

Construction at 4,800 MW and R105bn
Medupi power station . Delayed plant will
start generating power in 2014.
Photo courtesy of Mitsubishi
Hitachi Power Systems Africa.

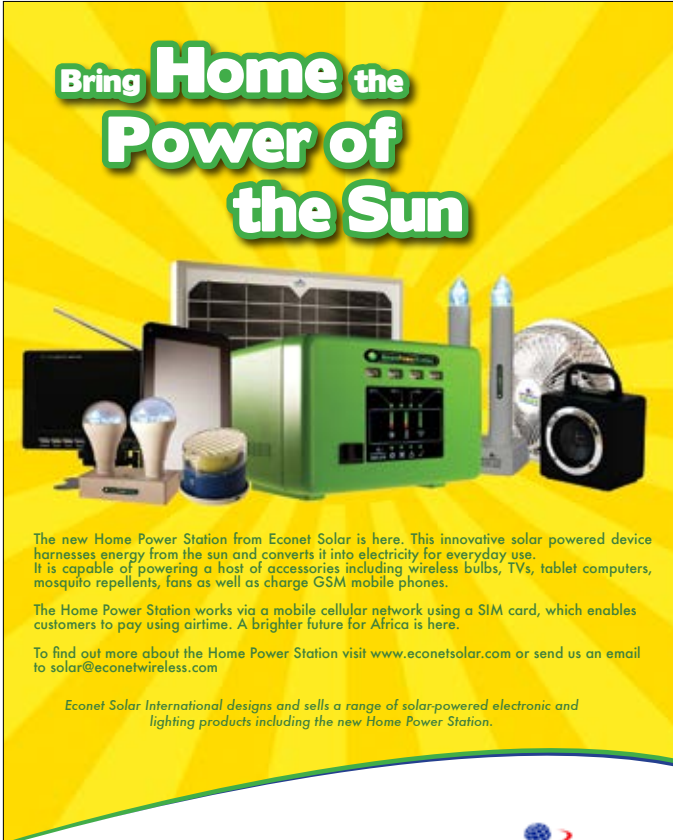
Shining a Light on South Africa's Power Plans

Growing private sector participation gives hope to South Africa's fragile electricity situation

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 1980's. However, a lack of investment in South Africa's power infrastructure over the last three decades coupled with a growing electricity demand resulted in a situation that called for the upgrading of existing Eskom plants. 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 most recent 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 expanded through the Renewable Independent Power Producers Program (REIPPP), the hope is to replicate this model to generate further base load capacity.

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; 95% of South Africa's electricity generated through coal-fired power stations. 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,



Bring Home the Power of the Sun

The new Home Power Station from Econet Solar is here. This innovative solar powered device harnesses energy from the sun and converts it into electricity for everyday use. It is capable of powering a host of accessories including wireless bulbs, TVs, tablet computers, mosquito repellents, fans as well as charge GSM mobile phones.

The Home Power Station works via a mobile cellular network using a SIM card, which enables customers to pay using airtime. A brighter future for Africa is here.

To find out more about the Home Power Station visit www.econetsolar.com or send us an email to solar@econetwireless.com

Econet Solar International designs and sells a range of solar-powered electronic and lighting products including the new Home Power Station.

HomePowerStation

ECONET SOLAR INTERNATIONAL

once again, become an energy hub for Africa. 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. 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 (US \$50 billion) in new capacity projects over the next five years, South Africa's energy sector holds challenging and exciting opportunities.



Sheila Galloway,
Utho Investment Holdings,
Group CEO

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 10,000MW of new generation capacity and at least 3,700MW of that should be coming from renewables, where wind and solar PV are the dominant technologies. South Africa is fortunate that there is a focused approach through the REIPPP program 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).

Regulatory Framework

The IRP and the Future of South Africa's Energy Mix

The IRP 2010-30 is the main roadmap for the development of 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 REIPP program, the plan still makes provisions for the dominance of coal.

The Scope for Market Liberalization: Distribution and Transmission

As a single off-taker, Eskom will continue to dominate the sector, even where IPP's 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

Worldwide, millions of people have created boundaries believing they are shaping destinies of societies and organisations.

At Utho we do it differently - we challenge the boundaries, we create solutions without boundaries!

We will create a solution just for you.

UTHO

Utho Capital is a Pan-African corporate and project finance advisory firm.

Our offerings include:

- Infrastructure and PPP advisory specialists
- Empowerment and indigenisation advisors
- Consultancy
- Private equity

Lillipark Office Park, Progress House, 354 Rivonia Boulevard, Rivonia, 2128
Tel: +27 11 234 1370 Fax: +27 11 234 1380
info@utho.co.za www.utho.co.za

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.

Renewables

South Africa's Great Success Story: Attracting Independent Power Producers

South Africa is rated as the world's 12 most attractive destination for renewable energy investment. The Independent Power Producer Procurement Program that South Africa launched in 2010 remains one of the country's greatest success stories. The goal of the program is to reach the ministry's target of 3,725MW of renewable energy generation before 2016 through phased bidding rounds. With many of the first round projects coming online this year, the program is also being looked to 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 IPP's has also resulted in a remarkable reduction in tariffs from round one to three.

A challenge that renewable energy developers face is 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



Process monitoring. Photo Courtesy of Endress + Hauser.



More power in your process automation



Endress+Hauser offers comprehensive sales and service support for a complete product basket of flow, liquid analysis, level, pressure and temperature measurement; recorders, system components, data acquisition and solutions utilising various communication protocols required for your applications. Furthermore, from concept to execution of the most simple to complex projects, our knowledgeable sales and project teams can offer valuable insight.

Knowing your assets and keeping them healthy is essential to optimising your plant. Using our Plant Asset Management can reduce capital and operating expenditure on assets by optimising workflow and business processes.

Tel +27 11 262 8000
info@za.endress.com
www.za.endress.com

Endress+Hauser 
People for Process Automation



Rob MacKenzie Pr Eng
managing director,
Endress+Hauser



Stephen Leatherbarrow
general manager for
renewable energy,
Robor

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.

Financing

"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, former Eskom CEO.

Indeed, the bankability of the projects has not been in called into question as all 28 first round projects of the REIPPP 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 PPP's, the IPP renewables program 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 Invest-

ment 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.

Manufacturing for the Renewables Market

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 IPP program from round one to three has also seen tariffs come down 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 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 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 con-



Solar revolution is reaching rural areas with home power stations by Econet. Photo Courtesy of Econet .

tent 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.

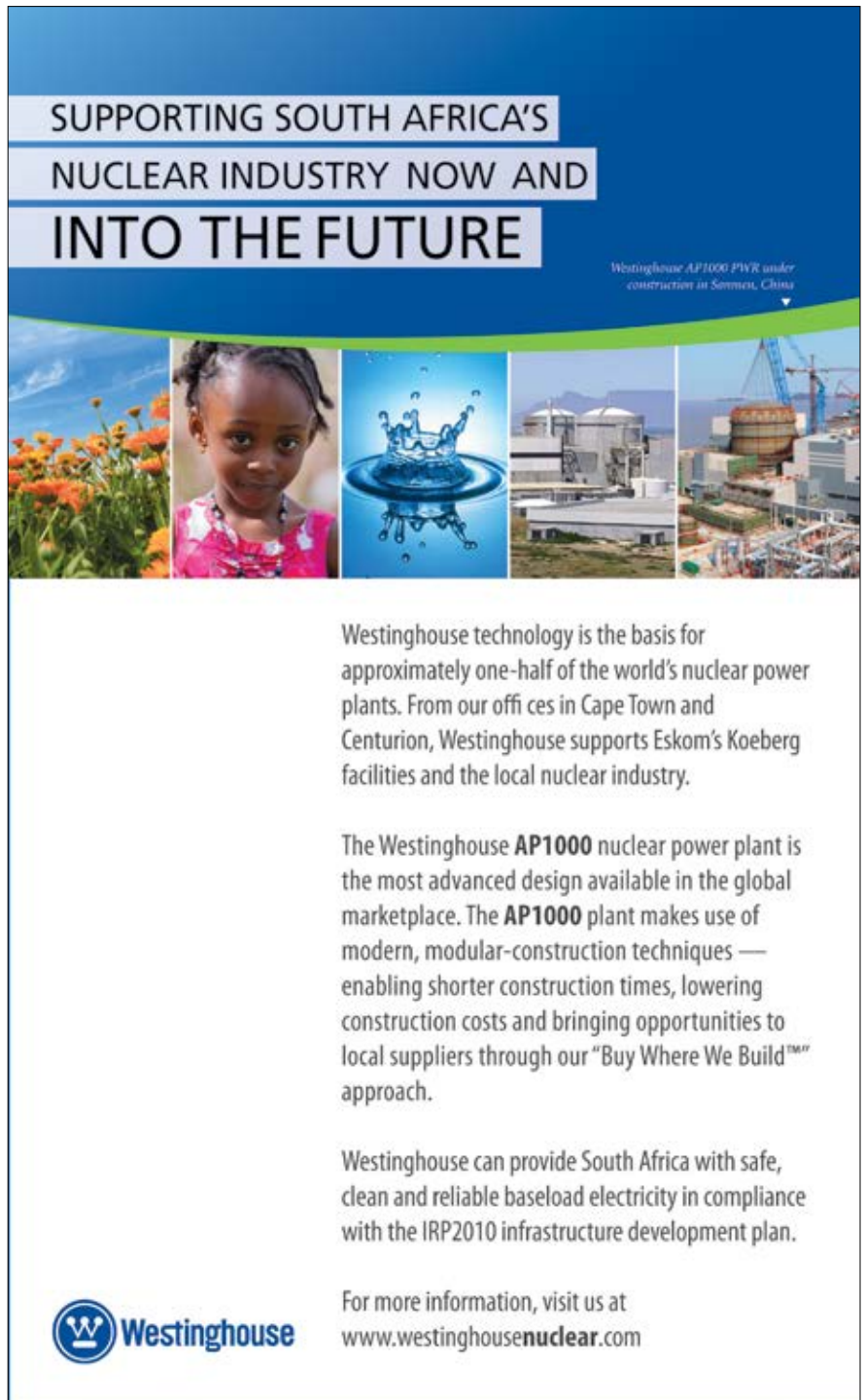
Coal the Present and Gas the Future

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 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."


Yet, while coal is an important resource for base load, the expectations are that, post 2020, the focus will shift significantly. "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. "There are many new opportunities that are presenting themselves such as gas which is a better alternative to coal." Stephen Moore, CEO of MHPSA, a merger between Mitsubishi Heavy Industries and Hitachi, said: "MHPSA are focused on thermal power so we are keen on pushing that



SUPPORTING SOUTH AFRICA'S NUCLEAR INDUSTRY NOW AND INTO THE FUTURE

Westinghouse AP1000 PWR under construction at Somerset, China




Westinghouse technology is the basis for approximately one-half of the world's nuclear power plants. From our offices in Cape Town and Centurion, Westinghouse supports Eskom's Koeberg facilities and the local nuclear industry.

The Westinghouse **AP1000** nuclear power plant is the most advanced design available in the global marketplace. The **AP1000** plant makes use of modern, modular-construction techniques — enabling shorter construction times, lowering construction costs and bringing opportunities to local suppliers through our "Buy Where We Build™" approach.

Westinghouse can provide South Africa with safe, clean and reliable baseload electricity in compliance with the IRP2010 infrastructure development plan.

For more information, visit us at www.westinghousenuclear.com



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 as announced by President Jacob Zuma in his state of the nation address in February. Regulations should be an-

nounced soon, followed by a process of licensing. According to the US 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 potential of shale gas discovery is held as one of the main reasons for the nuclear build delay, as it will be much a less costly and timely solution. Commitment from large multinationals such as Shell to shale

gas exploration serves as an indication of the confidence in this energy source in South Africa.

Nuclear

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 (6,660 MW) 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 2025-2030, 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.

The Region

South Africa’s importance in Africa’s power sector cannot be overstated. “Coun-



Greater than the sum of all parts

MHPSA > Σ {part₁; part₂; part₃...part_n}

Introducing Mitsubishi Hitachi Power Systems Africa (MHPS Africa), celebrating the joint venture of Mitsubishi Heavy Industries Ltd. and Hitachi Ltd’s Thermal Power Businesses. These two pioneers in engineering each bring their technological superiority and formidable manufacturing capacity into the formula. We, as **MHPS Africa**, are united through our commitment to product excellence, our dedication to the growth of the African economy, our drive to empower local communities and our promise to develop our people. **MHPS Africa** is truly set to be greater than the sum of its parts.

MITSUBISHI HITACHI POWER SYSTEMS AFRICA (PTY) LTD.

Building 10, Country Club Estate
21 Woodlands Drive, Woodmead, Sandton
Tel: +27 11 260 4300 Fax: +27 11 804 1137
Email: info@za.mhps.com
www.za.mhps.com



Stephen Moore,
CEO, Mitsubishi Hitachi
Power Systems Africa



Dr. F. P. Wolvaardt,
managing director,
Westinghouse
South Africa

tries 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.

Conclusion

While there is still a long and challenging road ahead for South Africa on its way to once again become a regional energy hub, the sector holds great potential, especially in light of the success of the IPP renewables program which proved that the South African energy sector can build investor confidence and that new programs in coal, gas and nuclear are attainable if rolled out in the same transparent and efficient way. •



YOUR BEST SOLAR PRODUCT SUPPLIER FROM ASIA

EGE is one of the leading manufacturers and exporters of renewable energy devices from China.

We create, develop and produce solar products that convert sunlight into electricity for different applications. We are exporting our products to the major market in the world such as France, Italy, Germany Brazil, Ghana, Angola, Slovenia or Mexico.

Eco Green Energy offers solar energy products for any kind of market, from small applications intended for individuals, up to very large government projects. We are also able to produce in large quantities to meet a growing demand. Thanks to extensive research and a commitment to development, Eco Green Energy continues to push the limits of production volumes.



Eco Green Energy (EGE)

Jin Tang Mansion #601

198 Gong Nong Road

Jiangsu, Nantong 22 6007

China

Tel: (+86) 513 - 8523 3508

Fax: (+86) 513 - 8523 3408

Email: info@eco-greenenergy.com

Website: www.eco-greenenergy.com