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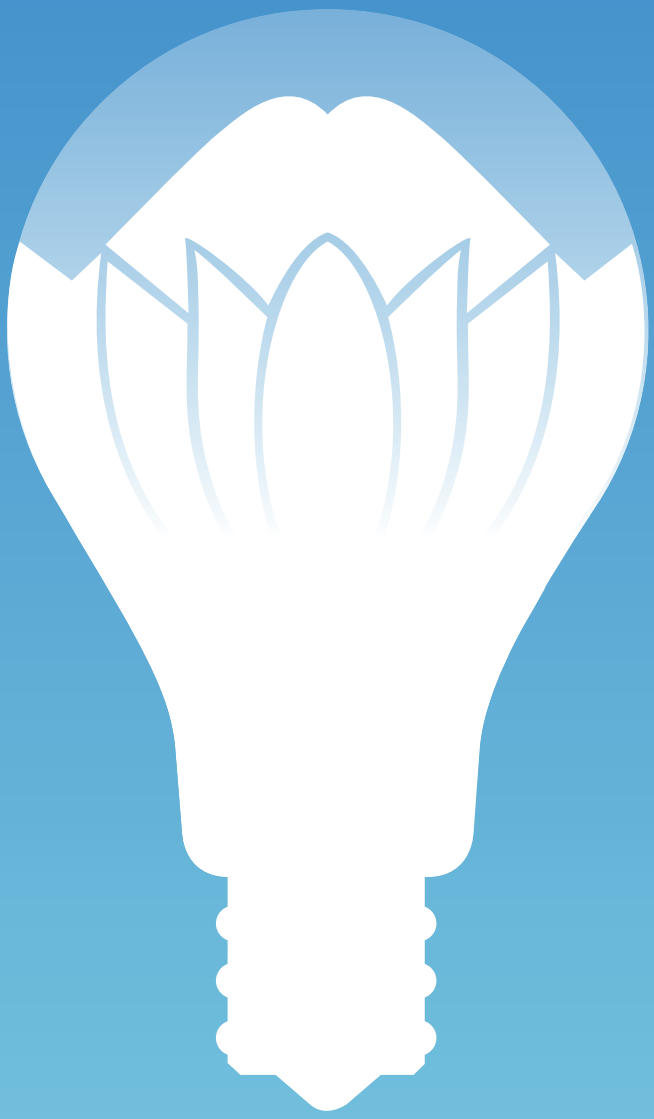
INDUSTRY EXPLORATIONS



SOUTH AFRICA POWER

2014

Economy | Coal-Fired | Independent Power Producer | Natural Gas | Nuclear | Renewables

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Dear Readers,

South Africa's critical power situation has been the subject of much speculation since 2008 when the country experienced its first electricity crisis after enjoying a surplus of cheap electricity for decades. A lack of investment in South Africa's power infrastructure coupled with a growing electricity demand has resulted in the urgent upgrade of existing power plants, as well as the construction of two of the world's largest coal-fired power plants, Medupi and Kusile, that despite long delays are now nearing completion. A perceived unreliability in the electricity supply coupled with financial constraints have led to discussions around the long-term structure of the nation's energy industry and the role of the national power utility Eskom.

With up to 95% of South Africa's electricity generated through coal-fired power stations, the country is now looking to rationalise consumption and diversify its energy mix. As the country plans to invest R385 billion (US $50 billion) in new capacity projects over the next five years, South Africa indeed holds challenging and exciting opportunities for companies operating in the power sector, amongst is the debated nuclear energy programme which would provide 50% of the 40 GWe targeted new generation by 2025.

Rated as the world's 12 most attractive destination for renewable energy investment South Africa has a great potential for renewable energy development and presently has in place a target of 10 000 GWh of Renewable Energy. The Minister has determined that 3 725 megawatts (MW) to be generated from Renewable Energy sources is required to ensure the continued uninterrupted supply of electricity shedding light on the sector's potential but also the need for government to create an environment to promote investment. So far the legislation and regulatory framework around the introduction of renewable energy has been favoured globally.

South Africa is also an integral part of the Southern African Power Pool (SAPP), with extensive interconnections. The total installed generating capacity in the SAPP countries is 54.7 GWe, of which around 80% is South African and controlled by state-owned Eskom. This means that developments in the South African energy sector is also set to have far-reaching affects in the Southern African Region.

GBR's Industry Explorations South Africa Power 2014 is a result of intense on the ground research compiled from interviews with selected executives from local South African homegrown companies as well as an array of multinationals to showcase to our readers and international investors the challenges, risks, threats and, most importantly, the opportunities for investment within the South Africa power sector. We would like to extend our sincere gratitude to all industry players who contributed their time and knowledge.

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An Introduction to South Africa and its Power Industry

Cooling on Coal

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This research has been conducted by Sharon Saylor, Jolanta Ksiezniak and Anita Kruger.
Edited by John V. Bowlus
Graphic design by Gonzalo Da Cunha

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Africa's Regional Power Hub:

An Introduction to South Africa and its Power Industry

"The first IPP renewable project is already online and as our renewable energy index shows, South Africa is ranked number 20 out of 40 attractive renewable energy countries in the world. If South Africa had not created this market and regulatory structures it would not have been possible. South Africa will meet its renewable energy targets as set out in the Integrated Resource Plan and the IPPs are doing very well. Now it becomes a question of whether the cost of structuring will continue to be driven down as we have seen especially in solar energy tariffs."

- Norman B. Ndaba, Sector Leader, Power and Utilities Africa, Ernst and Young

Image: Nolte Lourens

An Introduction to South Africa

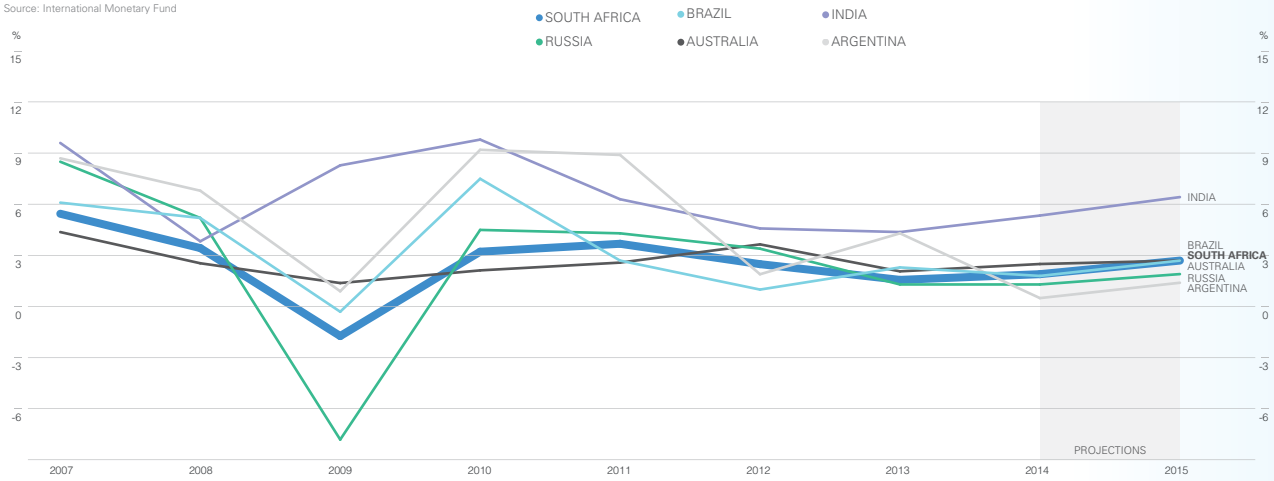
A Brief Overview of the Country and Economy

On May 24, 2014, South Africa swore in its third democratically elected president, Jacob Zuma, for his second five-year term. 2014 marks 20 years of democracy for the rainbow nation, but celebrations seem bittersweet. The party and its leader remain embroiled in corruption scandals and with the president's promise of "radical social-economic transformation" come many hurdles to overcome. South Africa needs to break free from its comparative growth slum, which has seen the country edged out of the number one spot as the continent's greatest economy by an even more politically troubled Nigeria.

Zuma's party, the African National Congress (ANC), has ruled South Africa since the country became democratic, and, despite ongoing scandals, the ANC managed to carry 62% of the vote in May. Still, the opposition party Democratic Alliance (DA) and Economic Freedom Fighters (EFF) both appear to be gaining strength and constituents, particularly among urban blacks tired of corruption. Zuma's corruption and graft scandals has pummeled his popularity rating, which fell from a high of 77% in 2009 to 46% in 2014, according to a South African polling firm, Ipsos. As this report was going to press in late August, President Zuma's legal setbacks in fighting charges against him had some analysts predicting that his presidency could end and another members of the ANC could replace him. Zuma may still survive, as he has done count-

GLOBAL REAL GDP GROWTH RATES (%)

Source: International Monetary Fund



SOUTH AFRICA AT A GLANCE

Source: CIA World Factbook

Population: 52,981,991 (2013 est.)
Capital: Pretoria
Chief of State: President Jacob Zuma (since 9 May 2009)
Growth Domestic Product: $595.7 billion (2013 est.)
Growth Rate: 2.0% (2013 est.)
GDP per Capita: $11,500 (2013 est.)
Economic Sector Breakdown:
Exports: $91.05 billion (2013 est.): gold, diamonds, platinum, other metals and minerals, machinery and equipment.
Imports: $99.55 billion (2013 est.): machinery and equipment, chemicals, petroleum products, scientific instruments, foodstuffs.
Major International Trade Partners: China, Germany, United States, Saudi Arabia, Japan, India
Economic Sector Breakdown: agriculture: 2.6%, industry: 29%, services: 68.4% (2013 est.)

South African Development Community (SADC)
Angola, Botswana, Democratic Republic of the Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, Swaziland, Tanzania, Zambia, Zimbabwe, **South Africa**

$595.7 billion

GDP
(current US dollars) 2013

Source: CIA World Factbook

2.0%

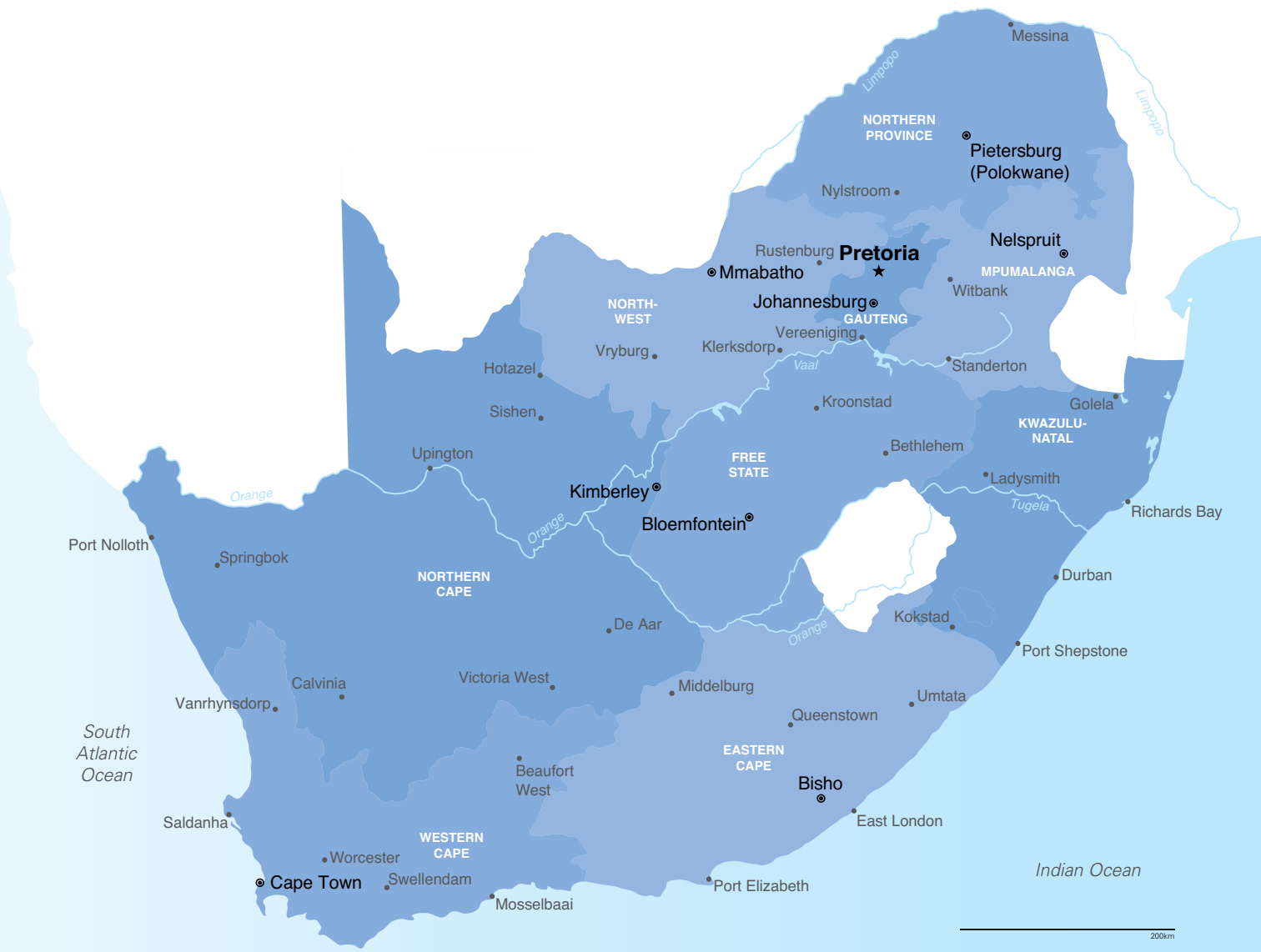
GDP GROWTH RATE
2013

Source: CIA World Factbook

less times before, while the DA and EFF have the effect of dividing the opposition to ANC rule. Local elections will be held in 2016.

In addition to corruption charges, the weak South African economy is placing additional pressure on the government. South Africa enjoyed decent growth prior to the global financial crisis but has been hovering at roughly 2% since 2008. Unemployment is officially estimated at 25%, but is certainly higher, and even those with employment are unhappy. A spate of striking workers, most notably in mining, forestry, and farming, are demanding higher wages and are slowly down production through strikes. Power shortages have been common, further slowing down the economy and adding to the political dissatisfaction. The urgency of encouraging more private investment into the power sector, long dominated by public utility, Eskom, appears to have come and should have been started years ago. However, a pro-business agenda will antagonize the political opposition further. South Africa fell from 53rd to 56th (out of 148 countries) in competitiveness in the World Economic Forum's Global Competitive index for 2014. The same survey ranked the country 144th in labor-employer relations. On the positive side, the country was ranked 36th for the quality of its institutions, 20th in property rights, 15th in the efficiency of its legal framework, and, most impressively, second in its accountability of private institutions.

As this report will show, steps are being taken not only to welcome private investment but also to diversify the country's energy mix to include more wind and solar energy. Moreover, the country is making significant investments in its long-term future, building two new coal-fired power plants, Medupi and Kusile, and looking to expand to renewables, natural gas, and nuclear. These advancements could spur innovation in the broader South African economy, throughout the continent, and in the South African Development Community in particular. It will not be an easy political path to walk for the ANC, and the power sector will stand at the intersection of this political balancing act. •



Brian Dames

Former CEO
ESKOM

In the face of the current critical electricity situation, Eskom has extended at-risk short-term electricity purchases from Independent Power Producers (IPPs). As we wait for Medupi and Kusile to come online is this the best option to secure electricity?

Certainly, the private sector must play a role moving forward. Many of the short-term Power Purchase Agreements (PPAs) are cogeneration agreements, which are energy sources that we should leverage as a country. South Africa has a constrained energy system and Eskom, we are very transparent about it. Many other countries have constrained energy systems too and we are not in a unique position. It is the result of the underinvestment that has happened for many decades. In managing this balance we have to make sure we leverage all demand and supply options. There is still great opportunity for energy efficiency in the country and those should be driven together with private sector power generation opportunities such as the short-term power purchase contracts. Eskom is very supportive of private participation and would like to see more of that. The Department of Energy is responsible for the procurement of energy in South Africa after which Eskom enters into PPAs with private players that make independent power producer (IPP)-projects bankable. To attract cogeneration investment, there needs to be a framework in place that allows IPPs to make an investment and recoup that over an extended period of time. The Department of Energy (DOE) procures power in SA and Eskom then enters into the contracts, which makes IPP projects bankable.

Is it crucial for Eskom to remain the country's sole off-taker?

It is not crucial for Eskom, but it is crucial for the IPPs. There is no other entity that can offer them that type of security and enable them to make their projects bankable. The IPPs currently coming into the market focus on renewable energy and are self-dispatched at the expense of Eskom plants, so there is no discrimination on dispatch from an Eskom perspective. Being the off-taker, Eskom provides IPPs with significant support in terms of raising capital because it is a credible counter party.

Could South Africa benefit from a more liberalized sector where IPPs are able to supply directly to the mining industry?

The mining industry has been supported by reliable and very cost-effective electricity for many years. The industry continues to have that. In the next five to ten years we will get to point where mines will build their own generation capacity and use a mix of their own power and power supplied by Eskom. Many mines have considered this option, but have up to now have chosen to rely on Eskom, as it is investing into new generation capacity.

Is there a need for the restructuring of Eskom to increase the parastal's efficiency, especially considering the delays of Medupi and Kusile coming online?

Structure does not deal with efficiency and there are no structural changes that will deal with energy security or creating more efficiency. There are opportunities to drive efficiencies within Eskom. That being said, Eskom is not inefficient and still provides very reliable and cost effective electricity to South Africa and for many other customers. The supply of coal and how we deal with the coal cost, which is more than 50% of all generating costs, is an area that we have to address in collaboration with the South African mining industry. All deregulations that have been applied globally and brought in competition have not led to lower electricity prices and will not lead to them in the future. The delays on Medupi and Kusile have been due to the well-documented labor issues and the inefficiencies of international suppliers in terms of the boilers and control and instrumentation. We have now dealt with those issues, and Medupi will come online before the end of 2014 and Kusile a year later.

Recently you called for a reinstatement of the energy saving programs that were suspended late last year due to a lack of funding. What are the benefits of such programs versus the cost of driving down electricity demand, which is directly correlated to industry expansion and economic growth?

The energy efficiency program does not impact any production. As far as demand management is concerned, there is no great productivity in any mine from 7pm

to 9pm at night (peak time) and demand is then driven by residential demand and industrial loads. We need to implement an active demand management program. The demand conservation program is suggested as a safety net and we continue to suggest that. It would have a positive impact on the economy because you would do it on a planned basis and customers would understand the requirements and expectations of a fundamental system constraint. Our recommendation is that if a customer is able to save more than for example 10%, they could trade the delta and so create a market to curb the electricity demand. The energy efficiency programs have really been impacted by a lack of funds. These programs have a real benefit for the power system, as they reduce prices for customers and have a direct climate change benefit given our coal mix. There is massive opportunity in South Africa to drive that.

Do you think South Africa will become a regional power hub again and when will we see stability in the sector supported by adequate reserve margins of 15% or more?

It is the regional power hub producing 40% of electricity on the continent. We only experience lack of reserve margin over peak periods. During the rest of the day, there is a reserve margin of over 10%. The peak period remains constrained, yet we have supported economic growth for a number of years. We have to make sure we deal with investment, not only in South Africa but also in the rest of the Southern African Development Community region, where there are significant opportunities to invest in the distribution segment of the sector. We need a medium-term transition strategy before going into shale gas. Coal will remain the largest contributor in the world to electricity generation.

Do you have a final message for the readers from Eskom?

Eskom will continue to connect every customer that needs electricity. There is great confidence that new generation capacity is being built. South Africa is an exciting energy place, and the market will not just be for Eskom, but for other independent players too. Over the last three years Eskom has managed to build new capacity of 6000 megawatts, which adds to peoples' confidence to invest. There are challenges, and we could have done things differently, but we have rebuilt local manufacturing capability, so the sector should operate much more smoothly going forward. •

ESKOM POWER STATIONS

Source: Eskom

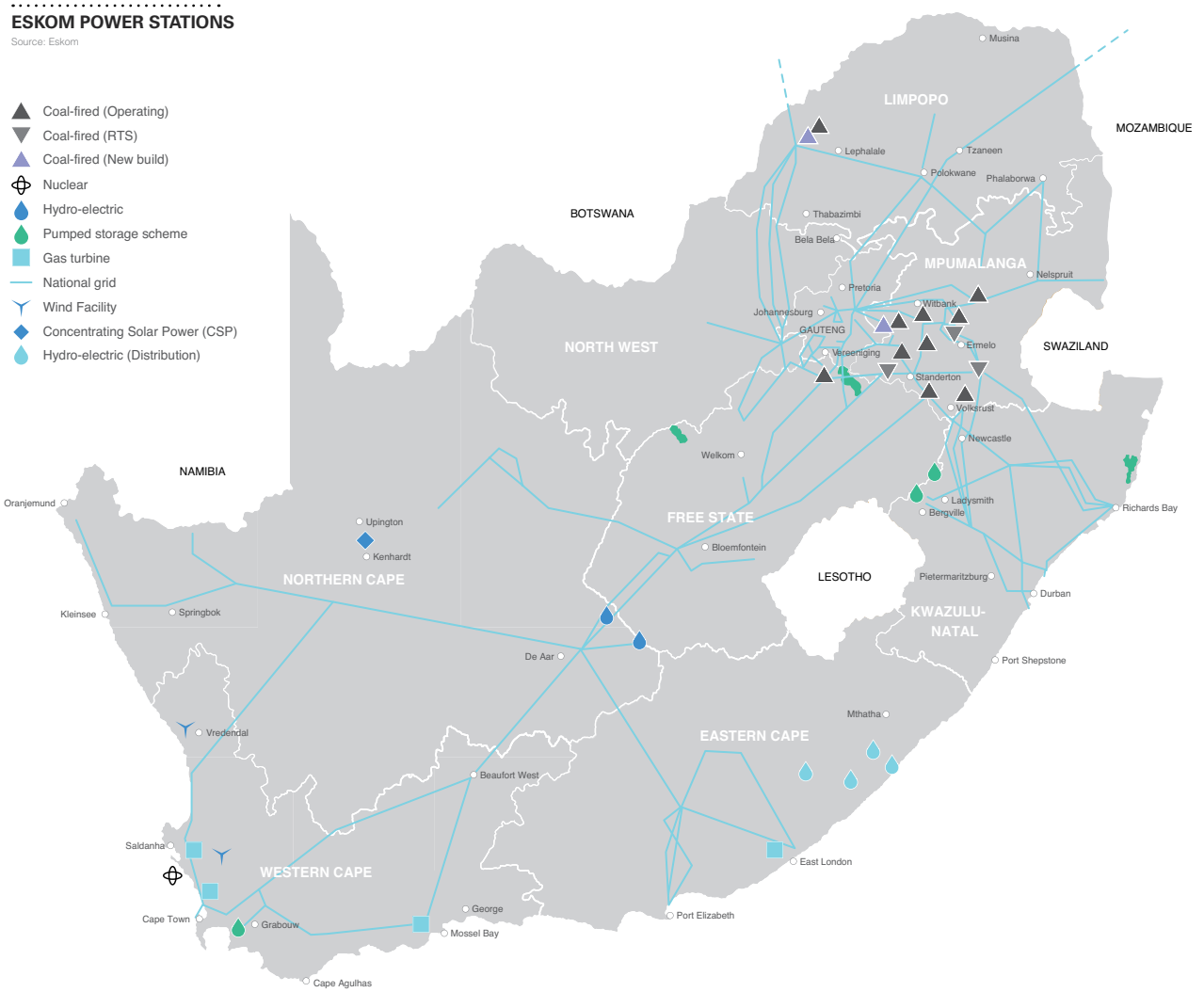



Image: Nolte Lourens

Shining a Light on Future Power Plans

An Introduction to South Africa's Power Sector

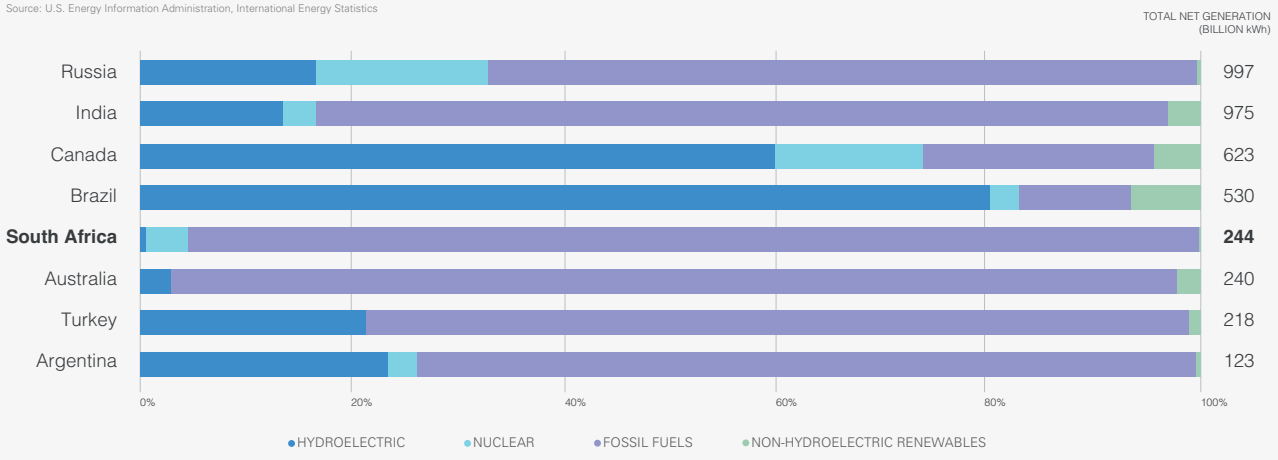
South Africa's critical power situation has been the subject of much talk and speculation since 2008, when the country experienced its first electricity crisis after enjoying a surplus of cheap electricity since the 1980s. However, low levels of investment in the country's power infrastructure over the last three decades and growth in demand have forced Eskom, South Africa's public electricity company, to upgrade its existing plants. According to Norman Ndaba, sector leader for power and utilities Africa at Ernst and Young, electricity demand is expected to grow in the range of 2% to 3% per annum for the next four to five years.

Eskom, supplies 95% of total electricity in South Africa and continues to rely heavily on increasing its generation capacity from the country's abundance of coal. South Africa generates 95% of its electricity through coal-fired power stations.

Coal generation will continue to predominate the energy sector until 2020 through new builds as well as the upgrade of Eskom's existing fleet. As Stephen Leatherbarrow general manager for renewable energy of Robor noted: "One needs to bear in mind that South Africa has an abundance of coal resources which will maintain and create jobs for many years to come. If well managed, coal is still one of the cheapest forms of energy in South Africa." Two new coal-fired power plants, Medupi and Kusile, were commissioned in 2007 and are now nearing completion, almost a year behind schedule. Brian Dames, Eskom's former CEO, noted: "South Africa has a constrained energy system and as Eskom, we are very transparent about it." Acknowledgement of mismanagement by the parastatal has not done much to prevent further blackouts early in 2014. Yet in the midst of South Africa's electricity woes, one of South Africa's greatest success stories is being written. As private participation through Independent Power Producers has

ELECTRICITY GENERATION BY FUEL TYPE, SOUTH AFRICA AND ITS PEERS (2011)

Source: U.S. Energy Information Administration, International Energy Statistics



expanded through the Renewable Independent Power Producers Program (REIPPP), the hope is to replicate this model to generate further base load capacity.

The updated 2013 version of the Integrated Resource Plan (IRP) seeks to rationalize consumption and diversify the energy mix. As the country plans to invest R385 billion ($50 billion) in new capacity projects over the next five years, South Africa's energy sector holds challenging and exciting opportunities.

However, it has been the success of South Africa's Renewable Independent Power Producers Program (REIPPP) that was rolled out in 2010 that has captured the attention of the global investment community. The hope is that through private participation South Africa can leverage its domestic coal and access to its own potential gas reserves to once again develop into an energy hub for Africa.

South Africa's importance to Africa's power sector cannot be overstated. "Countries in the region that do have new generation projects will not be able to consume all the new capacity and are looking at South Africa and Eskom to do so. South Africa currently uses 80% of the region's generation capacity and is the enabler for many of these projects through off take agreements. The Southern African Power Pool (SAPP) is one of the best power pools around and will continue to improve", said Kevin Nyatsanza, a senior associate at Utho Capital.

Even though South Africa is often the entry point for investors, the rest of sub-Saharan Africa's energy challenges are very different from South Africa's. A lack of grid connection in the rest of Africa explains the development of GSM operator Econet into the renewable energy sector. "Getting into power was a very simple and natural step for Econet. We had to come up with a solution to provide our subscribers with electricity so that they could at least charge their own phones," said Luc Tanoh.

Technology has proven to be a developmental saving grace for the region and looking at the future of grid connectivity and GSM providers Tanoh added: "We might witness something similar to what happened in the nineties when GSM came and brought wireless technology. The fact is that the grid is very limited in Sub-Saharan Africa. The need for distributed energy will grow very fast and Econet wants to be part of that growth. We believe that energy is the next big thing in Africa".

Similarly, Eco Green Energy has seen the opportunity of providing energy systems to rural communities in Africa, where materials are not always readily available. Eco Green Energy has developed products that are suited to the conditions. "Solar technology is becoming increasingly affordable, and with Eco Green Energy technology it is also becoming cheaper to install", said Nikolovski.

The race is on for the electrification of Africa, which will have far-reaching economic and developmental effects. •

Rob MacKenzie

Managing Director
ENDRESS+HAUSER SOUTH AFRICA

Could you give us a brief background and overview of Endress+Hauser in South Africa's power industry?

Endress+Hauser has been present in South Africa for over 30 years. Globally, the company has been traditionally strong in the food and beverage and pharmaceuticals industries. When Endress+Hauser came into the South African market, the company diversified and grew very strongly in the mining and primary industries. A strategic decision was made about 10 years ago to become more involved in the power industry. While Endress+Hauser has always been very involved in the water and wastewater industries, we have also become more involved in the treatment of water for the power industry. Through this we found a natural extension into the rest of the power industry. Endress+Hauser have had great success in providing equipment for level measurement in boilers. We are the main instrument vendor for the Medupi and Kusile power stations.

While South Africa's energy mix is still very much thermal orientated, there is a lot of diversification happening in the sector. Can you tell us where Endress+Hauser is placing its focus with regards to the energy mix?

While Endress+Hauser in South Africa has been privileged to supply equipment to Eskom projects through Alstom, we are not solely focused on thermal. The thermal business is one that Endress+Hauser understands and that our customers in South Africa understand, so it is natural for us to keep growing this business. However, we understand the challenges of sustaining thermal projects going forward, and it remains to be seen what Eskom's plans are beyond Medupi and Kusile. There are many new opportunities that are presenting themselves such as gas, which is a better alternative to coal. To this end, Endress + Hauser have done projects with Eskom, such as the complete control and instrumentation of the two open-cycle gas turbines in the Cape from 2008 to 2009. We continue to be very involved in other energy sources, such as gas and solar and are looking to work with independent power producers (IPPs) in biomass and biofuel energy. In solar energy, Endress+Hauser is especially involved on the water supply side, which is naturally required where a lot of heat is generated. We are, however, quite widely involved with power and energy, and clients such as Areva and Alstom are technology partners that drive and import the technologies. Endress+Hauser takes on an important supporting role in being able to measure and control different aspects of their projects and are able to offer the application solutions rather than the complete control solution.

How has Endress+Hauser's focus on power grown over the last few years and what is your presence in this sector in the rest of sub-Saharan Africa?

Endress+Hauser's focus on the power industry has grown significantly over the last 10 years, especially because of the four big projects that we have won. From the perspective of volume, the work is still less than what we are doing in other industries but it continues to grow. Endress+Hauser has recently also started to supply maintenance, repair & operations equipment to various power stations and expect to see growth in this area too.

The rest of sub-Saharan Africa remains an interesting, albeit challenging market for Endress+Hauser. So far we have been able to build a very good working relationship with NamPower in Namibia, but otherwise we have had limited success with energy and power in the rest of Africa to date. This is mainly because there are a number of projects that have started but not finished, such as hydro-energy in the Democratic Republic of Congo, where progress has been halted. There are many projects that still need to happen in sub-Saharan Africa, but access to the market remains a challenge. Endress+Hauser deals mostly with representative companies in sub-Saharan Africa, and, because of the opportunities currently in Africa, most of our representative companies are focused on the mining sector. Endress+Hauser is looking to find the right partners to support the power industries in sub-Saharan Africa.

How will the South African energy sector evolve over the next few years and where will Endress+Hauser be in the South African energy sector in five years?

The IPP environment is continually being developed and is constantly evolving and that can be a challenge. However, this market will mature quite quickly and the demand for energy will continue to drive participation from both public and private companies. It has been encouraging to the shift in South Africa's energy mix, and South Africa, has the possibility to become energy independent, if it can find the right technology.

In South Africa, Endress+Hauser has become quite strong in the energy sector and will continue to grow our position. Our biggest challenge is getting into other African markets. The access to power in Africa generally is still quite low and similar to the water industry. We will need to continually generate more and more power. Endress+Hauser has a lot to offer and has the right technology for this marketplace. We now have to bring our technical capabilities to bear on the market to add value to the power producer. •

Stephan Kornelius & Kenneth Robinson

SK: Managing Director
KR: Senior Executive
ACCENTURE

SK

KR

Could you give us an overview of Accenture and its role in South Africa's energy and utility sector?

KR: Accenture is a consulting technology outsourcing organization that has been working with Eskom for over 20 years. At Eskom, we have implemented the latest financial and commercial plant maintenance systems. We have the largest electricity practice in the country. We have also done a number of smaller assignments and have also helped direct policy in electricity industry through a model designed by Stephan.

SK: South Africa is facing serious distributions issues in light of a lack of maintenance and investment in recent years. It is technically illegal for Eskom to distribute electricity in the country because the constitution grants that right to municipalities, but given the way the network has developed over time, Eskom does some distribution in cases where a municipality is unable. At some point the consolidation of the distribution industry between municipalities, Eskom and regional distribution companies is necessary. Accenture is working with Eskom, the municipalities and policy makers to find a relevant solution across the electricity value change from generation, transmission, distribution and trading companies, to the electrification program and social and economic issues that come with it. There is a financial component to the model, but it also provides a real understanding of the industry from both a social and economic development perspective as well as from an industry one.

How can South Africa alleviate some of the distribution challenges through its municipalities?

SK: The design of the electricity industry is not intrinsically wrong. The problem is sequencing and capacity. Making a municipality, which has not spent a single rand on electricity infrastructure for the last 15 years and has no technical capability to maintain it, a distributor, is a recipe for disaster. In principal I have no objection with the government fragmenting or liberalizing parts of the electricity market, but it has to be done off a base of stable operations. Eskom is the only entity that is currently technically capable of building and operating or expanding an electricity infrastructure. The ability to run those distributions is dependent on the skills of the individuals and not on the systems that underlie it. As South Africa is an electricity-dominated economy, it has a knock on effect on things like economic growth. The idea of having a competitive generation market is not bad, but it has to be done off a base of stability and competence. It is difficult to attract funding and technical capability that it is needed to replace a baseline power station, given that we have a regulatory uncertainty in South Africa. Eskom is the only viable alternative and because we have a massive capital backlog, it is immature and irresponsible to try and fragment that industry. Timing and phasing is critical. It takes seven years to build a power station and on average the Eskom generation fleet is at 58% of its useful life. This means that this has to be replaced in the next ten years. This capital program is a good opportunity to introduce Independent Power Producers (IPPs) as part of the investment program.

Is Accenture starting to do more work for IPPs that are beginning to connect to the grid?

SK: The work associated with IPPs is more confined to how the overall power grid and system supports IPPs from a national power market perspective. Accenture has not necessarily worked with IPPs in terms of their funding or technology models. The big debate for the renewable sector is not the technology, but whether it is financially viable given the tariff structure and how it feeds into the overall transmission grid.

With the upcoming baseload IPP program, from which sources should new generation capacity come from?

SK: The best place to introduce new IPPs is in the gas sector. South Africa has a massive dependence on coal and there is a debate around Eskom's supply. It is faster and less risky to link up with the likes of Petro S.A and build a gas-fired power station. This is in line with every investment incentive that government has with the economic development requirements of the Eastern Cape and opens up a huge amount of other economic development opportunities. We are currently doing work in the gas development area with some large oil companies around the drilling programs offshore of South Africa and the expansion of the existing gas pipeline network in the country.

In what other area of the South African electricity sector do you see strong growth potential?

KR: The smart grid area has great potential in South Africa. There are currently 27 plants, of which only four have smart grid sensors installed. Smart grids allow for effective monitoring. When something happens, an automated smart grid immediately reroute electricity and crews would then fix that breakage.

SK: Accenture is currently working with Eskom on smart grid strategies. A smart grid is needed to increase distribution capacity and will enable proper supply and demand planning as well as the appropriate rerouting of the load on the grid. Eskom needs help alleviating strain on the system, which will come through co-generation and demand management, all of which depends on intelligently managing the grid. •

Theuns Ehlers & Justin Ma

TE: Head of Resources and Project Finance
JM: Vice President, Power, Utilities and Infrastructure, Investment Banking
BARCLAYS AFRICA

TE

Could you tell us about Barclays Africa and its role in the South African energy sector?

TE: For many years, South Africa had a surplus of generated electricity. This situation changed at the beginning of 2008 due to a lack of investment in energy infrastructure coupled with a strong growth phase. Eskom then launched a number of new initiatives to add capacity to the grid, and the Integrated Resources Plan (IRP) aims to generate capacity from different technologies, including coal, renewables, and gas. Barclays Africa has always supported Eskom, which is its most significant client, and has assisted them in various fundraising initiatives, including bonds and commercial bank funding. We see opportunity in funding Independent Power Producer (IPP) projects and have done extensive work in this area. Barclays Africa provides project finance debt funding as well as a range of corporate and commercial banking services. After three rounds of project financing, Barclays Africa debt financed 14 projects in total and provided services to an additional five projects, supporting projects that make up 29% of the total megawatts (MW) allocated during the three bidding rounds.

JM: There is a shift now in the major South African banks from public sector assistance in energy to private sector assistance. Barclays Africa has been active in the power-infrastructure space across the African continent for more than a decade. Since the late 2000s, there has been resurgence into South Africa to assist Eskom to raise funding to roll out the capital expenditure program. Of equal importance is raising funds for the IPP programs in renewables, baseload and cogeneration. Barclays Africa's role is to assist the power sector and the economy. Previously, we only assisted the public sector but now increasingly assist the private sector. Apart from project financing, Barclays Africa has also done corporate related financing for the renewable energy sector. For example, it provided an invoice-discounting facility of roughly R1 billion to a Round 1 engineering, procurement, and construction contractor. There are different ways of providing support to private sector participants, from advisory services, equity arranging, and project financing to mezzanine facilities, invoice discounting, and risk management.

How has the IPP program evolved and how is it shaping South Africa's energy sector?

TE: We have engaged with the government and Eskom in shaping the way that new programs are procured. Before the rollout of the renewable IPP program, Barclays Africa and others consulted with them on how to make the program bankable. There is a solid foundation for the renewable energy program; the same will be true for the baseload program, for which procurement and project documentation are now being finalized.

All 28 Round 1 projects have successfully reached financial close but were dominated by local banks. What do you foresee for international participation in IPP programs?

TE: Eskom is only willing to sign rand-dominated Power Purchase Agreements (PPAs), which means that funding will also have to be in rand to match the revenues. Even if a project is able to secure US Dollar funding, it is likely that those exposures will have to be swapped into rand in order to mitigate the potential currency risk. If Eskom wants rand-denominated PPAs, the local banks, asset managers and development finance institutions (DFIs) will continue to play a major role.

Is there enough appetite from local banks to continue to fund future IPP programs?

TE: After round three, there is an estimated R90 billion of debt financing in the market. Round four will add another R20- to R25 billion. A number of new specialist debt funds are emerging to buy these exposures, predominantly for clients in the pension fund industry. There is a new asset class developing in South Africa. Many funds were constrained to participate in debt funding because of construction risk, but now that the projects are reaching operation, the risk is reduced. We expect more appetite from these funds.

Will we see a divestment in these projects from the local banks?

TE: The banks are impacted by Basel 3 regulations, which make holding long-term loans on their books potentially more challenging. We do not expect a significant divestment from them in the short term, but more specialist players in the insurance industry may increase their participation in this new debt class.

JM: If you look at the evolution of the involvement of institutional funds, in round one only the funds that had existing highly specialised project finance teams could participate. Moving to round three, there are more of these funds looking to invest through specialized intermediaries. On the banking side, more DFIs are providing rand financing through swaps and raising capital from the markets.

Do you have a final message from Barclays Africa about the South African and African power sectors?

TE: Barclays Africa is keen to grow the sector and support its clients to reach their ambitions. Many of our clients are in different parts of the world, and we would like to help them grow their businesses in Africa. We understand the industries and markets across Africa. In some countries we have been on the ground for over a century. Our primary priority is doing the right thing, and we want to see the lights to shine across the continent. •

Easing Eskom's Dominance

The Growth of Private Sector Participation in South Africa

The Integrated Resource Plan (RP) 2010-30 is the main roadmap for developing South Africa's energy sector and outlines the government's strategy for electricity generation. The IRP is revised every two years, with the latest version to be released before the end of 2014. While the IRP stipulates that 42% of South Africa's electricity needs be met by renewable energy generation by 2030, through the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), the plan still makes provisions for the dominance of coal.

The recently revised draft IRP also makes provision for a base load IPP program, meaning that there will be room for large-scale independent power generation in the future, although there has been no official announcement yet. "The scope for more Public Private Partnerships (PPPs) is there, but there are challenges revolving around tariffs, particularly since the utilities have traditionally been monopolized by government agencies. There is an attitude that energy can be provided by the private sector, however it also has to be reasonably priced for the private sector to enter that particular foray. In terms of demand, there is a need for 10,000 megawatts (MW) of new generation capacity, at least 3,700MW of which should be coming from renewables, where wind and solar photovoltaic (PV) are the dominant technologies. South Africa is fortunate that there is a focused approach through the REIPPPP and there is a strong commitment from government to incentivize private participation", said Sheila Galloway, CEO of Utho Capital, a leading specialist firm in Public Private Partnerships (PPPs).

As a single off-taker, Eskom will continue to dominate the sector, even where IPPs are involved. "The problem is that Eskom remains the single buyer and therefore has a vested interest in limiting the amount of successful IPP projects, as it would be more profitable for them to generate capacity themselves. Until there is a buyer independent from the parastatal this problem will continue. Any IPP's that are outside the regulated IPP programs will face that challenge. For example, for players in the sugarcane industry who generate their electricity from waste, the technologies do not qualify for the renewables program and therefore any excess capacity that they generate will go to waste and they do not qualify for a refit tariff. If there were an alternative buyer the scope for IPPs would easily double," said Galloway.

The question of a more liberalized energy market is not a new one. Even Dames noted: "Eskom is very supportive of private participation and would like to see more of that." However, bureaucratic hold-ups hamper the process of passing legislation, such as the independent system marketing operator (ISMO) bill, which will aid such participation in transmission and distribution. "The South African energy sector needs the bill. [It] will be a first step to resolve the conflict of interest between Eskom as generator, buyer, distribute and transmitter. There are a whole lot of very sensitive political and policy considerations around that, and the bill has effectively been shelved for now, but for our market to grow and expand, it is needed," said Karel Potgieter, partner at Webber Wentzel, a leading South African law firm.

Transmission remains a big concern and has a unique regulatory caveat as a result of being managed by municipalities. "Municipalities have the first right of refusal in the distribution network. If they cannot meet the supply demands, they can turn to Eskom to do it, but because this is almost their sole source of income they want to do it themselves", explained Johan Pieters, divisional managing principle of energy for Bigen Africa, a civil engineering company. "South Africa is facing serious distributions issues in light of a lack of maintenance and investment over the last few years. At some point the consolidation of the distribution industry across the country between municipalities, Eskom and regional distribution companies is necessary", said Kenneth Robinson, senior executive at Accenture. •

Sheila Galloway & Kevin Nyatsanza

SG: CEO
KN: Senior Associate
UTHO CAPITAL

SG

When GBR last spoke to Utho Capital in 2011, the company was set to lead Public-Private Partnerships (PPPs) in the energy sector. What have been the company's new developments since then?

SG: In the PPP space, Utho is a leading specialist firm. Utho became the technical specialist in six countries in the Southern African Development Community (SADC) region, where it has advised governments on setting up PPPs. Utho has built up experience in Africa in technical PPPs for SADC and the SADC Banking Association, a main client of Utho's, in conjunction with CIDA, the Canadian agency that funded a project. CIDA and SADC were trying to roll out PPPs in the region across all sectors, and they are now being taken increasingly seriously. Utho initially looked at PPPs in the construction industry or office accommodation but is now more focused on the renewable energy sector.

How would you rate South Africa's performance against the other six SADC countries where Utho has also been involved in PPPs?

SG: South Africa is leading the continent in PPPs. It started them in 2000, the same year that Utho began consulting on the PPP for the building for the Department of Trade and Industry (DTI). Thereafter, Utho drafted the guidelines that are now called the "Standardized Guidelines for PPPs in South Africa." Having drafted those guidelines and set up the institutional framework for PPPs, South Africa is ahead of other countries. This framework set the playing field and rules for PPPs, ensuring that there was transparency in the way that government interacts with private sector. A high degree of mistrust between the private sector and government is prevalent everywhere but in Africa in particular. In many ways it prevents relationship building and partnership between the two sectors, but by standardizing the guidelines, it allows for a partnership in which there is real engagement. However, PPPs remain a complex partnership. It is a challenging space for government and private sector to interact and come together, but it is necessary because government alone cannot build infrastructure for Africa. Between now and 2025, all major infrastructure projects will be in Africa and PPPs will have to propel this development.

How big is the scope for PPPs in the energy sector in Africa?

SG: The scope for more PPPs is there, but there are challenges involving tariffs, particularly since the utilities have traditionally been monopolized by government agencies. There is an attitude that energy can be provided by the private sector, however it also has to be reasonably priced for the private sector to enter that particular foray. In terms of demand, there is a need for 10,000 megawatts (MW) of new generation capacity and at least 3700 MW of that should be coming from renewables where wind and solar photovoltaic are the dominant technologies. South Africa is fortunate that there is a focused approach through the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and there is a strong commitment from government to incentivize private participation.

KN: As we progress, all parties are learning how to improve the process. REIPPPP round one and round three were very different. Both sides are coming to terms with requirements, and prices are coming down, so there is more scope to develop IPPs, as opposed to mega projects from Eskom.

Outside of the renewables space, are IPPs in thermal and co-generation a good way option to address South Africa's power situation?

SG: Cogeneration is a good option if the price is right. The problem is that Eskom remains the single buyer and therefore has a vested interest in limiting the amount of successful IPP projects, as it would be more profitable for them to generate capacity themselves. Until there are buyers that are independent from the parastatal, the problem will continue. For example, for players in the sugarcane industry, who generate their electricity from waste, the technologies do not qualify for the renewables program and therefore any excess capacity that they generate will go to waste and they do not qualify for a refit tariff. If there were an alternative buyer, the scope for IPP would easily double.

What can be done to fast track the Southern African Power Pool to electrification?

SG: South Africa should take the lead as it has the necessary capacity in terms of resources, expertise, infrastructural development and financial capacity. The South African private sector is also very involved in the rest of the SAPP region.

KN: Countries in the region that have new generation projects will not be able to consume this new power and want to sell it to South Africa. South Africa currently uses 80% of the region's generation capacity and enables new projects through off take agreements. SAPP is one of the best power pools around and will continue to improve.

Do you have a final message from Utho Capital?

SG: Unless power is in place, Africa will not be able to develop. Utho capital is therefore taking a serious view of the power sector, having set up a Power Energy Unit to advise it. We need to solve the power problem on the continent in the next five to ten years. International players are already investing in the sector, but aligning with a local partner is important. There has to be job creation, localization and healthy development. •

Kieran Whyte

Director, National Practice Head: Projects and Infrastructure
DLA CLIFFE DEKKER HOFMEYR

Could you give us a brief overview of DLA Cliffe Dekker Hofmeyr (CDH) and its role in the South African energy sector?

DLA CDH is part of the Global DLA Piper network with 117 partners in total and 360 professionals overall. DLA CDH offers the full spectrum of services. For infrastructure projects, we often create virtual multidisciplinary teams and work with our colleagues across various areas of expertise such as banking and finance or real estate and property development, construction and engineering, corporate and commercial and environmental. In the last three years DLA CDH has been actively involved in the South African renewable energy sector across all technologies. Of the 64 preferred bidders that have been announced to date, DLA CDH has been involved directly or indirectly with 31 of them, acting for project sponsors or project developers or the lenders or for contractors.

What were some of the key legal issues that had to be addressed in the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and what role did DLA CDH play?

DLA CDH developed a land lease arrangement to address the provisions of the Subdivision of Agricultural Land Act. Most of the projects are built in rural areas and it is uneconomic to have a rural tract of land being broken up into small pieces. DLA CDH developed the land lease arrangement that was signed off by senior council as valid and enforceable and it has now been used the market. Another challenge was that the project agreements (the Power Purchase Agreement, the Implementation Agreement and the Connection Agreement) issued under REIPPP could not be negotiated or marked up by bidders. Bidders just had to accept them. DLA CDH then developed detailed heads of terms for the engineering procurement commissioning (EPC) and operations and maintenance (O&M) contracts that were based on the project documents based on the principles of linked entitlement and the flow through of obligations, responsibilities and liabilities and then also fully-termed agreements for such activities based on the heads of terms, gaining a march on other legal firms. Another hurdle centered on the impact of mining legislation, including section 53 of the Minerals Petroleum and Resources Development Act (MPRDA). It was thought that it applied only to mining land when in fact it applies to the whole of South Africa. Obtaining the Section 53 consent would prevent the issue of a third party wanting to explore for minerals where a power facility, a transmission line, or distribution line already exists.

The independent renewable energy market has matured quickly. Has legislation and regulation kept up with the pace of market development?

We are working in a very dynamic statutory and policy framework. Changes are being mooted to address the fact that Eskom is a vertically integrated utility. Eskom undertakes generation, transmission and distribution activities and even has a number of its own renewable plants that it is developing. State entities purchasing power from IPPs are required to comply with the New Generation Capacity Regulations. The issue facing the South African electricity sector is to liberalize the electricity market to ensure a competitive and secure electricity supply. The Independent System Market Operator (ISMO) Bill that could create a more liberalized market has not been passed by Parliament. The ISMO Bill will take the wires business out of Eskom and force it to compete with IPPs in respect of the supply of electricity via a regulated power pool. The base load, cogeneration and nuclear programs will hopefully be released this year. There should be more IPPs coming into the market, which will diversify the energy mix. Certainty in legislation will open up the South African energy sector to IPPs.

How will local content requirements affect IPP programs in the future?

Government would obviously like to see local content increase for the sake of job creation and poverty alleviation. However, increased local content also means that it will be pushing IPPs to be creative on the formulation of their tariffs when they can get cheaper products and services from inter alia China. The Integrated Resource Plan 2010 is evolving and gives a roadmap to where the South African energy market is headed. Programs must be sustainable for a long-term period; otherwise, there is no incentive for manufacturers to set up manufacturing facilities in South Africa.

What is the future for gas in South Africa?

South African electricity is currently operating at strained minimum reserve margins. Usually the standard reserve margin is in the region of 15%. Infrastructure for natural gas can be built quickly and it can be transported quickly, so the pursuit of fracking in the Karoo is the big game changer in the South African energy sector. But fracking has to be pursued responsibly. If South Africa has the opportunity to become energy independent, it has to take it.

Do you have a final message for international investors looking at South Africa's energy sector?

Investors want certainty, and South Africa must work hard on ensuring that we are investment country of choice and that our regulatory frameworks are robust and certain. Combined with South Africa's relative political stability and an increasing acknowledgement of the need to diversify its generating capacity in a sustainable and competitive way, we are on the right track. •

Viability and Bankability of Private Power Purchase Agreements in South Africa

Charles Marais
Head of Projects and Energy
Hogan and Lovells South Africa

Introduction

The energy crisis which has confronted South Africa since 2008, and which is likely to endure for a while yet, is causing large power users, such as the members of the Energy Intensive User Group of South Arica (EIUG), to look for alternative sources of energy. According to their web-site , the 32 members of the EIUG account for approximately 44% of electric energy consumed in South Africa and produce 27% of the country's gross domestic product. Own-generation has become one way to reduce reliance on the country's utility, Eskom, and energy intensive firms have started engaging independent power producers (IPPs), particularly those utilising renewable energy technologies, for the supply of electricity. The notion of entering into private power purchase agreements (PPAs) is set to gain traction as large energy users mitigate their power supply risk. This article will take a closer look at the private PPA, in the context of its bankability within the South African markets.

Background to Private PPA's

The country does not have a reserve margin in accordance with international best practice and, ignoring the fact that energy intensive users are periodically requested to reduce their demand, electricity supply and demand is more or less in equilibrium. If one had to take into account latent demand, the present electricity supply is probably significantly below what the country requires, at considerable cost to the country which is desperate to increase economic growth, and has published a National Development Plan to address its infrastructure needs.

Eskom's tariffs are set to increase by rates significantly higher than inflation. By contrast, tariffs bid by renewable energy producers are declining to the extent that prices of onshore wind and solar photovoltaic (Solar PV) energy produced under the Renewable Energy Independent Power Producer Programme (REIPPP) are approaching grid parity. The disadvantage of such energy is that it is not dispatchable, i.e. not capable of being dispatched at the request of the power grid operator. Renewable energy will not replace base load energy produced by Eskom, but will reduce total reliance on Eskom, as the latter addresses its capacity problems, and allow large power users to increase productivity. A number of energy intensive users are well located to tap into renewable energy sources, especially Solar PV. Mines and some industrial companies have vast areas of unutilised land at their disposal, perfect for 5 Megawatt to 10 Megawatt sized Solar PV plants, and renewable energy is becoming attractive to them, especially with the threat of the new carbon tax, due to be introduced in January 2016.

Financing a Renewable Energy Project

A Solar PV plant could cost between ZAR13 million and ZAR14 million per installed Megawatt to build. Thus, a 10 Megawatt plant will cost about R135 million to build. For sponsors to show a return on investment commensurate with their risk, a certain amount of this capital will have to be financed by way of debt to enhance gearing. Typically, project finance is used, and the capacity of a project to achieve the necessary levels of equity and debt in a project finance structure is a measure of its bankability. To achieve bankability, the following will be necessary:

a) A project company (SPV) will be formed to build, own and operate the plant.

b) The SPV will service the bank debt out of the proceeds of the PPA concluded with the off-taker. To be acceptable without sponsor guarantees, the PPA will have certain characteristics, inter alia a term of sufficient length and a take-or-pay tariff robust enough to ensure comfortable debt service, sufficient reserves to enable proper maintenance, and profits to deliver a reasonable return for the shareholders. A private PPA is unlikely to be as attractive to lenders as a PPA under the REIPPP where the obligation of the off-taker, currently Eskom, is underwritten by the South African government. Thus, lender margins are likely to be higher, terms and conditions will probably be tighter and credit enhancement (such as sponsor support) may be necessary. This might also result in an upward pressure on tariffs, but that should be offset by advantages of some multiple.

c) Construction risk will have to be fully mitigated, by way of a turnkey construction contract, with appropriate penalties and guarantees.

d) If the facility is built on the off-taker's own land, connectivity should not be a problem. However, having to wheel on the transmission grid could be a significant challenge, as that would depend on the cooperation of the owner and operator of the transmission infrastructure. Ideally, connectivity should not depend on access to the national grid.

e) All consents and authorisations (including environmental) will have to be in place, including licences required under current legislation. This is less of a problem for rooftop Solar PV.

Many innovative funding structures have been devised to finance these projects.

Closing comment

On a macro level, the cost of installing independent power plants is probably a lot less than the cost of lost opportunity through an undersupply of power. Private PPAs such as these should be encouraged and onerous regulatory hurdles should be removed to free up enterprise currently being stifled by the energy problems facing the country. •

Charles Marais

Head of Projects and Energy
HOGAN LOVELLS SOUTH AFRICA

Hogan Lovells recently merged with local South African law firm, Routledge Modise. We did you merge and what will it mean for Hogan Lovells in the South African energy sector?

To offer a comprehensive service and to become more than a local player, larger local firms such as Routledge Modise have to become international. At the same time, Hogan Lovells, a large international firm, was looking to enter Africa. South Africa has always been a stepping-stone into Africa, not just for law firms, but for banking institutions and other international companies. Negotiations started in the second half of 2012. As a result of good synergies between the two companies and after careful planning it all came together at the end of 2013 and we had our official launch under Hogan Lovells' branding at the end of January 2014.

How attractive is South Africa's energy from a regulatory perspective?

South Africa's energy sector is busy and is therefore attractive from both an advisory and from an investment point of view. It is a very popular destination for funds and technology, especially because the sector is well regulated. Project risks are well understood and mitigated. The Department of Energy has done a great job in rolling out the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) and helped all players understand the rules and regulations. The competitive bidding process is clear, as are the legislative requirements thereof. The REIPPPP has attracted global attention, and the sector looks set to be an attractive destination for capital and technology.

What are the main regulatory challenges for investors in the South African energy sector?

The keys to success in the bidding process are price, local content and the benefits to local communities. A big challenge is local content requirements. While South Africa is not always the most competitive in terms of labor and manufacturing, there is an understandable drive from government to make sure there is substantial local content as well as involvement of the local population in terms of job creation. However, it has not deterred, to a significant degree, any entrants from bidding for licenses in the renewable energy program. Local content requirements are not legislated but there are guidelines and targets and to have a strong chance of being awarded a license, the closer you can get to these targets the better.

The South African energy sector is dominated by the large parastatal, Eskom. Is this something that can and should be addressed?

As far as independent renewable energy generation is concerned it can be seen as an advantage, as you have the guarantee of a large, government-supported, off-taker in Eskom. This makes it fairly easy to package and mitigate risks. But for meeting the country's energy demand, a more liberated sector will bring more competition to install generating capacity, which should push prices down.

There is a lot of excitement about South Africa's gas prospects. What legislation is being proposed to regulate this source?

South Africa has never had its own significant gas reserves and has relied on imports from countries such as Mozambique. There are only a couple large importers of gas, which use it for their own purposes. The future of gas in South Africa is unknown and will depend on shale gas initiatives. South Africa has a Gas Act that regulates how one imports, sells and distributes gas in the country. There is no gas legislation at the moment, but if gas were to become a big play, legislation would be adopted. Shale gas in particular would have to be regulated carefully.

Could you elaborate on the potential of South Africa in the sub-Saharan energy sector?

Anything that one can extract from the ground or the air that can be economically transformed into electricity will benefit the region. But there are transmission challenges that need to be overcome. Installing capacity to make electricity available, thereby driving demand, instead of simply reacting to perceived demand would enhance development. There are very good relations in the Southern Africa Power Pool amongst its members through bilateral agreements. As long as the transmission challenges are addressed, the whole region will benefit from additional capacity no matter where it is situated.

What type of growth do you expect for Hogan Lovells in the energy sector in South Africa and Africa over the next five years?

We expect that growth for Hogan Lovells will be significant. Our international footprint and international reach is attractive not only to international clients but also to local players and institutions. These projects are capital intensive and entities are going to be looking to the banks and DFI's for financing. Hogan Lovells is well positioned to facilitate that from anywhere in the world, from China in the East to Europe and the US in the West.

Do you have a final message to players looking at South Africa as an investment destination?

There are many positive reasons to invest in renewable energy in South Africa. The country has a strong regulatory environment and well-developed legal system alongside a well-developed banking system. There is a concrete way of registering land ownership and rights. There might be some commercial challenges to procure locally, as South Africa is not always competitive in terms of commodity prices. •

Jason van der Poel & Karel Potgieter

Partners
WEBBER WENTZEL

JVDP

KP

Can you give us some background on Webber Wentzel's expertise and involvement in the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)?

JVDP: Webber Wentzel is a full service law firm specializing in every area of law in South Africa. In the renewable energy sector, we have one of the largest teams of private sector representative lawyers. From round one to round three of the REIPPPP, Webber Wentzel represented almost the majority of the projects, either representing the lenders, the borrowers or the contractors or even specific shareholders in the consortiums where bids became successful.

KP: Webber Wentzel has 450 lawyers in South Africa and has an alliance with Linklaters, which strengthens us significantly in our power expertise as well as infrastructure and oil and gas. We also have an African legal network of leading firms from 12 African jurisdictions outside of Linklaters. We act with them on projects and consider ourselves an African law firm.

One of the greatest legal concerns for IPPs is securing land. Can you tell us about the process of securing land, the challenges that go with it and how it can be addressed?

JVDP: The request for proposal (RFP) dictates the requirements for a project to qualify. According to the RFP, an IPP can either own the land or lease it and ownership or lease right must be demonstrated at the time of bidding. Finding the correct piece of land is the challenge. Companies need land that is close enough to the grid, where there is capacity for your project. Eskom and also other projects in the vicinity control the capacity and access to the grid. While there is plenty of land in South Africa, it is not always suitable for the type of technology you have or the size of the project.

KP: Grid connection is a major challenge, and a sort or regional procurement could be introduced due to grid accessibility issues. In terms of the RFP requirements, companies must demonstrate that they have the necessary land rights. That could include getting consent from the minister of agriculture affairs for the sub-division of agricultural land. There are also permits around mining such as the rights to use the surface of the land.

What will be the terms of the contract requirements for round four of the REIPPPP and for the base load IPP program?

JVDP: The requirements should not be more onerous. A concern is the lack of visible benefits to the local content aspect of the REIPPPP. Whilst commitments have been made by all of the successful projects, those commitments are commitments, which will materialize over a 20-year lifespan while people are actually looking for tangible success now.

KP: People want to build manufacturing plants but are hesitant because of the lack of a clear pipeline. AThere is a balance to be struck between using local content, which often includes higher prices. It puts bidders in a position where they have to reconsider their financial models. You have to compete against your fellow bidders and have the best local content offering but also have the best price offering. The Department of Trade and Industry (DTI) is pushing the requirements higher, and there is a tipping point where investor will abandon the project.

Is appetite for financing from the local banks sustainable for IPP programs moving forward?

JVDP: For the moment, the appetite is still there. The local commercial banks will keep inventing ways of providing the funds. The more pressing issue is the funding for BEE (Black Economic Empowerment) in the program. The development finance institutions (DFIs) that have been providing funding have been restricted. If DFI funding dries up, there will be a problem for BEE. Some of the commercial banks need to start finding ways to fund BEE structures, and government needs to apply pressure to make it happen. The commercial banks have the money to fund normal shareholders, but the developmental funding required for BEE shareholders is drying up.

KP: International lenders want to get involved, but South African banks have called the shots and been conservative, which has produced more conservative terms than in Europe and elsewhere. International developers can find less stringent terms in other jurisdictions.

Do you think that the sector can benefit from more international funding?

KP: The government does not want to dollarize the economy, and the country has exchange controls. The South African banks have rand, so they hold the cards.

Can South Africa benefit from a more liberalized energy market?

KP: The South African energy sector needs the ISMO (independent system marketing operator) bill because it will be a first step to resolve the conflict of interest between Eskom as generator, buyer, distributer, and transmitter. There are many sensitive political and policy considerations around that, and the bill has effectively been shelved, but it is necessary for our market to grow and expand.

Do you have a final message for international investors looking at the South African energy sector?

KP: Webber Wentzel has key experience in the rounds of procurement. We have close relationships with the government, which helps with funding. We are willing to do an honest day's labor for clients that are willing to operate in this market. South Africa's renewable energy program is a success story. For any international investor, there is a clear proven track record. •

Johan Pieters

Divisional Managing Principle: Energy
BIGEN AFRICA

Can you give us a very brief overview of Bigen Africa's presence and evolution in the South African and African Energy Sectors?

Bigen Africa was founded in 1971, and the company initially focused on civil engineering, especially in the water services. We subsequently did a lot of projects for private developers on housing developments, specializing in electrical engineering, reticulation or electrification designs and from that the energy division was born. Initially the company was based in Johannesburg but has subsequently grown to where it now has six offices in the South Africa. In terms of growing in the energy market, we have recently been accredited by Eskom to work on the Eskom grid. Our Bloemfontein office was established in 2009 to focus predominately on substations and lines for Eskom and other private clients. We have grown from purely electrification to distribution of substations and lines as well as working in the transmission field.

While generation constraints are on the forefront of the discussion in South Africa's energy sector challenges, is distribution an equally important challenge to address?

You can build new dams, but you still need to get the water out of the dam to a house. The same applies to electricity; you can build generation, but you still need to get the electricity into the house so that the community can switch on its lights. The power needs to be transported, and there are huge challenges with the transmission grid. Where distribution is concerned, there are significant backlogs and refurbishing that needs to be done, especially in jurisdictions where municipalities have mismanaged systems. Municipalities have the first right of refusal in the distribution network. If they cannot meet the supply demands, they can turn to Eskom to do it but because this is almost the sole source of income for the municipalities, they want to do it themselves. Before 2016, Bigen will not be looking to go into traditional generation, but the company has a clear strategy and vision to go into small and green generation, such as wind and solar and definitely transmission and distribution.

What potential is there for Bigen in the renewable energy sector in terms of Independent Power Producer (IPP) projects?

Bigen made the decision that it would never become an IPP, but we will form part of an IPP-team in which our focus will be on grid connection. Bigen has the expertise to do the designs of the substations and lines linking the energy to the grid. We have done a number of reports and feasibility studies for IPPs in rounds one, two, and three, but to date have not collaborated with successful bidders. We are expanding our service delivery to future IPPs that will be bidding in rounds four and five.

What do you expect to see in terms of growth in the energy sector throughout the continent of Africa?

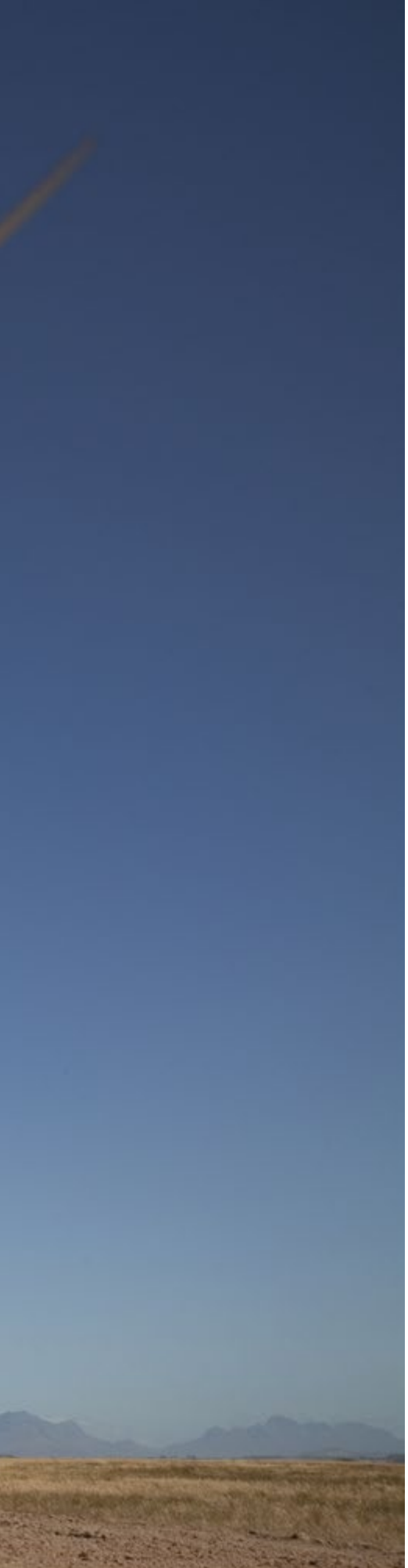
There is a great potential for infrastructure growth and expansion in Africa in the next few decades. Bigen has developed its S-Vision 2016 strategy to expand its capabilities into many different disciplines into Africa. In terms of energy, we are looking at expanding our capabilities in renewable energy taking them into different countries in Africa. Unlike in South Africa, there is a lack of policies and institutional capacity in the rest of the African continent that makes the task quite challenging. To get investment into Africa, investors want security, sound policies and government commitment, which is still lacking in most jurisdictions.

What is the medium-term outlook for the South African energy sector and what role will Bigen Africa play in it?

The focus in South Africa should be on energy efficiency and ensuring that we use the resources that we have efficiently. We must still use our coal resources, but also make use of the renewable energy resources available to us. For the short- to medium-term, we see many projects in commercial and industrial areas, where we can save energy through new technology and education. Bigen will look to increase transmission and distribution capabilities and satisfy the housing backlog in South Africa in terms of access to electricity. Internally, Bigen is busy growing the energy division to address the challenges going into Africa. In other divisions, Bigen will continue to grow in Africa in terms of infrastructure development, and the company is streamlining itself to be able to deliver the capabilities that we have in other countries.

Do you have a final message for our international investors looking the South African power sector s a possible investment destination?

There is huge opportunity for international players and investors to come to South Africa and bring in new technologies and expertise as an IPP to Africa. As Bigen Africa is a local company, we have access to the national grids through the work that we have done for Eskom and can assist any international who would like to play a role in the electrification of Africa. Our core business is giving people access to energy. •



Cooling on Coal:
South Africa's Alternatives to Coal-Fired Power Plants

"The drop in prices from round one to three was massive. Moving to the fourth round, prices cannot really go much lower than what we have seen up until now and should level out. As local content starts playing an increasingly important part, this will also stabilize prices. There is extra cost involved in meeting local content requirements and the playing field has to be leveled through increased enforcement."

- Warren Pollard, Sales Manager Africa, Trina Solar

Image: Danie Nel

South Africa's Great Success Story

Attracting Independent Power Producers for Renewable Energy

South Africa is rated as one of the world's 12 most attractive destinations for renewable energy investment, and the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) that the country launched in 2010 remains one of its greatest success stories. The goal of the REIPPPP is to reach the Department of Energy's target of 3,725 megawatts (MW) of renewable energy generation before 2016 through phased bidding rounds. With many of the first round projects coming online this year, the REIPPPP is viewed as a model for other countries in the region that aim to develop their renewable energy sector. Growing interest in the sector and increased competition amongst independent power producers (IPPs) has also resulted in a remarkable reduction in tariffs from round one to three.

Renewable energy developers have difficulty gaining access to land. "The request for proposal (RFP) clearly dictates the requirements for a project to qualify. According to the RFP, an IPP can either own the land or lease the land and at the time of bidding you have to show that you have either obtained the actual ownership or the lease rights. Finding the correct piece of land where you are able to access the grid is the challenge. Companies need to find a piece of land that is close enough to the grid where there is capacity for your project. The capacity and access to the grid is controlled by ESKOM and also other projects in the vicinity. While there is a sizeable amount of land in South Africa, it is not always suitable for the type of technology you have or the size of the project," explains Jason van der Poel, Partner at Webber Wentzel.

Nevertheless, the sector continues to thrive. "The IPP environment is continually being developed and is constantly evolving. This market will mature quite quickly and the demand for energy will continue to drive participation from both public and private companies. South Africa has the possibility to become energy independent if we find the right technology", said Rob MacKenzie, managing director of Endress+Hauser.

"The Department of Energy is responsible for the procurement of energy in South Africa, after which Eskom enters into Power Purchase Agreements (PPAs) with private players that make IPP projects bankable. To really attract cogeneration investment you need to have a framework in place that allow IPPs to make an investment and to recoup that over an extended period of time," explained Brian Dames, Eskom's former CEO.

Indeed, the bankability of the projects has not been in called into question as all 28 first round projects of the REIPPPP have successfully reached financial closure through local banks and institutions. "From a lenders point of view and as part of a team involved in a lot of government programs, ranging from hospital and prison PPPs, the REIPPPP has been by far the most ambitious and the best program that government has rolled out. It has never been done anywhere else in the world and is currently being used as a model in many other countries", said Dario Russo from Investment Banking, Infrastructure Investment at Rand Merchant Bank, one of the leading financiers of IPPs in South Africa.

While the appetite for debt financing from the local South African banks remains strong, there is also significant interest from international lenders. So far, their participation has been very limited, as Theuns Ehlers, principal of resources and project finance of Barclays Africa, explained: "The reality is that Eskom is only willing to sign Rand dominated Power Purchase Agreements, which means that funding will also have to be in Rands to match the Rand revenues. Even if a project is able to secure US Dollar funding, it is likely that those exposures will have to be swapped into Rands in order to mitigate the potential currency risk. For as long as Eskom wants Rand denominated Power Purchase Agreements, the local banks, asset managers and DFI's will continue to play a major role."

The Industrial Development Corporation (IDC) also helps with the financing of IPP projects, especially where Black Economic Empowerment funding is necessary. "The IDC has an annual base target of R3 billion for investment in renewables projects, but that is not our limit and includes some small IPP's", said Christo Fourie, acting SBU head, Green Industries.

Debt funds are a new asset class emerging in South Africa, following the success of the program. Funds seek to buy the energy assets from local banks after the construction risks of the project have been eliminated. "Banks have an important role to play in structuring and executing these projects, but this does not mean that the loan exposures have to stay on their balance sheets for the full term of financing. While we do not expect a significant divestment from the banks in the short term, it is likely that more specialist

players in the insurance industry will increase their participation in this new debt class over time", said Barclays Africa's Theuns Ehlers.

With the rapid development of the South African renewable energy market, service providers in the industry have had to adapt and develop new capabilities. "Realizing the potential of the renewable energy sector in 2011, Robor set up a permanent Renewable Energy division to gain a first to market advantage. The first order through its renewable division was secured in November 2012," explained Indiran Gounden, managing director of Robor, the largest manufacturer of tube and pipe in South Africa.

The increased competition in the REIPPPP from round one to three has also caused tariffs to decline drastically, especially in solar technologies, resulting in a spillover effect on local manufacturers. "Round three has been very different to rounds one and two. Firstly, the MW allocation of solar photovoltaic (PV) is lower in round three. Secondly, the increasing competition at a project level means that tariffs are coming down, which is resulting in a downward price push on the supply chain. At the same time manufacturers are facing rising input costs with the weakening rand, rising steel prices and an increase in competition. There is no real continuity with developers as the market matures and there are many different potential clients that were not involved in rounds one and two," said Stephen Leatherbarrow, general manager for renewable energy of Robor.

While the price squeeze on manufacturers has been tight, the increase of local cont ent requirements in IPP projects is a factor that will spur on the local manufacturing industry. According to Dr. MKhulu Mathe, manager of energy materials at CSIR: "It is the government's position that 50% of the materials should be made locally. Another reason for that is that increased competition forces a normalization of prices and compelled developers to have a realistic mark up."

"Increased local content requirements will be pushing IPPs to be creative on the formulation of their tariffs when they can get cheaper products and services from China. Programs must be sustainable for a reasonably long period of time; otherwise there is no real incentive for manufacturers to set up manufacturing facilities in South Africa", said Kieran Whyte, director, national practice head for projects and infrastructure from DLA Cliffe Dekker Hofmeyr, a leading South African law firm.

Many entrants, especially in the solar market, continue to import their products from China, but are mindful of the local content requirements and local job creation. "As Eco Green Energy, we aim to work with the local community, as we do not want to threaten the local industry with imports from China. We see it as an opportunity to develop, not only the energy that is needed here in South Africa, but also to create more jobs," said Dalibor Nikolovski, general manager of solar solutions provider, Eco Green Energy.

Econet is a well-known mobile service provider in Africa that has recently branched out into the providing solar solutions to remote clients. As a newcomer on the scene, Econet is already building local ties and manufacturing capabilities "All the design concepts are done in South Africa and all the installation and supervision is local, so our products are South African products," said Luc Tanoh, CEO of Econet Solar. •

Luc Tanoh

CEO
ECONET RENEWABLE ENERGY SYSTEMS (ERES)

Econet is well known as a mobile service provider in Zimbabwe. Can you tell us about the decision to branch out into the renewable energy sector?

Getting into power was a very simple and natural step for Econet. In many of the areas that we operate, our own subscribers did not have electricity, and we had to come up with a solution to provide them with electricity so that they could at least charge their own phones. Econet wanted to offer more to improve their quality of life. We came up with the home power station (HPS) concept and conducted a trial over the course of a year. This helped us refine our business model as well as the technical specifications of the unit. We have improved it and now have our final model of the HPS, which will be launched in Zimbabwe in June 2014 where we are looking to deploy 120,000 units.

Econet aims to provide solutions that will meet the needs of individuals, but also of communities. We are looking at distributed energy that will vary from 8000 watts to several megawatts. The HPS is really aimed at people, who are off grid and disenfranchised and are in need of the lights and key appliances that we have developed. The TITAN is a more powerful off-grid unit, which can power a home and also address the needs of communities, such as powering hospitals and schools. The TITAN is based on renewable energies like solar, so it can be a hybrid system. Once established From Zimbabwe, Econet's energy systems will then branch out elsewhere in Africa, starting with the countries in which we already operate, namely South Africa, Burundi, Lesotho, and Botswana. Econet are also signing partnerships in the Democratic Republic of Congo, Namibia, and the Ivory Coast.

What are the main types of companies that Econet is partnering with in its rollout of its new product?

In some cases we will be partnering with the utility companies and some will be with Global System for Mobile Communications (GSM) operators. GSM operators have the infrastructure that we need to roll out our equipment, and we will use the network to be able to debit customers' account and customers would be able to pay through the network. In Zimbabwe we initially subsidized the product, and it was a major challenge to have partners that understand the utility concept.

With the home power station the business plan has been put together so that we can meet the needs of people who live with less. Econet only charges a few cents a day. We have been looking at their average spending in terms of candles and lanterns and came up with a business model that stipulates that we do not want the use of our system to cost people more than their previous system. There is a huge market, not only for Econet, but also for several operators in the energy field. We believe that in Africa there is huge potential and that a company like Econet can install several millions of units. We also see a great opportunity to partner with utility companies in Africa.

Will Econet consider manufacturing its products in South Africa in the near future?

The first HPS was manufactured in South Africa but now we are manufacturing in China. In the future we can see some of the manufacturing being relocated here, but it is a question of price. All the design concepts are done here and all the installation and supervision is local and Econet has contracted local companies and has several local partners. For installation and maintenance we need to work with local partners. In South Africa we are working with local partners for the design and concept, so our products are South African products.

Where will Econet be in the next five years?

In Africa, we want to be in as many countries as possible. The critical part is to have an infrastructure on the ground. We are one of a few GSM operators that have the infrastructure to be able to develop such product. We might be at a critical point now and might witness something similar to what happened in the nineties when GSM came and brought wireless technology.

The fact is that the grid is very limited in Sub-Saharan Africa, much of the population is out of grid or when you have the grid, it does not give you power. There is need for distributed energy, which will grow very quickly, and Econet wants to be part of that growth. Energy is the next big thing in Africa and we want to be a player in that field. International investors should invest in local companies targeting that market. If you want to empower the people, you need to find energy solutions. •

Dr. MKhulu Mathe & Wim Jonker Klunne

MM: Manager Energy Materials
WJK: Senior Researcher,
Built Environment
CSIR

MM

WJK

Can you give us a brief background on the work that you are doing in the renewable energy sphere in South Africa in your respective divisions?

WJK: I work in a unit called Built Environment, which analyzes how to implement renewable energy technologies and energy sufficiency technologies. We identify what is needed to get certain technologies on the ground and working. By analyzing energy that is used in buildings, we determine how to optimize the usage, but also how to integrate the generation of energy into the design of the buildings.

MM: I am in the Energy Materials unit, which has two research groups: one specializing in the electrochemical energy technologies, where we look at batteries and fuel cells; the other examines cleaner energy technologies and works with gasification of coal as well as hydrogen storage. We try to find energy storage solutions, as the inability to store leads to problems in meeting demand, and want to reduce the cost of energy, which will increase access to it.

We have seen significant cost reduction in fields like solar energy. What do you think were the main drivers of lower tariffs?

MM: Lower tariffs became possible with the enforcement of localization. The entities that provide solutions should have a component of local manufacturing. It is the government's position that 50% of the materials should be made locally through training people to make the necessary parts. Another reason is that increased competition forces a normalization of prices and compelled developers to have a realistic mark up.

WJK: While the competitive process ensures lowering of prices, the cost of technology over the years is also declining. Local players understand better the market and its risks, which helps lower the costs of capital. The recession also plays a role because of the international investors. The drivers are flattening out and a further lowering of costs is unlikely. Local players have to reduce their costs to compete in the next round. The question is whether international investors will come back to South Africa.

Do you think there should be more generation coming from renewables and how pressing is it to find storage solutions for solar to contribute to that?

WJK: The focus in South Africa has been on large-scale grid connected renewables. What we now see is the huge scope for small-scale renewables, which can contribute significantly. The challenge will be to adjust current technologies and determine how different types of technologies can play together to meet electricity demand.

MM: Finding a storage solution is possible but not urgent. South Africa compares itself to Europe and fails to understand the dynamics of the country. There are challenges of modernizing transmission. In the future, a distributor generation that lends itself to understanding of concentration on density of user will allow you to manage and map your storage better. If your grid is not flexible, then you cannot generate and store into your grid and get back on demand and also be able to have competitive prices. We should look at what is likely to happen to transmission in the future.

Can you elaborate on the availability of skills in the technology intensive renewable energy sector?

MM: Skills are adaptable in the materials space. It is in the intermediary integration or system engineering where there are challenges but these can be met through global collaboration. However, integration should happen locally, as it would also contribute to cost reduction. We are aware of the challenges and are being aggressive to acquire the right skills. South Africa wants to ensure that it can be assessed, evaluated and understood in a competent manner. We might not able to design new technologies yet, but we should be able to understand them.

What do you think South Africa's energy mix would look like over the next 10 to 20 years?

WJK: It will be a mix of the different technologies. We have traditional power stations that will be phased out in 2030, as they are not technically efficient. We have the two new power stations coming online, so coal technology will be with us for the next 30 to 50 years. We will also see a lot of the small-scale renewables.

Despite the economic advantages of coal, should and can South Africa move away from that "dirty" technology?

WJK: It depends on what you do with the coal. Carbon can be taken out and stored. We need to analyze how to use coal more cleanly.

MM: The future is full of new ideas. These could be the ideas that provide solutions, but those solutions would be based on existing knowledge repackaged in a different manner. Whenever we talk about coal, we quickly talk about emissions. Technology has helped alleviate the problem of car emissions, and the same can happen for coal. Coal will remain a big part of the energy mix, but when you start looking into and using smart technology, you have a new behavior and a new culture. In 20 years, South Africa will have a population of 70 to 78 million people, whose energy demands will need to be met. •

Indiran Gounden & Stephen Leatherbarrow

IG: MD
SL: GM Renewable Energy
ROBOR

IG

SL

Could you give us a brief overview of Robor and its evolution in the South African renewable energy sector?

IG: Robor, the largest manufacturer of Tube and Pipe in South Africa, is a privately owned company that serves a diverse range of market segments, include building & construction, mining, water reticulation, rail & logistics, automotive components and energy. Robor's strategy in the energy sector is to be the preferred supplier of steel components for Solar Photovoltaic (PV) and Concentrated Solar Power (CSP) projects.

SL: Realizing the potential of the renewable energy sector in 2011, Robor set up a permanent Renewable Energy division to gain a first to market advantage, and the first order through its renewable division was secured in November 2012. Robor has been involved in numerous projects in South Africa's Renewable Independent Power Producers Program (REIPPP). In round one, Robor supplied into nine of the solar PV projects the largest of which was the 72.5-megawatts (MW) Kalkbult project. Robor also supplied turnkey solutions to both the 64-MW Lesedi and 64-MW Letsatsi projects. In round two, Robor has been involved with five solar PV projects, of which the three most significant are the 60-MW Boshoff project, the 75-MW Jasper project, and the 74-MW Sishen project.

Now that round three preferred bidders have been announced, what will be the main challenges as the REIPPP continues to roll out?

SL: Round three is very different from rounds one and two. Firstly, the solar PV-MW allocation is lower in round three. Secondly, the increasing competition at a project level means that tariffs are coming down, which is resulting in a downward price push on the supply chain. At the same time manufacturers face rising input costs with the weakening Rand, rising steel prices and an increase in competition. There is no real continuity with developers as the market matures and there are many different potential clients that were not involved in round one and two.

Can you elaborate on Robor's current capacity to supply for the solar market and how did you have to change your manufacturing capabilities to cater to this market since 2011?

SL: Robor has installed capacity that has been built up over time, which includes major capital investment resulting from South Africa's spending on infrastructure prior to the FIFA World Cup in 2010. This capacity is not fully utilized, and Robor is therefore able to meet increasing demand. Robor is well positioned to support the solar market whether it is in fixed-tilt or tracker technology. Robor realizes the importance of a consistent supply to its existing customer base, and supply and demand are carefully managed to ensure continuity.

You mentioned increased competition both for project developers as well as for manufacturers. Can you elaborate on how this has affected Robor and why it is still a preferred supplier despite the increase in competition?

SL: While there certainly are quality competitors in the market, Robor's solar offering includes a broad range of products and services to meet the needs of the solar market. Robor is currently well positioned, however to keep our competitive edge is becoming more difficult in a market that is developing so rapidly so we adapting all the time.

IG: Robor offers clients an integrated solution, which is our competitive advantage. A good example of our integrated approach was at Kalkbult, where Robor supplied the steel value added products and finished the project three months ahead of schedule. Robor also supplied 13,000 tons of value added steel components to the Lesedi and Letsatsi solar projects, which are also coming on stream as planned. Robor is proud of this achievement and this has drawn attention to Robor as a total solutions provider in the renewable energy segment

What do you foresee for the future growth of Robor in the renewables space compared to other segments that it is active in?

SL: The renewables space is an exciting market to be in and has a very positive growth trajectory when compared to other market segments. Robor's continued supply to the utility scale solar PV market in the REIPP has resulted in Robor exploring other markets and technologies within the segment. There remains a need for coal-powered electricity generation, as South Africa has an abundance of coal resources that will maintain and create jobs for many years to come. If well managed, coal is still one of the cheapest forms of energy in South Africa.

Do you have a final message from Robor to the South African energy market?

SL: As Robor we aim to be the leading integrated steel solutions supplier in this market segment. With local content and Broad-Based Black Economic Empowerment (BBBEE) credentials Robor has an added advantage for players in the renewables space. Robor realizes the potential in solar and is prepared to invest in viable opportunities which are presented to it. Robor remains strategic in its thinking, keeps pace with what is happening in the steel as well as the energy sector, and is excited about the future. •

Pierre Viljoen

Africa Business Line Leader, Energy
AECOM

Can you tell us about the entry of AECOM into the South African power industry and what its focus will be in the near-term?

AECOM entered South Africa's energy industry sector at the end of 2012, when BKS joined the firm. BKS had already established itself in the 1980s, when the company was appointed as the consulting engineers for civil and structural work for the development of Eskom's Majuba and Matimba power stations. When Eskom started the new build program in 2005, international players faced specific problems in the unique South African market. The country's construction industry is quite different from the European market because it has a strong focus on civil and structural design. In this market, we provide a much higher level of detail to our contractors. When international suppliers came into South Africa, the reality and the perception of what they needed to supply was inconsistent, and they struggled to find the right balance. However, through enquiry to the South African industry role-players, they found BKS and, since then, we have been involved in the civil and structural engineering design for the power islands for Medupi and Kusile.

What were the biggest challenges in the projects that AECOM has done for Medupi and Kusile?

As with most big projects, we took some time to build the necessary capacity and skills set for these specific projects. The majority of people who were involved in the Majuba and Matimba design and construction in 1980s were no longer around. South Africa had not embarked on a new build of this magnitude since, and none of the big civil engineering firms had done it recently. There was a need to build capacity in South Africa, and our company was a part of that.

What has AECOM's role been in the renewable energy space in South Africa?

We have secured a number of contracts in rounds one, two and three of the Renewable Energy Independent Power Producer Procurement Programme. The involvement of AECOM ranges from serving as owner's engineer to providing engineering services for the EPC contractor. Our engineering offerings include the entire range of services from geotechnical and environmental to civil, structural, electrical, sub-station and grid connection design. According to the Engineering News-Record (ENR) magazine's annual industry rankings in 2013, AECOM is a global leader in energy and design.

In 2010, AECOM also brought on-board Davis Langdon, a cost consultancy and project management company with a focus on private clients and property development. Now, our combined company can provide the full spectrum of services. AECOM, through its global centers of excellence (hydropower, thermal, renewables and transmission & distribution) can mobilise international expertise to support our local resources — providing global reach and local knowledge. This combination allowed us to extend our service offering not only to the contractor, but also to the developers themselves. This extended capability also allows us to extend our service offering from engineering services to the full spectrum of services needed to assist in securing financing for a project and negotiating grid-connection agreements to assisting with finding the right contractor or turbine supplier. With this strategy, we have been successfully developing renewable energy projects, especially in the wind sector.

> "The renewable energy program is still going strong and also has a place in the energy mix in South Africa. Our country has the resources in both wind and solar, and there could be a lot more scope in that sphere."

How do you foresee South Africa's energy mix, which is still thermal-driven, changing over the next few years?

Due to the price and availability of coal, the mix will still be very much thermal-focused for the time being. The schedule of the nuclear-build program still needs to be proven, and for that reason we hope to see the third coal power station being developed soon. The renewable energy program is still going strong and also has a place in the energy mix in South Africa. Our country has the resources in both wind and solar, and there could be a lot more scope in that sphere. Unfortunately, the renewable energy program only allows for a limited amount of megawatt generation per round per technology, otherwise we may have seen a substantial increased number of renewable energy projects being developed.

How big will AECOM's focus and role be in the South African energy sector?

In the next three years, we believe that energy's contribution to our Africa-wide turnover will grow substantially. The majority of that growth will be outside of South Africa's borders, while we will obviously keep a keen eye on the South African market. Africa is not going to develop without energy, and AECOM has the ability to make a difference. If we can provide Africa with power, the continent's potential is limitless. •

Christo Fourie & Gerrit Kruyswijk

CF: Acting SBU Head, Green Industries
GK: Senior Specialist, Green Industries
IDC

CF

Can you give us an overview of the IDC and its role in the South African renewable energy sector?

CF: Within the IDC, there is a Green Industries Business Unit that covers renewable energy. There is also the Strategic High Impact Projects, which covers other energies such as gas-fired technology. The IDC partners with developers of renewable energy projects by taking up an equity position and financing it through debt. A key part of our participation is the financing of community ownership. To date, we have participated in all three rounds of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), providing equity debt, community finance totaling R13.5 billion of approved funding, of which R7.5 billion has reached financial close. The most significant IPP projects that the IDC has been involved in are the concentrated solar projects (CSP), which have a huge developmental impact in terms of job creation as well as potential for creating local manufacturing. There is a gap in the market for community finance and the IDC, the DBSA and PIC typically invest in this. The funding needs to be repaid, but communities also benefit throughout the project's life. The IDC has designed a financial instrument, which allows a dividend to flow to the community from the first year of the project. We take community development seriously. Still, there are challenges that need to be addressed to enable and empower communities to manage their own funds and choose the right projects to invest in.

How important will international funding become in the renewable sector in South Africa?

CF: Any government undertaking will only be repaid in rand, which renders international funding problematic in terms of currency. Will there be enough local funding? The banks and discussion panels believe there will be, and we believe that institutional funding will flow as well. We have to keep funding for the future base load projects in mind. The fact that there is treasury support for the counterpart means that banks are not really limited.

How important is the base load IPP program become when compared to the REIPPPP in the Strategic High Impact Business Unit?

The base load program will initially be much smaller but fills a slot in the country's long term planning. It may surprise the Department of Energy (DoE) that the private sector can deliver at a lower cost than they can. Gas will play a larger role. There is a synergy between gas and renewables, which makes it a perfect match because of the destructibility of gas.

Is energy efficiency policy more important than new generation capacity programs?

CF: There are so many opportunities for energy efficiency. South Africa has the financial infrastructure available but needs to identify the right projects. There is an IDC initiative to work with our existing business partners to identify what energy efficiency programs they can implement in their own manufacturing space, but we are not doing enough. The pressure is not yet strong enough, and the incentive is not there.

Can you elaborate on the IDC's role in the Sub-Saharan African energy sector?

GK: In renewable energy, we have nothing outside of South Africa. The Green business unit was established in 2011 and there has been such a flood of South African projects that we have been focusing on that. Neighboring countries are trying to catch up, looking at the successes for South Africa in terms of the renewable program. However, these markets are still very small. As Green Industries, we will participate in renewable projects Botswana or a Namibia if it is worthwhile, but the IDC has an investment minimum of €5million. By the nature of their economies, these projects may be too small. The IDC will support local suppliers to become involved in energy projects throughout Africa or facilitate the participation of local companies in these projects with equity.

How much does the IDC expect to allocation in the upcoming round four of South Africa's REIPPPP?

CF: The IDC has an annual base target of R3 billion for investment in renewables projects, but that is not our limit and includes some small IPPs. The IDC has grown rapidly in the last three years, and we must consider our concentration risk.
GK: The IDC will also be more selective and will concentrate specifically on the objective of promoting increased localization.

What is the outlook for the IDC Green Business unit after the IPP program that draws to a close in 2016?

CF: The renewables projects will not end in 2016. We will likely see a shift towards the rooftop solar market with new CSP technologies.

Do you have a final message to international investors looking at the South African energy sector as a possible investment destination?

CF: The South African energy sector seems to have become a space where international utilities are flexing their muscles and is moving towards utility type equity returns. In South Africa you are not going to make the quick and high returns as is evident by the results of round one and two of the Renewable IPP Program. Investors need to understand that we must maximize local content and transfer skills in terms of operating and maintenance capabilities because in the long run that will make a difference. •

Ute Redecker & Jose Machado

UR: Head of Energy
JM: Head of Corporate Communications
SIEMENS SOUTH AFRICA

UT

In our last interview with Siemens in South Africa in 2011, a big topic was Siemens' Wind Power Centre of Competence. Can you tell us about recent developments at Siemens South Africa and what you plan to achieve in the near- to medium-term?

UR: Wind is continuing strong. We have two operational sites: the 138-megawatts (MW) Jeffreys Bay wind farm, which has 60 turbines being installed and where we are supplier to Mainstream, and the 100-MW Sere wind farm in the Western Cape, where we are the direct turnkey supplier to Eskom. Both projects are running smoothly, with the Jeffreys Bay already connected to the grid and in the middle of commissioning. Although the project has not officially been finalized, the turbines have been running since December 2013. In the third round of bidding for the Renewable Energy Independent Power Producer Procurement Programme, Siemens has been awarded a wind generation project together with Mainstream. The process is still ongoing. It is too early to predict the scope of the work, as it will take at least another six months to finalize.

Siemens is also active in gas and solar power generation. Can you highlight the importance of the different renewables to Siemens in South Africa?

UR: Apart from the wind projects, Siemens is also involved in the solar photovoltaic (PV) plants in Droogfontein and De Aar, which are also in commissioning. The turnkey project includes a five-year operating and maintenance agreement for the two solar farms. The Jeffreys Bay wind farm contract includes the servicing of the wind turbines for ten years. Wind power has potential because technological innovation has made the generating capacity of onshore wind plants equivalent to many conventional plants. Improved turbine and generator design has increased efficiency to make onshore wind power a viable option. At the moment we deliver 2.3-MW geared wind turbines and 3.0-MW direct drive wind turbines. Solar panels, on the other hand, require much more space. The Droogfontein and De Aar solar plants each generate 50 MW, but an installation of 180,000 individual panels is required. Solar panels also require less maintenance than the rotating components of wind turbines, but wind ultimately holds more generation potential. PV will always be welcome in remote areas, where you have the space, and in hybrid power plants, where you have a combination of wind, solar and diesel, with storage connected. Siemens has rolled out the smart-generation packages that combine the three types of power. These have attracted interest in South Africa. In Africa, we have hybrid plants active and also see the supply of turnkey solutions through hybrid plants as the future for electrification in rural areas.

What investment is Siemens making to ensure that there is an adequate skillset to run and maintain such technologies in South Africa?

JM: Siemens has invested millions of rand into training artisans through Further Education and Training (FET) colleges, particularly the Lepalale College and the SAJ Training Institute in Germiston. These investments have been in infrastructure upgrades and helping to ensure that the level of training meets industry standards. In 2012 Siemens launched its own initiative called the Power Academy in Mpumalanga to help train our customers, especially Eskom, in the latest in control and instrumentation (C & I) and ensure that the skill levels are strong enough to operate C & I systems. Lately Siemens has conducted training on operating transformers, among other initiatives. Siemens employs approximately 1,500 people in South Africa, 400 of which are in the energy division, and some of our employees come from Siemens-supported colleges.

What is the outlook for the South African energy sector over the next five to ten years?

UR: There are still challenges. At the moment Eskom's main focus is to keep the lights on. Eskom has a few gas-fired peaking power plants, but because of the high demand they are currently nearly run at base load. Siemens is supporting Eskom to optimize the existing fleet without interrupting the power supply, in order to be more flexible when there is an unplanned outage. The Department of Energy is trying to get IPPs invested in renewables, and many solar and wind plants will be connected to the grid this year. It is also a sensible to diversify South Africa's energy mix. We have to learn lessons from Europe about how to integrate renewables into the grid, as we realize the importance of getting the regulatory environment for renewables right. Gas also holds huge potential as gas or combined cycle power plants are very effective. A gas-fired combined cycle power plant is now 60% efficient, while the latest coal-fired power plant is only 40% to 45% efficient from primary energy to output. While the gas price is higher than that for coal, the future lies in gas' increased efficiency.

Do you have any final words of advice for IPPs looking to invest in South Africa?

UR: Africa and especially South Africa are good markets for investment for renewables and state of-the-art gas-fired energy with the demand for electricity remaining high. South Africa also has a good infrastructure and well developed financial structures that support leading industries. Realizing the potential of renewables quite early will pay off. The future for South Africa is bright, and the challenges can be managed. •

Coal the Present and Gas the Future

Natural Gas and Nuclear Power in South Africa

While coal is an important resource for base load electricity generation, the industry recognizes that the focus will shift significantly after 2020. "Endress + Hauser in South Africa understands the challenges of the sustainability of thermal projects going forward and it remains to be seen what Eskom's plans are beyond Medupi and Kusile," said Rob MacKenzie managing director of Endress + Hauser. "There are many new opportunities that are presenting themselves such as gas which is a better alternative to coal."

Stephen Moore, MHPSA's former CEO, a merger between Mitsubishi Heavy Industries and Hitachi, said: "MHPSA are focused on thermal power so we are keen on pushing that forward. Coal, apart from emission issues, is the perfect fuel. Planning ahead, it is all about progressing the plans with coal and gas as base load complemented by nuclear, solar and wind."

There is hope that shale gas will become a game changer for South Africa's energy sector. President Jacob Zuma announced in his state of the nation address in February 2014 that the country would shift its power mix in this direction. According to the U.S. Department of Energy, South Africa may be home to the world's eighth largest shale gas deposits at an estimated 390 trillion cubic feet. The Department of Energy has reiterated its intent to release South Africa's gas utilization master plan for public discussion by the third quarter of this year. In this master plan, as with renewables, the role of Independent Power Producers (IPPs) will be crucial, with the gas IPP program targeting 3,000 megawatts (MW) of energy generation. The gas master plan will set long-term goals with a 30-year view with demand for gas coming primarily from South Africa's energy generation industry.

While the gas sector is already showing exciting prospects even before resources have been proven, there are still a lot of pieces, such as policy instruments, routes to market and infrastructure build that need to fall in place for the puzzle to start making sense. Gas has only recently surfaced as a serious energy source in long-term government planning. The small demand for gas before the electricity shortages that commenced in 2008 meant that South Africa has no gas infrastructure in place. South Africa's gas industry currently consists of PetroSA, operating the Mossgas gas-to-liquid plant in Mosselbay, and SASOL, which imports close to 200 million gigaloules of gas per year from neighboring Mozambique. In the short-term, imported liquefied natural gas will play a larger role, but in the future, South Africa will need to build proper gas infrastructure and pipelines if it wishes to utilize its own gas resources. Apart from releasing a framework for gas development, the next crucial step will be to prove the estimated resources. This will need significant investment. Apart from the controversial shale gas potential in the Karoo, exploration of offshore oil and gas potential in the Ibhubesi, Zululand and Bredasdorp basins will also need funding. Many key international players have already shown interest in South Africa's offshore oil and gas potential and in the last two years the likes of Anadarko, Afren, Cairn, Canadian Natural Resources, Exxon Mobil and Total have entered the market with a number of participants already gathering 2D and 3D seismic data.

The rest of 2014 and 2015 will prove to be a crucial phase for gas development in South Africa. As with the promised social-economic change that South Africa is desperate to see, the hope is that the energy sector will go transform at the same time that uncertainties in the policy framework are eliminated. •

Is Nuclear Power a Long-Term Solution?

The potential of shale natural gas discovery is held as one of the main reasons for the delay in the construction of more nuclear power facilities, as natural gas will be considerably cheaper and offers a more timely solution. There have already been serious commitments from large multinationals such as Shell to explore for shale natural gas, which has contributed to a sense of confidence in the future of natural gas in South Africa.

Still, until these plans are realized, South Africa's nuclear plant at Koeberg is the backbone of electricity supply in the Western Cape. Despite the success of the Eskom owned plant, any further nuclear build program has been delayed, as the downward revision of electricity demand only calls for base load nuclear energy of 6,660 megawatts to come online after 2025.

Despite the delays in the nuclear build program, in the long-term, nuclear power should play its part in the South African energy mix. "The electricity supply constraint in South Africa and the rest of sub-Saharan Africa is one of the main factors holding back economic development. Therefore, when Medupi and Kusile eventually come online, that capacity would immediately be absorbed by new business and growing industry. In the longer-term, toward 2025 to 2030, nuclear would have to come online as part of the energy mix. Westinghouse continues to maintain a team that is ready to rise to the challenge of the new nuclear program," said Dr. F. P. Wolvaardt, managing director, Westinghouse South Africa. Westinghouse provides plant design and technologies for the nuclear power industry and has been involved with the Koeberg plant since its inception. •

Dario Musso

Infrastructure Finance
RAND MERCHANT BANK

Can you provide an overview of Rand Merchant Bank's (RMB) projects in the energy sector in South Africa and on the continent?

RMB's focus remains on the development of sub-Saharan Africa. While the South African power sector is a major part of our portfolio, RMB also has large projects elsewhere in Africa. RMB is the mandated lead arranger (MLA) for the 340-megawatts (MW) CenPower gas-fired power plant in Ghana, which is due to close in 2014. We are also one of the MLAs on a 350-MW gas fired power project in Nigeria. In South Africa, RMB is involved in several large projects in the renewables IPP program. In round one of the Renewable Energy Independent Power Producer Procurement Program (REIPPPP), RMB led the financing for Abengoa's 100-MW Ka Xu Concentrated Solar Power (CSP) trough project, which is currently under construction. RMB was also the MLA for the 67-MW Umoya wind farm in Hopefield, which in February became the first wind project to reach Commercial Operation in the whole program. RMB's three 75-MW round one solar photovoltaic (PV) projects are currently under construction and are well on schedule. Round two of the REIPPPP saw RMB lead the financing on a 140-MW wind project, three large solar photovoltaic (PV) projects and a mini-hydro project. In round three we are leading the financing on another Abengoa 100-MW CSP project and working on closing the program's first biomass project, which would be located in KwaZulu Natal.

What are the most significant challenges in the renewables sector for IPPs?

The main challenge for an IPP bidding in the REIPPPP is tariff competitiveness. Competition for available MW has multiplied in each round, which has reduced tariffs significantly. Nonetheless, the Integrated Resource Plan (IRP) proposes that renewable energy will make a significant contribution to the energy mix in the medium-term. Another challenge for many renewable energy technologies is reliance on meteorological conditions like sunshine and wind, which makes them poor replacements for base load generation. Therefore, dispatchable, thermal-power plants that run on fuels like gas, coal or nuclear are still necessary. Renewable energy plants remain a complementary source for the grid and cannot alone meet energy demand.

What is RMB's financing appetite for nuclear energy generation in South Africa?

RMB remains interested in playing a significant role in funding the government's nuclear program. The complexity associated with a nuclear plant, however, means that it will take a long time. The high front-end cost requires a large-scale funding plan with foreign participants. This will depend on whether government decides to procure a nuclear fleet from a single supplier, leading to better economies of scale, greater localization and more job creation, or to carry out procurement on a single plant basis.

Who is funding renewable energy projects in South Africa?

The majority of debt funding for the REIPPPP is from local banks and institutions, which continue to have strong interest. Foreign banks have been uninterested, as long-term rand funding is required, which foreign banks cannot source as competitively as South African banks. RMB's appetite for the REIPPPP remains healthy and plans to grow its current funding commitment, which started at roughly R10billion in round one and currently totals about R15 billion.

From a financing perspective, how successful has South Africa been in rolling out its power programs?

From a lenders' point of view and as team that has been involved in a number of government programs, the REIPPPP has been the most ambitious and best run program that the government has rolled out. Over 60 projects have been awarded PPAs and several are now starting to contribute electricity to the grid. The government has been able to make decisions quickly, which has given the market confidence in the program, and stuck to the initial objectives and plan, leading to a high degree of certainty.

What can we expect to be South Africa's energy mix in five years?

The shift has already begun towards less reliance on Eskom for new generation capacity and more on private players, which is reinforced by the government's plans to procure new base load capacity from the private sector, underpinned by an Eskom offtake. The market is awaiting the launch of the government's base load IPP and cogeneration programs, both of which are due in late 2014. Eskom will continue to be the backbone of the power generation sector, the proposed diversification of generation sources is positive and will take pressure off Eskom, which is focused on bringing its two mega plants, Medupi and Kusile, online. There may be a short-term supply-demand crunch, but the latest IRP contains encouraging long-term planning, including a diversification away from coal towards more gas, either through imported LNG or shale gas fracking.

Do you have a final message regarding RMB's commitment to electrification of Africa?

RMB is committed to the power and infrastructure sector in South Africa and throughout the continent, which is evolving into a much more investor-friendly environment. RMB is excited to contribute to the continent's electrification efforts and, ultimately, economic development. •

Stephen Moore

Former CEO
MHPSA

Could you please give an overview of MHPSA in the energy sector of South Africa?

We have been active in the energy sector in South Africa for over 40 years being the OEM for Grootvlei, Hendrina, Kriel, Duhva, Tutuka, Majuba and now Medupi and Kusile. We also supplied much of the steam raising plant to Sasol in Secunda and we supplied all 4 boilers for the original Moropule A power plant in Botswana.

Currently our most prominent power projects are as boiler OEM for the 12 x 800 MW units at Medupi and Kusile. We see electrification as the most fundamental requirement to provide decent living standards for the people throughout Africa. Furthermore electrification enables much needed economic development throughout Africa providing jobs and prosperity to all its people.

MHPSA was formed as a joint venture between Hitachi Power Africa and Mitsubishi. Could you describe why this came about?

The joint venture between Hitachi and Mitsubishi Heavy Industries has enabled us to significantly expand our footprint and participation in the energy sector in Africa. We are now part of one of the largest energy equipment suppliers in the world and our new shareholders see MHPSA as the springboard for entry into one of the most exciting regions in the world for energy technology.

Can South Africa become an energy hub for Sub-Saharan Africa?

An energy hub implies that South Africa will be the centre of energy developments; however we believe that all countries in SSA have identified their own strategies for energy supply and many are planning to be interconnected with, but not reliant on South Africa. We would like to see continued strengthening and integration of the Southern African Power Pool.

How is MHPSA working with Independent Power Producers (IPPs) and Public-Private Partnerships (PPPs)?

MHPSA is able to support IPPs and PPPs through 2 routes. First, as a turnkey engineering procurement and construction contractor, design and construct the complete power plants. Second, as an original equipment manufacturer, we can provide equipment and components such as gas turbines, steam turbines and boilers (for geothermal, coal and biomass). In both of these routes we are able to provide attractive finance packages and operation and maintenance services for the life of the plant. We anticipate supporting IPPs in the upcoming requests for proposals for baseload coal, gas and cogeneration capacity from the Department of Energy (DOE).

Finding the right energy mix between is always a challenge and there are investments being made in renewables, nuclear and thermal energy, and natural gas. What role do you see MHPSA playing in these areas?

MHPSA fully supports the DOE's Integrated Resources Plan (IRP) and its latest update. We believe that it strikes the right balance between base load thermal, nuclear and renewables. In particular MHPSA is ready to support the IRP with regard to base load coal, gas and cogeneration technologies.

MHPSA has been formed to focus on thermal power generation. Included in this portfolio is biomass renewable technology which we see playing a key role in fulfilling the cogeneration requirements of the IRP. In addition we have had considerable success with geothermal energy and we are the leading supplier of geothermal plants in Africa. Our shareholders both Mitsubishi Heavy Industries and Hitachi have separate divisions which are addressing solar, wind and nuclear technologies.

What technologies can MHPSA bring to bear in terms of power generation in the South African energy sector?

MHPSA is looking forward to introducing our technologies to support the biomass cogeneration and geothermal opportunities arising in sub Saharan Africa as part of supporting sustainability in our region. With regard to gas turbine technology we are introducing the SMART AHAT system which combines the benefits of open cycle simplicity and low cost with combined cycle heat rate. This technology is ideally suited to operation in Africa because it requires virtually no water for the auxiliary cooling system.

Our second technology development is IGCC (Integrated coal Gasification Combined Cycle), which is in the final stages of commercial roll out following successful operation of our 250 MW pilot plant in Japan. This technology has a higher efficiency and lower emissions than conventional coal fired power plants.

Finally with regard to CCS (Carbon Capture and Sequestration) we are world leaders and are operating a number of large scale pilot plants throughout the world.

What is the outlook for MHPSA in the medium-term for power generation in South Africa's energy sector?

We are very encouraged by the level of activity in South Africa's energy sector across all technologies. We believe that it is an exciting time to be involved in South Africa's energy expansion plans and our parent company in Japan is keen to support us in our participation.

We are very optimistic about the medium-term prospects for the African power sector. We are already a significant player in existing projects and with our recently expanded technology portfolio we aim to be one of the industry leaders in power generation in Africa. •

Dr. F P Wolvaardt

MD
WESTINGHOUSE SOUTH AFRICA

Could you give us a brief overview of Westinghouse in South Africa and its role in the energy sector?

Westinghouse has two main origins in South Africa, through the Koeberg power station that is still ongoing and through the Pebble Bed Modular Reactor (PBMR) project that has now been discontinued. Westinghouse got involved with the Koeberg operations about eight years ago, after the apartheid era sanctions were lifted, while the PMBR leg of activity was through our former shareholder British Nuclear Fuels Ltd (BNFL). Westinghouse's involvement in the Pebble Bed project resulted in the purchase of IST Nuclear, a local company that was developing support systems for the Pebble Bed reactor, which officially established Westinghouse's presence in South Africa.

The Integrated Resource Plan outlines 6660 MW of nuclear energy to be introduced from 2025. What does the future of nuclear energy in South Africa look like and are the generation goals feasible?

Westinghouse South Africa has aimed to maintain a presence with a view of the new nuclear program as set out in the 2010 IRP. Unfortunately, there have been several delays in the launch of the new nuclear program, and in 2012 Westinghouse moved several people to Cape Town to be closer to our existing client, Koeberg. Westinghouse continues to maintain a team that is ready to rise to the challenge of the new nuclear program.

How big is the need for nuclear generation in South Africa and Africa and will the country be able to meet electricity demands without the new nuclear program?

The electricity supply constraint in South Africa and the rest of sub-Saharan Africa is one of the main factors holding back economic development. Therefore, when Medupi and Kusile eventually come online, their capacity would immediately be absorbed by new business and growing industry. In the long-term, toward 2025-2030, nuclear would have to come online as part of the energy mix. Westinghouse is focused on supporting nuclear plants and building nuclear power stations around the world. While nuclear energy is a viable option for African countries, there are no active nuclear projects in the continent, as the plant construction is very capital intensive and has to be supported with a long-term view. There was some movement in the nuclear energy space in Egypt before the revolution there, but that is on hold at the moment. If a nuclear program does become active in Africa, Westinghouse would be well positioned to support that.

How do the technologies at Koeberg compare to nuclear plants elsewhere in the world, especially where nuclear is an important part of the energy mix, such as South Korea or Germany?

Koeberg is the backbone of electricity supply in the Western Cape, and when Koeberg is down, the consequences are immediately felt through blackouts in the area and the costs of having to import power from the northern parts of the country. Koeberg has been and continues to be operated fully to international standards. The plant is well managed and upholds the standards of INPO (the Institute of Nuclear Power Operations). As a result, they undergo regular reviews from INPO and other organizations that hold nuclear plant management to the highest standards. Koeberg holds its own among the leading nuclear power stations of the world. For the past eight years, Koeberg has also embarked on a huge safety upgrade program in which Westinghouse was involved, which resulted in Koeberg having state of the art modern safety features. Some features that are now being installed in other plants post-Fukushima have already been installed in Koeberg over the past eight years.

Should the nuclear program take off, what new technologies would be available from Westinghouse that will change the nuclear energy landscape?

Westinghouse is eager to introduce its AP1000® reactor to South Africa. The main advantage of this reactor is its passive safety features. The AP1000 reactor does not need alternating current electrical power or operator action to place the reactor in a safe shutdown condition during design-basis accidents

or beyond-design-basis accidents, such as the Fukushima Daiichi event. At the Fukushima plant, the earthquake and ensuing tsunami took out the power lines and the diesel generators, leaving the station in a blackout situation, resulting in core damage. Westinghouse's AP1000 nuclear power plant uses passive safety features to maintain the core in a safe shutdown condition for at least 72 hours using the basic laws of nature, including evaporation, natural circulation, and condensation. Some operator action is required after 72 hours to provide makeup water from on-site sources and to maintain the safe shutdown condition. The revolutionary design of the AP1000 nuclear power plant and the use of passive safety systems significantly reduces the risk of core damage from scenarios such as station blackout.

How big is the competition for the supply of nuclear reactors in South Africa?

During the previous round, competition was mainly Westinghouse and Areva tendering for what was called the Nuclear One program several years ago. That program has since come to a halt. With the new program, the competition will be wider and stronger, as there are various companies from China, Russia and Korea, in addition to Westinghouse and Areva, which will be competing to supply to these projects.

Do you have a final message from Westinghouse?

Westinghouse remains committed to the South African energy sector and is excited to see progress on the new nuclear program. Unfortunately, the impact of the electricity price increase being limited to 8% a year, instead of the 16% that Eskom required, led to moratoriums and delays on new projects.

Westinghouse has made a considerable investment in South Africa and has established its presence here. Westinghouse keeps to its motto of "We buy where we buildTM," allowing for a strong localization program. Westinghouse has established capability in engineering, project management and analysis in our offices in Cape Town and Centurion. Westinghouse is ready to meet the demands of the new build program. •

Image: Shutterstock

Into the Future: Final Thoughts, and Company Index

"The electricity supply constraint in South Africa and the rest of sub-Saharan Africa is one of the main factors holding back economic development. Therefore, when Medupi and Kusile eventually come online, their capacity would immediately be absorbed by new business and growing industry. In the long-term, toward 2025-2030, nuclear would have to come online as part of the energy mix. Westinghouse is focused on supporting nuclear plants and building nuclear power stations around the world."

- Dr. F P Wolvaardt, MD, Westinghouse South Africa

Image: Shutterstock

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In the Southern African Development Community region there is cohesion and collaboration among member countries. Africa is coming of age in terms of power and with all the attention on African infrastructure and investments we are in a good space. South Africa certainly has a major role to play; however the challenge of generating base-load capacity remains pressing. Gas will be the big wave, followed by renewable energy then metering technology. We need to continue strengthen the regulators to have efficient markets.

- Norman B Ndaba, Sector Leader, Power and Utilities Africa,
Ernst and Young

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Trina Solar will be part of the commercial rooftop revolution and will continue to work with the key developers and EPC players that we have worked with in the past and help them to develop market as well. The key will be to focus on keeping our good quality and brand name as well as our local support, but also to differentiate our company. South Africa will be the key to accessing the greatest emerging market in solar power: Africa. The market is very competitive and price sensitive, but also exciting and full of potential.

- Warren Pollard, Sales Manager Africa,
Trina Solar

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The IPP environment is continually being developed and is constantly evolving and that can be a challenge. However, this market will mature quite quickly and the demand for energy will continue to drive participation from both public and private companies. It has been encouraging to the shift in South Africa's energy mix, and South Africa, has the possibility to become energy independent, if it can find the right technology.

- Rob MacKenzie, Managing Director,
Endress+Hauser South Africa

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Unless power is in place, Africa will not be able to develop. Utho capital is therefore taking a serious view of the power sector, having set up a Power Energy Unit to advise it. We need to solve the power problem on the continent in the next five to ten years. International players are already investing in the sector, but aligning with a local partner is important. There has to be job creation, localization and healthy development.

- Sheila Galloway, CEO,
Utho Capital

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Image: Rudi Venter

This list contains those companies interviewed during the course of research for this publication and as such represents only a selection of the companies operating in the power industry of South Africa. It should not be considered a comprehensive guide. GBR holds an exclusive and extensive power database for South Africa and the wider region. For further information on database access packages, please contact info@gbreports.com or call +44 20 7612 4511.

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