alternative energy project investigating the energy efficiency of various geyser configurations, including solar power and timers.

Kantarlukwittaya School Thailand, Charinrat Aong-arj and Wanthanee Chanhom.

New headquarters & accommodation for SAIEE

After extensive research, investigation, debate and planning, the SAIEE Council has decided to proceed with the building of new offices and other accommodation on the Observatory site, which is the location of Innes House, the current Head Office of the Institute. After the pros and cons of remaining in Observatory had been thoroughly debated, consensus was achieved amongst members of Council and planning for the development proceeded in earnest.

Not the least of the considerations given to remaining in Observatory is the association the Institute has with SAASTA - the Science and Technology Centre which occupies the major portion of the Observatory site. Also, the relatively easy access from major highways, the proximity to ECSA and the existence of an 'academic spine' through the city, starting from the University of Johannesburg's Auckland Park campus, through the Milner Park Witwatersrand University, the Doornfontein campus of UJ, the Observatory site and down to the ECSA site in Bruma, were all factors taken into consideration.

Because of the Town Planning restrictions on the site a lengthy process had to be instituted to upgrade the coverage allowed for the proposed new office building, but this was successfully concluded and an architect, originally commissioned to provide sketch plans of possible buildings, was instructed to proceed with the building design. A major consideration in the design of the new building has been the requirement by the Heritage Authorities that there should be no undue conflict with the facade of the Sir Herbert Baker designed Innes House.

This has been achieved in various ways including the appropriate choice of finishes and by keeping the roof line lower than that of Innes House. The design also incorporates energy efficient features such as double glazing in specific areas and dual cycle air conditioning in appropriate areas, and when completed should be well accepted by both the professionals and general public alike.

(Architects drawing of site plan and north and west elevations)

The new building is located to the east of Innes House and will provide not only offices but also a new Council Chamber and other accommodation. Not the least of these are proper archive and storage areas, spaces that are sadly missing in the current accommodation. The project has been estimated to cost in excess of R10 million and is being financed from the Institute's own savings.

The project is being driven by a special Building Committee under the Chairmanship of Paul van Niekerk—a Vice-President of the Institute—with members Angus Hay, Ian McKechnie, Les James, Stan Bridgens, Alan Meyer, Jane Buisson-Street and Max Clarke. The architect is Luigi Salemi whose company, Vox Humana, has a strong focus on ensuring that buildings suit their environment. He is supported by a team of professionals who include SAIEE Council Member Bill Bergman, an Electrical Consulting Engineer whose company – Bergman and Fischer – has donated the company's time without charge, for the design and supervision of the electrical installation in the building. In addition there is a Quantity Surveyor, Geoff Drake, a Civil Engineer, Keith Trowbridge and a Structural Engineer, Marylyn Coney, with other specialists to call on as and when required. The building is to be undertaken by a company operating under the name of Biltworx.

Building work has already commenced on the site and is expected to be completed by July, 2011.

Once the building is ready for occupation, all the existing personnel and equipment will be moved into the new facilities and Innes House will be made ready for occupation by the Historical Section of the Institute. The plan includes the use of the upstairs section as a library and the lower floor as a display area for the many unique artefacts in their collection. Presently these are mostly hidden from public view due to the acute lack of space in their current storage area which is located on the south side of Innes House, in what formed part of the outbuildings of the original astronomer's residence. Plans are already being made for additional shelving, racks and other items for the proper storage of the books and equipment.

The Council is confident that the new facilities will be a worthy headquarters for the electrical engineering profession of South Africa and is reinforcing this by embarking on a re-structuring of the Institute's operations both at Council and Committee level, as well as the administration. The changes will enhance the operating efficiency of the Institute to better serve the profession and the nation.

A full set of drawings is on display in the Historical Section Committee Room at Innes House and visitors are welcome to come and view them and the site and if anyone would like more information on the developments they can contact the Institute's Business Director, Stan Bridgens, at 011-487-3003.

TELECOMMUNICATIONS RESEARCH GROUP

POWER LINE COMMUNICATIONS:
University of Johannesburg

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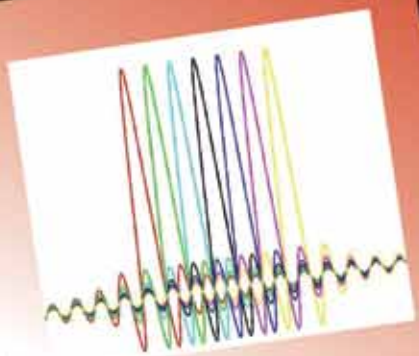
Digital Communications
Coding Techniques
Information Theory
Video Communications
Networks



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