

ELECTRICITY

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While South Africa's electricity supply situation is not currently under threat to the extent that it was when the 2008 electricity supply emergency unfolded, power supply remains vulnerable, and ongoing pressure is being placed on both government and its electricity utility, Eskom, to resolve the situation and ensure that the country's growth and development is not hampered by inadequate energy supply.

The global economic crisis, and its impact on South Africa, eased the electricity supply-demand balance in late 2008 and into 2009, in essence offering some breathing room to plan for new capacity. It seems, however, that this brief reprieve served more to engender a false sense of security than to facilitate the roll-out of additional power generation plans.

As a result, as South Africa emerges from the recession and electricity consumption starts trending upwards, the country's electricity generation capacity is little different from when the load-shedding crisis unfolded. That said, it must be noted that, while the reserve margin remains inadequate, the factors that exacerbated the 2008 situation – such as wet coal, constrained coal stockpiles and unplanned capacity outages – are not currently in play.

Nevertheless, South Africa's electricity sector continues to be strongly characterised by concerns over capacity, the need to secure additional capacity and the challenges involved in such an endeavour.

Efforts to alleviate electricity-related vulnerability in South Africa have been focused around three broad areas of intervention, namely the expansion of Eskom's

power-generation capacity; the development of additional power-generation capacity in the form of independent power producers (IPPs); and the implementation of measures to moderate demand.

To date, the impact of each of these programmes has been fairly limited. While it is understood that any proposed supply-side interventions will have long lead times, other factors that have contributed to the limited success of these programmes have included policy and regulatory constraints, funding challenges and, at times, seemingly limited commitment, and it is these factors that raise serious concerns about South Africa's return to electricity supply security.

Expansion of Eskom's capacity

Eskom, which is currently the source of about 95% of South Africa's electricity, has a total power station capacity of 44 193 MW, as indicated in the utility's 2009 annual report. This capacity is dominated by coal-fired power, which contributes 85% of the utility's total capacity, but also includes power from other sources, such as gas, liquid fuels, hydroelectric, pumped storage, wind and nuclear facilities.

Towards tackling the need for additional capacity, Eskom is undertaking a multi-billion-rand capacity expansion programme.

The scale and scope of this programme are continuously revised. Originally valued at R84-billion, based on a gross domestic product growth rate of 4%, the programme was later recalibrated in line with the country's 6% growth ambition, increasing the value to R97-billion over five years. In March 2007, the value of the pro-

gramme was further increased to R150-billion over five years and, by early 2009, the value of the programme had more than doubled to R385-billion over five years, including the generation, transmission and distribution components of the project.

Currently the project is valued at over R400-billion, including funding for additional baseload capacity, the recommissioning of previously decommissioned baseload capacity and the development of new peaking capacity.

The largest component of the capacity expansion programme is the construction of two new coal-fired baseload power stations in Limpopo and in Mpumalanga, known as Medupi and Kusile, respectively, each of which will contribute about 4 800 MW of capacity to the Eskom grid.

A decision was taken to develop the two power stations in tandem to take advantage of potential economies of scale. However, this hope has seemingly proved unfounded, and the costs of both power stations have risen significantly above initial cost projections, with Medupi currently expected to cost some R125,7-billion and Kusile some R140,7-billion. Initial cost estimates for the projects were R60-billion and R80-billion respectively.

Additional baseload capacity is also being brought on stream through a project aimed at upgrading Eskom's Arnot power station. This project is set for completion in 2010.

The project to recommission previously decommissioned baseload capacity will see the return of the Camden, Grootvlei and Komati power stations, in Mpumalanga, to full operation. The demothballing project, being undertaken at an estimated cost of R16-billion, is expected to be completed by

2011, although several of the units are already back in service.

Eskom's efforts to increase its peaking capacity – that capacity necessary when demand is at its highest – have included the commissioning of open-cycle gas turbine facilities at two locations in the Western Cape. These facilities have a combined capacity of about 2 000 MW. This capacity is only used during peak demand, owing to the very high cost of operating these facilities.

Further peaking capacity, in the form of the Ingula pumped-storage scheme, is under development at a cost of R16,6-billion. Commissioning of Ingula, which is situated on the border of the Free State and KwaZulu-Natal, will start in January 2013.

Various other projects that have, at one stage or another, been included as part of Eskom's capacity expansion, are currently on hold, owing to either economic or strategic considerations. Such projects include the development of a third new coal-fired power station, the development of an additional pumped-storage facility and the development of a new nuclear power station.

Funding

Eskom is seeking to fund its massive investment programme through various traditional means, including earnings, borrowings and government support.

The major challenge of funding its expansion through earnings is evident in the R9,7-billion loss, and the R3,2-billion operating loss, that Eskom reported for the 2008/9 financial year.

This loss is indicative of challenges that the utility is facing on both the expense and income sides of its business, and Eskom will need to undertake serious cost control measures, at the same time as increasing its tariffs, if it is to successfully fund any aspect of its capital expenditure (capex) programme from earnings.

On the expense side, Eskom's 2008/9 loss was in part a consequence of high expenditure on coal, with the utility having spent a significant R25,4-billion on coal in the period, which was some R7-billion more than was spent on the primary-energy source in the previous financial year.

The higher expenditure was mainly the result of Eskom's use of short-term contracts, deployed to rebuild stockpiles that had been

depleted to unacceptable levels and had contributed to the load-shedding crisis of early 2008. Moreover, this restocking was implemented at a time when the export coal price was peaking at above \$100/t.

Eskom's coal stock is now at far more acceptable levels, compared with the low stocks that were present at the peak of the 2008 crisis.

The additional coal costs were also a consequence of the fact that the existing power station fleet, which was having to be run harder owing to capacity shortfalls, was burning more coal than contracted for with the dedicated, or tied, collieries. More coal also had to be transported from distant mines, which added considerably to logistics costs.

Coal savings are being targeted, and Eskom is giving greater priority to engagements with the coal-mining industry to better manage these costs. A national coal forum has been established to reduce the coal costs to Eskom.

The utility is concerned, however, that there is currently insufficient coal-mining capacity in South Africa for long-term contracts to be concluded, as new mines have not yet been opened.

On the income side of its business, it has become critical for Eskom to resolve certain challenges if it is to fund its programme out of earnings.

Firstly, certain large electricity users, including some aluminium smelters, are operating under long-term special electricity tariff arrangements, negotiated at a time when Eskom had excess supply. For example, global diversified miner BHP Billiton had a pricing arrangement with Eskom that was linked to commodity prices, the exchange rate and the standard electricity price. This, and other such contracts, deepened Eskom's losses significantly in 2008/9, and the utility is seeking to extricate itself from these deals that, in the current electricity supply context, are unsustainable and cause undue earnings volatility.

Eskom is in the process of renegotiating these contracts. In May 2010, Eskom signed an amended tariff deal with BHP for its Mozambican smelter. Discussions with BHP on the South African smelters' contracts are ongoing. However, attempts to renegotiate a similar contract with Anglo American have proved more complex.

The more significant challenge on the income side, however, is the need to increase

Eskom's tariffs across the board, in an effort to bring the price of electricity more in line with the cost of production.

For years, Eskom offered electricity to South Africa at prices considered among the lowest in the world.

However, now that the utility is seeking to bring new capacity on stream, and in the context of needing to increase investment in the electricity sector by independent operators, it has become increasingly evident that the price of electricity in South Africa will need to increase significantly. Recognition of this prompted Eskom to apply to the National Energy Regulator of South Africa (Nersa) for permission to raise tariffs in double-digit increments.

In February 2010, Nersa approved a nominal Eskom power tariff increase of 24,8% as from April 1, 2010, and subsequent increases of 25,8% and 25,9% for 2011/12 and 2012/13 respectively.

In November last year, Eskom applied for increases of 35% a year over the three year second multiyear price determination (MYPD2) timeframe, having initially requested yearly increases of 45%, which it said were necessary to help it cover rising operational and capital costs.

Following an extensive process of consultation and deliberation, during which Nersa received 427 comments on the proposed tariff hikes and listened to 85 oral presentations across nine provinces, the regulator ruled that it would allow Eskom to recover revenue of R85-billion in 2010/11, R105-billion in 2011/12 and R141-billion in the final financial year of the control period. Eskom had requested revenues of R99-billion, R146-billion and R216-billion for the period. However, Nersa placed some severe constraints on Eskom's internal cost increases, particularly in the area of primary energy and human resources.

Nevertheless, the average electricity price will rise from around 33c/kWh to 41,5c/kWh this year, and then to 52c/kWh in 2011/12 and to over 65c/kWh in 2012/13. This is, however, in Eskom's view, below a cost-reflective level, which the utility reports to be upwards of 70c/kWh.

However, the increase is already very unpopular, and will certainly add to inflationary pressures. Further, it could have negative implications for economic growth, employment and investment, and concerns in this regard have been raised by a wide range of

interest groups, including business and labour.

Concerns have also been raised that the price increases could lead to a proliferation of illegal connections, as more electricity users will not be able to afford power, and that the tariff increases could impact on sensitive balances that have already been negatively affected by the recession.

Despite these concerns, the rationale behind Eskom's tariff increases remains solid – the utility needs to enhance its ability to fund its capex programme from earnings, and needs to improve its balance sheet in order to boost its capacity to raise funds from the financial markets.

The utility's borrowings programme will include domestic and international bond issuances, as well as fundraising from development finance institutions, such as the African Development Bank (AfDB) and the World Bank, commercial banks, and export credit agencies. In total, Eskom is expected to tap the domestic and capital markets at a rate of around R47-billion a year between 2010 and 2013.

In November 2009, the AfDB announced that it had approved a R20-billion loan to assist in financing the Medupi project. This was the second multibillion-rand loan Eskom had secured from the AfDB within a year, with the utility and the bank having also signed a 20-year R5-billion loan to fund the capex programme in November 2008.

Further, and very significantly, is the recent announcement of a \$3,75-billion loan to Eskom by the World Bank. The approval of this loan was strongly contested, and it is

reported that World Bank representatives from the US, the UK and the Netherlands abstained in the vote on whether to approve the facility, owing to environmental and other concerns about the Medupi project, which will receive some \$3,05-billion of the total loan amount. Medupi will include supercritical technology to mitigate its environmental impact. Some \$260-million of the loan will be used for piloting a utility-scale 100-MW wind power project in Sere, which was previously suspended, and a 100-MW concentrated solar power project with storage in Upington, while \$485-million will be used for low-carbon energy efficiency components, including a railway to transport coal from Ermelo to Majuba.

Shortly before the approval of the loan was announced, Eskom indicated that the loan was a component of a larger \$6-billion "funding window" with the bank, and that an additional \$1,25-billion could flow to the State-owned power utility specifically for emission-reduction projects.

To aid Eskom in accessing finance in the capital markets, the South African government has tailored a support package providing guarantees for R176-billion-worth of Eskom's debt. Government has also offered Eskom a R60-billion long-term subordinated loan (in effect equity), to be disbursed over three years.

Despite the various means being pursued to fund Eskom – including the loan injection from the National Treasury, the government guarantees, the average price increases of 25% a year between 2010 and 2013, and the plans for extensive domestic and international

borrowings – the utility continues to face a funding shortfall of R190-billion between now and 2017. However, this figure includes the capital necessary for projects that are not yet committed, and might not even be built by Eskom.

The utility is, thus, also investigating various alternative funding sources to make up the funding shortfall in coming years, and an inter-Ministerial Committee on energy is considering at least 50 options.

One such option, currently under consideration, is the sale of a stake in the Kusile power station, which is currently under development. To date, Eskom has received a mandate from government to secure private equity for 30% of Kusile, and an option to explore raising this percentage to 49%. Eskom is hoping to raise between R20-billion and R40-billion from this sale, and the resultant ownership structure would arguably be the largest public-private partnership ever undertaken in South Africa.

Industry observers argue that potential private investors in Kusile would want ownership and control, and that the stake on offer is too small to attract interest. Further, it is argued that investors would want a ring-fenced power purchase agreement (PPA), with offtake guarantees, as well as a price discount to make the acquisition palatable. In addition, the tariffs Eskom is permitted to charge will have an impact, once again raising the debate over an appropriate tariff level for Eskom. Thus, there are concerns about whether there is investor appetite for such a proposition.



Further impacting on investor interest will be the contention that the Kusile project and the Eskom new-build programme generally are, on a kilowatt-for-kilowatt basis, the most expensive in the world. One analysis shows that the Medupi and Kusile plants are being built at a cost of more than \$3 000/kW, which is said to be far higher than international norms of about \$2 000/kW. Should this be the case, it would negate the argument that the Eskom build programme has benefited from the economies of scale associated with the near simultaneous development of the world's two largest dry-cooled coal-fired power stations.

Perhaps an alternative to the sale of a stake in Kusile that would be more immediately palatable to potential investors would be the sale of equity in existing assets. The Congress of South African Trade Unions (Cosatu) has been strongly opposed to the sale of a stake in Kusile, and would almost certainly oppose the sale of a stake in any other Eskom asset, contending that such a move amounts to privatisation. Eskom, however, holds that the sale of a stake in Kusile is a necessary component of its fundraising efforts.

Other fundraising suggestions that have been raised include a proposal by Cosatu that development finance institutions play a bigger role funding Eskom's capex programme. Further, the ruling African National Congress has suggested that options, such as development bonds, are considered, although these would be another kind of debt Eskom would have to service. Business Unity South Africa has suggested that, if government were to provide additional guarantees of R27-billion, this would unlock an additional R10-billion in yearly borrowings.

While these are all possibilities, the fact remains that tariff increases are necessary to provide the base for raising capital. Further, tariff increases are critical if the involvement of IPPs is to ever successfully alleviate South Africa's power supply constraints.

The involvement of independent power producers

The potential exists for a host of IPPs to augment Eskom's power supply and take some of the funding pressure off the utility.

In the past, a goal of sourcing 30% of new power capacity from IPPs was articulated, and in February 2010, government indicated that it had set a three-year target of having 10% of the country's electricity supply arising from IPPs.

However, there have been many delays and uncertainties in pursuing the goal of IPP participation, with one of the major obstacles to introducing independent power to the grid being the fact that Eskom is currently designated as the single buyer of electricity produced by independent operators. In the context of this responsibility, Eskom has identified one of the reasons for the delay in bringing IPP power on stream, as South Africa's deliberate policy of underpricing electricity to the consumer. Eskom contends that, as a result of this practice, it has been constrained in signing PPAs with independent operators by the maximum tariffs it is able to charge consumers. The utility shows that the prices IPPs require to make their generation viable exceed the tariffs at which it is able to sell the power on to consumers. Thus, if Eskom operated in such an environment, it would incur losses in sourcing IPP power.

The obstacle represented by Eskom's role in the IPP process is, however, set to be removed. Recent regulations have stipulated the introduction of an Independent System and Market Operator (ISMO), which will be responsible for activities relating to procurement and will, ultimately, be able to sign PPAs with IPPs.

This move may be accompanied by the long-anticipated unbundling of the power transmission business from Eskom.

The creation of the ISMO is viewed as

an important mechanism to facilitate investment by IPPs; and the Department of Energy (DOE) is interrogating the framework for its creation and its possible business structure.

It is understood that it is likely that the ISMO will, eventually, be responsible for both tariff aggregation and transmission operations to ensure that the conflict of interest between Eskom as generator and transmitter, as well as the single buyer of all cogenerated and IPP power, is removed.

Meanwhile, other regulatory challenges relating to IPPs remain. The ISMO will be responsible for overseeing the implementation of government's integrated resource plan (IRP) for power generation.

However, the inaugural IRP, known as IRP1, demonstrates little commitment to the IPP sector. IRP1, which is, in effect, an electricity capital project roadmap for the country up to 2013, makes little room for IPP involvement, with only 1 100 MW set aside for renewable, cogenerated and conventional IPP power between 2010 and 2013. Further, IRP1 offers no clarity on the role of power imports from projects, such as Mmamabula, in Botswana, and the Moamba closed-cycle gas-turbine project, in Mozambique.

The DOE has stressed that power arising from IPPs after 2014, is likely to be far more material and will be set out in IRP2, which could be finalised in June 2010. Energy Minister Dipuo Peters has indicated that her department is aware of several potential projects awaiting PPAs, and that IRP2, which will have a 20-year horizon and will be revised every second year, will take such projects into account.

Interestingly, the policy confusion contained in IRP1 extends beyond its failure to cater for an expanded role for IPPs in South Africa's power mix. For example, the document represents a material misalignment with the information and plans presented by Eskom to Nersa in its MYPD2 application.

These inconsistencies are a consequence of the fact that the IRP1 and MYPD2 documents were prepared in parallel.

The ongoing presence of policy uncertainty and planning confusion in the South African power market mean that the country's response to its vulnerable power situation is likely to continue to be constrained.

Further, the situation is likely to be impacted on by the failure to adequately use those structures – such as the Electricity Advisory Council and the National Electricity Response Team – that have been established to deal with the power situation.

Demand-side management

The third means being pursued to alleviate the immediate threat to South Africa's power situation is energy efficiency and demand-side management (DSM).

This effort probably has the greatest potential to alleviate the tight power-supply situation in the short term, although the success of the various components of this programme has been varied.

As part of this, a programme of mandatory power savings, known as the Power Conservation Programme (PCP), has been devised, seeking an overall reduction in demand. Towards implementing the PCP, specifications are being drafted to define how power-consumption and allocation baselines should be calculated. Power use reductions prescribed by the PCP will be measured against these baselines, which will initially be determined for the country's 300 largest electricity users.

Another element of South Africa's DSM programme has been the roll-out of a national solar water heater (SWH) programme, endorsed by the DOE, which aims to see one-million SWHs installed across the country by 2014. The longer-term objective is a 50% penetration of SWH geysers by 2020.

Eskom's participation in this programme will be funded by its tariffs, as is the case for all DSM projects being implemented by the utility, although funding could also consist of a carbon financing component that would enable the initiative to leverage funds made available through the Clean Technology Fund.

Eskom announced in January 2010 that it would be increasing the rebates for purchasers of systems that are registered under its SWH programme, and that the increases are in the order of double the previous subsidies. The increased rebate, along with Eskom's proposed electricity tariff increases, will result in the payback period for a family of four being significantly less than five years.

Under the previous incentive structure, the SWH programme was slow in getting off the ground. Eskom had been hoping for a roll-out ramping up to about 15 000 a month, however, the scheme's uptake has been much slower, and estimates indicate that, at the current rate of uptake, it would take some 75 years to reach 50% market penetration. Hence, the need for increased impetus and robust supporting frameworks.

Eskom is working with government to finalise a number of other SWH initiatives, and the utility is confident that this multipronged approach will start delivering meaningful numbers in future.

Other projects included under Eskom's DSM programme are the compact fluorescent light programme, which has seen the distribution of some 35-million energy-saving lightbulbs, with additional tenders planned; the power alert; the energy-efficient motors programme; and the residential load management programme.

Certain critics have suggested that the DSM programme should not be a function of Eskom, as its objective is to generate and sell power, not to advocate energy efficiency. Thus, suggestions have been made that DSM initiatives should rather be a function of an independent agency.

Nevertheless, it remains true that DSM efforts have much to contribute to South Africa's attempts to alleviate its power supply challenges. The DOE contends that effective DSM efforts could lead to a reduction in demand of 3 056 MW by 2013.

In fact, Eskom contends that, since the inception of its DSM programme in 2004, nearly 2 000 MW of savings has been achieved, and verified at a cost of R3-billion. The aim is to achieve savings of over 4 000 MW over ten years.

Prospects

South Africa's electricity supply-demand balance remains tight, with indications being that demand could return to 2007 levels during the course of 2010. It is feared that, unless energy consumption levels are reduced, the country could face power shortages in 2011/12, and again in 2018, as Eskom moves towards increasing its capacity to 80 000 MW by 2025.

Interventions are necessary if the country is to avoid loadshedding on a significant scale, in the 2011/12 period.

Critically, renewed efforts and attention are needed to progress Eskom's new-build programme. Funding uncertainty in this regard needs to be resolved and creative financing solutions should be sought to ensure that the South African taxpayer does not bear the full burden of providing the funding required.

Further, the policy uncertainty and delays that have surrounded the involvement of IPPs need to be urgently resolved, so that capacity can be brought on stream from this valuable source of opportunity.

Finally, increased efforts should be made to expand the impact of the DSM programme, particularly the energy efficiency and conservation campaigns.

If the current seeming lack of urgency persists, South Africa is likely to face more loadshedding, at least until the new baseload capacity is brought on stream.

ESKOM PROJECTS

ENERGY FUNNEL

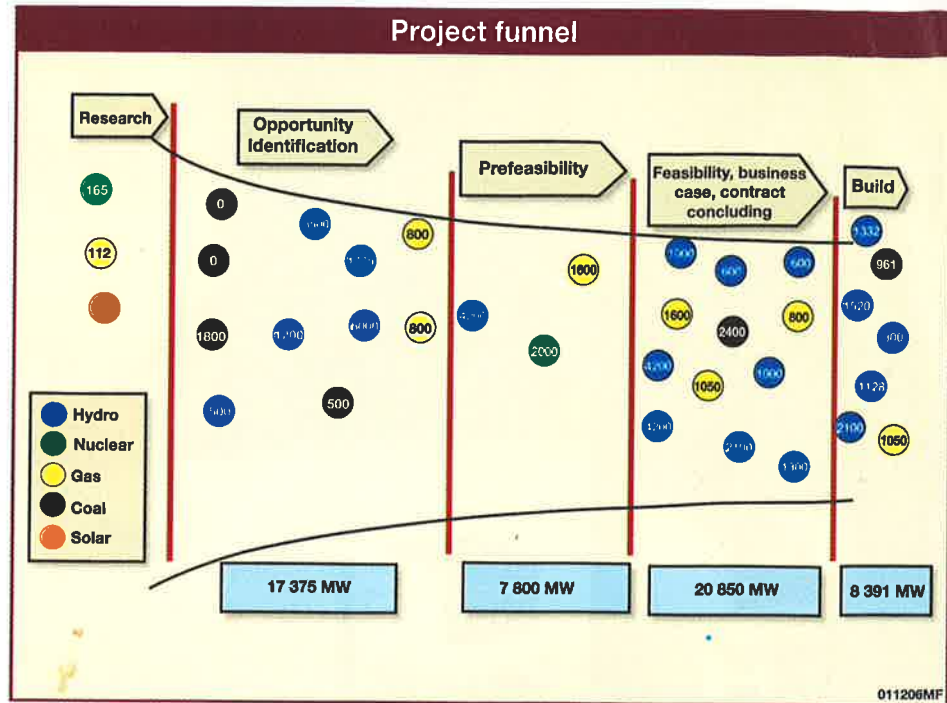
State power utility mulls various ways to meet 47 252-MW target for 2025

Jade Davenport | Staff Writer

In a bid to meet South Africa's phenomenal growth in electricity demand, State-owned utility Eskom is currently evaluating an elaborate capacity project funnel that comprises 17 375 MW in potential new projects.

The projects within this capacity funnel comprise hydro, nuclear, gas, coal and solar technologies, with the primary focus of most projects being coal and hydro technologies.

According to Eskom, within the opportunity identification phase of the funnel, the total value of the projects that are being evaluated is 17 375 MW,



PROJECT FUNNEL

The electricity-generation opportunities Eskom is evaluating

while in the prefeasibility and feasibility stages there is a total of 7 800 MW and 20 850 MW respectively.

The evaluation of this project funnel is in line with Eskom's original capacity-expansion programme, which was planned in early 2005 and was based on a forecast of 4% gross domestic product growth a year over the next few years, resulting in 2% to 3% growth a year in electricity demand.

This translated into an additional 1 100 MW of capacity a year.

However, Eskom has accelerated the expansion programme in line with government's drive to boost economic growth to 6% by 2010, as it is estimated that this will result in average growth in demand of 4,4% a year.

This will require approximately 47 252 MW of new capacity to satisfy new demand to be built between 2005 and 2025, or roughly 2 000 MW/y. As part of this capacity project funnel, Eskom states that coal, gas and nuclear options are being evaluated for board decision in the next financial year and that feasibility studies for new power stations over the medium term (2007–2010) are well advanced.

Although an investment decision has already been made to build a coal power plant of a minimum 210-MW capacity in the Lephalale area and planning has advanced for a 1 330-MW Braamhoek pumped-storage facility in the Drakensberg, on the boarder between the Free State and KwaZulu-Natal, the most prominent project in the feasibility stage is the potential construction of combined-cycle gas-turbine plants, each with a minimum of 1 800 MW.

In the long term, options such as Westcor (3 500 MW), the pebble-bed modular reactor (165 MW units) and conventional nuclear unit sizes from 700 MW to 1 600 MW are also being evaluated.

Eskom also has wind and concentrating solar power components that are at a fairly advanced stage of development with a wind-demonstration facility in the Western Cape and a large-scale concentrating solar power project in the feasibility stage.

A concentrating solar-therm central receiver-type power plant option in the Northern Cape (100 MW) could also contribute, although the State utility claims that costs are high.

This feasibility study is focusing on addressing technology risk issues, while refining the financial scenario facing such a development.

A number of pilot projects on solar water heating are under way in residential and commercial buildings, with an additional pilot at an industrial site under investigation.

The bioenergy and wave initiatives are still in the early stages of project development.

Apart from the capacity project funnel, Eskom has a R200-million-a-year research programme that seeks to investigate renewable energy sources, such as wind, solar, wave, tidal, ocean current, biomass and hydro.

Through this programme, Eskom continues to investigate a number of options, including conventional pulverised fuel plants, pumped-storage schemes, gas-fired plants, nuclear plants, greenfield fluidised bed combustion technologies, and renewable wind and solar energy technologies.

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already 25% and 31% complete respectively.

The surge chamber access tunnel has been completed and work on the surge chamber link tunnels one and two is 64% complete. Tunnels three and four have been completed.

Work at the outlet structure is ongoing, with 11 313 m³ of concrete poured already.

Civil works at the outlet struc-

ture and tower, currently 85% complete.

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While construction of the power generation facility is progressing, the Ingula Conservation and Land Management team has been busy eradicating invasive plant species in the 8 000-ha conservation area.

These mostly include the black wattle and the silver wattle. It is estimated that up to 3,3-billion cubic metres more water is con-



PROGRESS AT INGULA

Construction of the Braamhoek dam is ongoing, with civil works at the outlet structure and tower currently 85% complete

Ingula Pumped-Storage Scheme

In terms of expenditure, Ingula is currently the biggest construction project in KwaZulu-Natal.

- The main access tunnel is 1,4 km in length, with a 1:10 gradient.
- Ingula will be the nineteenth-largest pumped-storage scheme in the world.
- At peak flow, the equivalent volume of eight Olympic-size swimming pools will pass through the turbines every operating minute.
- Three of South Africa's six critically endangered bird species occur on site.
- Three-million tons of rock will be excavated from the underground works.
- A total of 15 000 t of steel lining will be used in the waterways.
- The concrete works will be reinforced by 3 600 t of steel.
- The machine hall is the largest-span underground cavern excavated in soft mud rock geology.

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sumed nationally by invasive plant species.

A reliable supply of water is imperative for the successful operation of the 1 332-MW hydropower plant.

Invasive plant species have to be eradicated to conserve water, as it withholds water from the natural ecosystem.

Before the pumps can start filling the upper reservoir with water, about 26-million cubic metres of water must first collect in the lower-level Braamhoek dam.

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The dam only needs to be filled once.

The Ingula pumped-storage scheme project will comprise an upper dam (Bedford) and a lower dam (Braamhoek).

The elevation difference between the two dams will be about 470 m.

The dams will be connected by underground waterways through an underground powerhouse, which will house four 342-MW pump turbines with a total capacity of 1 332 MW.

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Hydroelectricity project progresses

HENRY LAZENBY | FEATURES REPORTER

A milestone was achieved in the construction of State-owned power utility Eskom's Ingula pumped-storage scheme project, situated on the border between the Free State and Kwazulu-Natal, when the first of 32 concrete face slab panels were placed at the upper Bedford dam. Placing the remainder of the face slabs is expected to take six months to complete.

During April, the 861 000-m³ rockfill on the left side of the Bedford dam reached the top level of the dam wall.

This enabled engineers to continue with the construction of the initial dam wall face slabs.

Progress at the lower Braamhoek dam included the construction team reaching the spillway level on the left flank of the roller-compacted concrete (RCC) dam wall.

It is understood that only 8 700 m³ of RCC still needs to be placed before the dam wall is completed, but this has been deferred to August 31, as more time is needed to extract additional rock from the quarry.

Meanwhile, construction of the underground tunnels and works linking the two dams 4,7 km away from each other is also progressing.

Eskom's Ingula Visitors Centre reports

that the tailrace tunnel downstream is 47% complete at a distance of over 400 m, while excavation from the top level is 34% complete.

Further, work has started on the four draft tubes, number four of which is already 16% complete at a depth of 28 m.

Work on draft tubes one and two is

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BEDFORD DAM

The dam is nearing advanced stages of construction

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permanent staff and, where necessary, hire labour on a contract basis. This gives the labourers a greater degree of job security and allows us to train them," he says.

However, Kaefer Energy Projects marketing manager **Glenn Barry** points out that, owing to the HIV/Aids pandemic, the company has to manage its workers carefully.

He says that, with a contract spanning three years to four years, such as the Medupi project, and with the large numbers of transient labour mostly staying in single-sex accommodation camps, HIV/Aids will be a major threat to the wellbeing of the workforce.

To this end, Kaefer established its HIV/Aids relief programme, known as Karp, in 2005, to educate and manage infected employees.

Barry believes that up to 25% of all employees on the project could be HIV positive. "Through Karp, HIV positive employees are provided with comprehensive treatment and care packages and there is a site of-



STANDARD PROJECT

Kaefer MD George Wardrope and Renata Twigg, Kaefer loss control manager, holding the certificate confirming the company's ISO 14001 (environmental) and OHSAS 18001 (occupational health and safety) accreditation

office at the Medupi construction site to help administer the programme to employees," he concludes.

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The twin waterways, consisting of part concrete and part steel-lined headrace tunnels, pressure tunnels and shafts, will link the upper reservoir with the pump/turbines.

Steel-lined extended draft tubes and a single concrete-lined tailrace tunnel will connect the pump/turbines to the lower reservoir.

The upper reservoir will be a concrete-faced rockfill embankment dam 41 m high, with an active water storage volume of 19,3-million cubic metres.

The lower dam will be of RCC, 39 m high, with an active storage volume of 21,9-million cubic metres.

The upper reservoir will store enough water to continuously generate electricity, using all four units for 16 hours.

Pumping the water back from the lower reservoir will take about 21 hours, giving an overall efficiency of 76% for the scheme.

The first 333-MW unit of the nearly R17-billion project is expected to be commissioned on schedule by January 2013, while the remainder of the units will be commissioned in April, July and October.

Construction of the Bedford dam is expected to be completed by May 10, 2011.

Construction was unexpectedly delayed when excavations revealed prehistoric plant and animal fossils.

Palaeontologist Dr Gideon Groenewald regularly visited the site, examining the rocks for fossils after each blast.

A large diversity of fossils were found, including an excellent example of an ancient Gorgonopsian, a ferocious flesh-eating animal, with sabrelike teeth, dating from a period of one of the greatest mass extinctions, known as the Permian period.

NEWS&INSIGHT

EMPLOYMENT FUND

Jobs, Jobs, Jobs

R10bn jobs scheme to create up to 50 000 jobs, says IDC

LONI PRINSLOO | SENIOR ONLINE WRITER

South Africa's Industrial Development Corporation (IDC) recently launched a R10-billion scheme to tackle the country's chronic unemployment problem.

IDC CEO **Geoffrey Qhena** says that the scheme is aligned with government's New Growth Path and its latest Industrial Policy Action Plan.

The South African government plans to create five-million new jobs over the next decade, reducing unemployment by 10%.

The country currently has one of the highest unemployment rates on the African continent.

Companies will be able to access funding of between R1-million and R1-billion.

Chief financial officer **Gert Gouws** says that the scheme will be able to create an additional 40 000 to 50 000 employment opportunities, at an average cost of R250 000 to R300 000 for every job created. He adds that the cost per job created or saved may not exceed R500 000.

The funding will be available to entrepreneurs across the IDC's mandated sectors at prime less 3% over a period of five years.

Some of the sectors highlighted for funding include the green economy, manufacturing, the mining value chain, agriculture and infrastructure.

Qhena says that businesses and entrepreneurs applying for funding should have economic merit, show strong potential for job creation, be broad-based black economic-empowerment accredited and operate within South Africa.

Last year, the IDC set aside R6,1-billion for companies hit by the global economic recession, but businesses were slow on the uptake, with only R3,7-billion of the funds currently being committed.

Gouws believes that there will be a faster uptake of the R10-billion scheme, as it comes at much cheaper rates.

"With this scheme, we are actually lending below our borrowing rates, as the fund will be subsidised from dividends earned from the corporation's assets."

Qhena adds that the IDC will also be willing to go to the market and borrow or sell some of its existing shares if needed.

"If we want to expand South Africa's production capacity and create additional jobs, we cannot continue doing business as usual – we need to be creative in order to develop new industries," he says.

The IDC also announced a R750-million fund for businesses affected by



GEOFFREY QHENA
Businesses and entrepreneurs applying for funding should have economic merit

recent droughts and floods in the country.

Of this, R500-million will be made available at prime less 3% for businesses falling within the IDC mandate.

The balance will be loaned to the Land Bank to primarily assist agricultural businesses that fall outside the IDC mandate.



A long walk to integration: SADC leaders at one of their past summits

SADC Africa's most successful regional community

As the Southern African Development Community (SADC) celebrates 30 years since its formation, Neil Ford examines how Africa's most successful regional community is gearing up for a very ambitious future.

Despite its various drawbacks and the slower-than-hoped-for pace of development, there is little doubt that the SADC is the most successful regional economic community in Africa. With a population of about 250 million people and combined GDP of \$400bn, Southern Africa offers huge potential for foreign investors.

The SADC currently has 15 member states, including Madagascar, which had its membership suspended in 2009 after the coup led by Andry Rajoelina, and Seychelles, which rejoined the organisation in 2008.

The focus of the organisation has changed markedly since 1980. Originally set up as an organisation of Frontline States opposed to Apartheid South Africa, it is now very much built in the mode of other regional economic blocs, while South Africa now plays a prominent role in encouraging closer political and economic cooperation

across the region as a whole.

Article 5 of the SADC treaty lays out the organisation's main aims: "To achieve development and economic growth, alleviate poverty, enhance the standard and quality of life of the people of Southern Africa and support the socially disadvantaged through regional integration; evolve common political values, systems and institutions; promote and defend peace and security; and promote self-sustaining development on the basis of collective self-reliance of the region."

The timetable for harmonisation and economic integration was laid down by the Regional Indicative Strategic Development Plan (RISDP), which was adopted by member states in 2003. The SADC Free Trade Area (FTA) was formed as planned in 2000 and most SADC member states have subsequently joined, with the exception of Angola, DR Congo and Seychelles.

The FTA is supposed to be followed by the customs union next year, a common market in 2015, monetary union in 2016 and the introduction of a regional currency by 2018. The creation of a single currency will require a central Southern African bank to oversee the community's monetary and fiscal policy; and a single exchange rate policy.

Such a pace of development seems very ambitious and it may be difficult to integrate the needs of diverse economies such as South Africa and Mauritius, with those that are heavily reliant upon single commodity exports such as Malawi, Zambia and Angola.

EU comparison

Unquestionably, the European Union is by far the most successful example of regional integration in recent history and has provided the model for most other similar organisations, including SADC and the East African Community (EAC).

Yet the EU has adopted a far more gradual approach towards harmonisation and economic integration than that envisaged by the SADC, with decades separating the creation of a single market from the move towards monetary union.

The SADC could also face problems because of the massive political and economic dominance of South Africa. The first incarnation of the EAC failed in the 1970s because Kenyan companies overshadowed those in Uganda and Tanzania. There are therefore real fears over whether, for example, Malawian or Mozambican firms will be able to compete with their South African competitors within the SADC.

In addition, any Southern African central bank would have to manage interest rates in the best interests of the new SADC currency and this may favour big business in South Africa rather than small-scale farmers and small and medium sized enterprises (SMEs) further north.

Despite such challenges, the ambition and scope of the project is surely to be welcomed. South Africa is now playing a role for the good within the region rather than constantly trying to destabilise neighbouring states as in the past.

In addition, it is acknowledged that African countries must begin to trade more with each other and not just with richer countries in the rest of the world. Encouraging trade within Southern Africa should provide a huge boost to economic growth and living standards.

However, monetary union in the medium term will require much greater

Regional power regulatory body signs MoU with US

Power regulatory body the Regional Electricity Regulators Association of Southern Africa (Rera) signed a memorandum of understanding (MoU) with the US government to facilitate energy-related technical assistance from the Southern Africa Global Competitiveness Hub (USAid Trade Hub) to Rera.

Subsequent to the MoU signed between the Southern Africa Development Community's (SADC's) directorate of trade, industry, finance and investment and the US government in February 2007, the US embassy and USAid Trade Hub, together with Rera, agreed to sign the MoU in Botswana in February this year.

In recent months, the Southern African region has been plagued by an energy crisis of unprecedented

proportions.

South Africa is a significant supplier of electricity to other regional economies, such as Botswana, Namibia, Lesotho and Swaziland, and the lack of capacity to produce as much electricity as is needed by the country's industries and domestic consumers is leading to load-shedding and blackouts.

While plans are in the pipeline to increase the electricity supply, experts expect that the current situation may persist for another three to five years, as it takes several years to expand capacity at existing power plants or to build new ones.

While physical energy-related infrastructure is desperately needed, it is also imperative that the region establishes the correct regulatory frameworks to allow for the effective trade of energy generated with-

in the region, as well as the creation of an environment that encourages public- and private-sector investment in energy generation.

As an SADC subsidiary body, Rera aims to facilitate the harmonisation of regulatory policies, legislation, standards and practices and to be a platform for effective cooperation among energy regulators within the SADC region.

It was formally launched on September 27, 2002, in Windhoek, Namibia.

Meanwhile, since 2007, the USAid Trade Hub has been providing energy-related technical assistance to various countries in the Southern African region and to Rera under USAid Trade Hub's Africa Global Competitiveness Initiative.

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AFRICA & WORLD



AFRICA TO GET MUCH OF G8 ENERGY INVESTMENT – Much of the new money pledged at a Group of Eight (G8) summit for investment in cleaner energy will go to Africa, says British Prime Minister **Gordon Brown**. G8 leaders pledged \$6-billion to three funds run by the World Bank and \$44-billion of its money to be spent on low-carbon energy projects, stopping deforestation and helping nations adapt to climate change. Brown says that combining the public money pledged with private finance, the total amount to be invested in developing countries before 2012 will be about \$150-billion. "Much of that will go to Africa, and some of it will go to Asia," Brown tells reporters. Britain says that to get developing countries on board with respect to cutting greenhouse-gas emissions, rich countries should help poorer nations pay for cleaner energy as it tends to be more expensive than just using coal.



Siemens in Mozambique –

Big opportunities & big players

Siemens is no newcomer to Africa. In fact, the company has been represented in southern Africa in one form or another over the past half-century, and is today a major transnational presence in the region.

As regards Mozambique, Siemens has had ongoing activities over several decades - primarily in railway locomotion and power generation distribution. It was only in the 1980s that Siemens Limitada formally registered its offices in Maputo.

Today, however, the Mozambique operation is one of Siemens' six key SADC companies - the other five are situated in Angola, Botswana, Namibia, Tanzania, and Zimbabwe - and all are headed by Antonio Correia, the Managing Director for the SADC Region.

"The other seven SADC countries - plus the presence of Siemens in 29 other African countries - are serviced through an extensive network of agents and distributors, as well as Siemen's own offices" says Correia.

Correia is very positive about Mozambique's potential, which is cur-

rently focused on the development of natural resources. "Much of Siemens workload stems from industries operating in the primary sector, and Siemens are already involved in or seeking contracts in a number of large projects," he says.

These major developments include: the \$2.3 billion Mpenda Nkua Dam and hydro-electric station on the Zambezi, the \$3 billion Moatize coalfields project with all its ancillary infrastructure requirements, the Moma Mineral Sands Project, Corridor Sands and the Sasol-linked Pande and Temane gas-fields in the northern part of the country.

There are a host of other important multi-million dollar projects - like the upgrading of railways, harbours and airports, and roads and bridge construction - that will serve to transform the country within the next few years.

"Growth prospects for the region are looking exceptionally good, and the country is going out of its way to attract new investment," says Correia.

"From the very early days in our history, Mozambique has always enjoyed a special relationship with South Africa. As a result, these two neighbours are well placed to co-operate and participate in the major regional developments now underway," he notes.

South Africa is the largest single foreign investor


in the country, with infrastructure and construction projects totalling close to \$94-billion. Next is the UK, with 15 projects worth some \$28-billion, and Zimbabwe and China with initial projects worth \$9 million and \$5.6 million respectively.

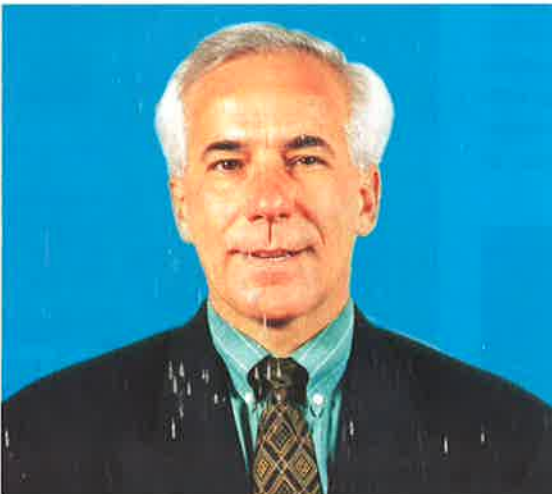
"All of Mozambique's growth potential is dependent on the availability of reliable power supplies. Once this is available, other more advanced levels of infrastructure can be entertained, including for example medical equipment, says Correia

"We see particular application for small generating units that can provide dependable power supply in remote areas, independent of the national grid. These units can be fuelled by natural gas, and offer the prospect of immediate switch-on with all the advantages that it entails," he adds.

Siemens is actively pursuing corporate growth in Mozambique, through a policy of targeting small local companies with whom it can partner in order to more effectively participate in the fast growing domestic market.

Tourism too is projected to play a major role in the region's development. According to the World Tourism Organisation, the country achieved tourism growth of 37% last year, making Mozambique the world's fastest-growing tourist destination.

As the domestic hospitality industry burgeons, the infrastructural demands - power supply, telecommunications, air-conditioning, and all the myriad necessities of world-travellers - offer exciting market opportunities for Siemens and all other stakeholders participating in Mozambique's development. 



Antonio Correia, the Managing Director for Siemens in the SADC Region.