

# ESKOM:

## POWER DELIVERY PROJECTS

[www.eskom.co.za](http://www.eskom.co.za)

CORPORATE BROCHURE



# Super highway for energy

With Eskom's New Build Programme forging ahead, Jeff Daniel talks to Johan Bornman, acting general manager for Power Delivery Projects (PDP), the Eskom department responsible for the building and refurbishment of transmission lines and substations in South Africa

“ By increasing the potential of the transmission line to 765kV, the network operates more efficiently ”

P

DP was established in 2005 and is divided into four portfolios—three based on geographical coverage: Northern, Central and Cape, and the fourth responsible for the new 765kV integration. This includes the integration of the new power stations into the national grid. PDP builds lines and substations and refurbishes others; it also has the task of building the popular 765kV transmission network, which will benefit the transfer of power from Mpumalanga down to the Western Cape. The main focus is on 400kV and 765kV with also some 275kV lines. There is also major power stations integration, including the Medupi, Kusile and Ingula power stations.





## Technological Experts in our Field

Technology (tk-nl-j) the scientific method and material used to achieve a commercial or industrial objective.

Technology affects us in a number of ways, driving us to continually improve the product that we offer to our customers through more cost effective solutions without taking shortcuts. Powertech Transformers manufactures the entire range of transformers from 16kVA up to 800MVA including miniature substations and NECRT's.

Johannesburg +27 11 835 1011

Cape Town +27 21 534 2681

Pretoria +27 12 318 9911

Durban +27 31 702 2861

[www.pttransformers.co.za](http://www.pttransformers.co.za)

[info@pttransformers.co.za](mailto:info@pttransformers.co.za)

**Powertech**   
Transformers

This department is entrusted with a massive budget stretching to tens of billions of rand, all in different phases of development and execution. PDP is currently working on 22 projects and schemes in execution on 51 sites around the country. The department has a total 209 permanent staff, complemented by the contractors total personnel pool of approximately 4,300. The number of sites will increase to about 80 sites at the end of 2011; and personnel will also increase to between 7,000 and 8,000. PDP prides itself on its mottos: "Passionate about safety; deliver and celebrate success" and "Powerful team—aligned, cohesive and fearless", ensuring that Eskom stays recognised as one of the top utilities worldwide. Since inception, this department has built 3,103 kilometres of lines and

### Powertech Transformers

Powertech Transformers, previously known as ABB Powertech Transformers, is 80 per cent owned by Power Technologies (Pty) Ltd (Powertech), the largest power-electrical group in Southern Africa and 20 per cent owned by Power Matla. Powertech is a wholly owned subsidiary of Altron (Allied Electronics Corporation Limited). Powertech is focused on delivering advanced technologies for the creation, management, distribution, storage and use of electricity across industries. Power and distribution transformers for the African continent are manufactured by Powertech Transformers at its operations in Pretoria West, Cape Town and Johannesburg.





**Supplier of:**  
Eskom South Africa approved products

- \* Glass Disc Insulators
- \* Earthwire & Guywire Ropes
- \* Optical Fibre Ground Wire (OPGW)

**Agent & Distributor of:**

- \* ACSR, AAAC, ABC Conductors
- \* Substation Clamps
- \* Power Transformers
- \* Capacitors & CT/VT
- \* Hardware Fittings
- \* Wind Power Turbine & Generators

**GOLDEN DYNASTY S.A. (PTY) LTD**

Tel: +27 11 453 4466 Fax: +27 11 453 3314

E-mail: [gordon@goldendynasty.co.za](mailto:gordon@goldendynasty.co.za)



15,670MVA as at the end of January 2011.

Power transmission is the movement of electricity from the point of generation to a substation from which it can be distributed to consumers. The focus is on SA grid code compliance and to ensure the country has an uninterrupted power supply to support mines and industry, rural development, government objectives for growing the economy, job creation and domestic customers. The ultimate objective is to ensure excellent customer service.

Acting general manager for PDP Johan Bornman explains: "Normally, long distance transmission networks operate at 275 or 400kV but the further you go, the greater the loss of power. By increasing the potential of the transmission line to 765kV,

### Golden Dynasty SA

GDSA is based in Johannesburg, South Africa. Competitive offers and quality services to our clients is first priority.

the network operates more efficiently. It's an expensive exercise because everything needs to be built on a much larger scale and it's the sort of solution only justified where particularly long distances are involved or where a huge quantity of energy needs to be transmitted. To the best of our knowledge, we are one of only seven countries in the



**RUGGEDCOM**  
INDUSTRIAL STRENGTH NETWORKS™



RuggedCom designs and manufactures reliable Rugged communication equipment that have set the standard for Rugged communications networks deployed in harsh industrial, military, utility and ITS environments.



H3iSquared bases its business dealings on the qualities built into its name:

**Honesty  
Humility  
Humour  
Integrity Squared**

H3iSquared offers a wide range of IP based products aimed at the industrial, utility, military and ITS worlds.

Tel +27 (11) 454 6025  
E-mail: [Info@\[H3iSquared.com](mailto:Info@[H3iSquared.com)  
[www.h3isquared.com](http://www.h3isquared.com)



**GAI-TRONICS**  
A division of Hubbell Limited



GAI-Tronics Voice over Internet Protocol (VoIP) telephones provide simple network connection without the need for telephone adaptors and extends VoIP access into the harshest environments.



**IVC**  
Industrial Video and Control



IV&C is a leading manufacturer of IP video solutions for industrial, marine, commercial and security applications. The use of Analogue-to-IP encoders allows easy integration of legacy cameras into IV&C's software, and with Active-X IV&C can be integrated into any SCADA software.



**SigniFire**



With embedded intelligence, the IP video camera can see and recognize smoke, flames and motion while monitoring large spaces at great distances. It identifies the event in seconds, sends live video to remote locations, triggers fire alarms, while recording forensic evidence crucial for future fire investigations.



### H3iSquared

H3iSquared is a company that bases its business dealings on the principles built into its name: Honesty, Humility, Humour and Integrity<sup>2</sup>. These principles, along with excellent knowledge, experience and world class leading product ranges, allow H3iSquared to provide equipment and service exceeding that of world class standards. H3iSquared distributes and supports ruggedized ethernet switches, routers and serial device servers; IP camera solutions with bandwidth management control aimed for use on industrial, utility, military and ITS networks; ruggedized telephony equipment able to tie into analogue or VoIP infrastructures; and a host of software for monitoring processes, control, networks or sites.

world that utilises the 765kV platform extensively.”

Everything about a 765kV transmission line is bigger and more costly than at 400kV, but it's a system that does offer real economies of scale. The towers stand higher and wider but can transmit more than three times the amount of energy.

“With 765kV,” says Bornman, “the three phases need to be held almost twice as wide as 400kV with regard to air insulation. Each phase has six 27mm diameter steel cored aluminium conductors in a hexagonal configuration, and it's been calculated that the total amount of cabling strung over the last three years—just over 1,100 kilometres—would stretch halfway around the world. The balance of the 3,103 kilometres was done of 400kV and 275kV which makes up for stringing conductor around the other half of the world. Thus we have now gone around the world with all the conductor strung to date.”

On the 765kV, the balance of the 1,800 kilometres is due for completion by 2013. Along the route there are a series of strategically placed transmission substations where the load can be distributed to centres of activity where it's needed.

The increase in activity in PDP has been truly staggering, doubling each year since the department was formed in 2005. However, just like in any project

### SOS Industrial Electronics

SOS Industrial Electronics has been supplying various divisions of Eskom for the last 25 years. Our main product line is AC power supplies, DC-DC converters and DC distribution panels. We have the ability to design and manufacture equipment for special applications. In addition we hold ISO9000:2008 rating and are a level one B-BBEE contributor.



Switch-mode Power Supplies



Isolating DC-DC Converters



DC Distribution Panels



Balun Transformers



**Made in South Africa**

S.O.S.

INDUSTRIAL  
ELECTRONICS

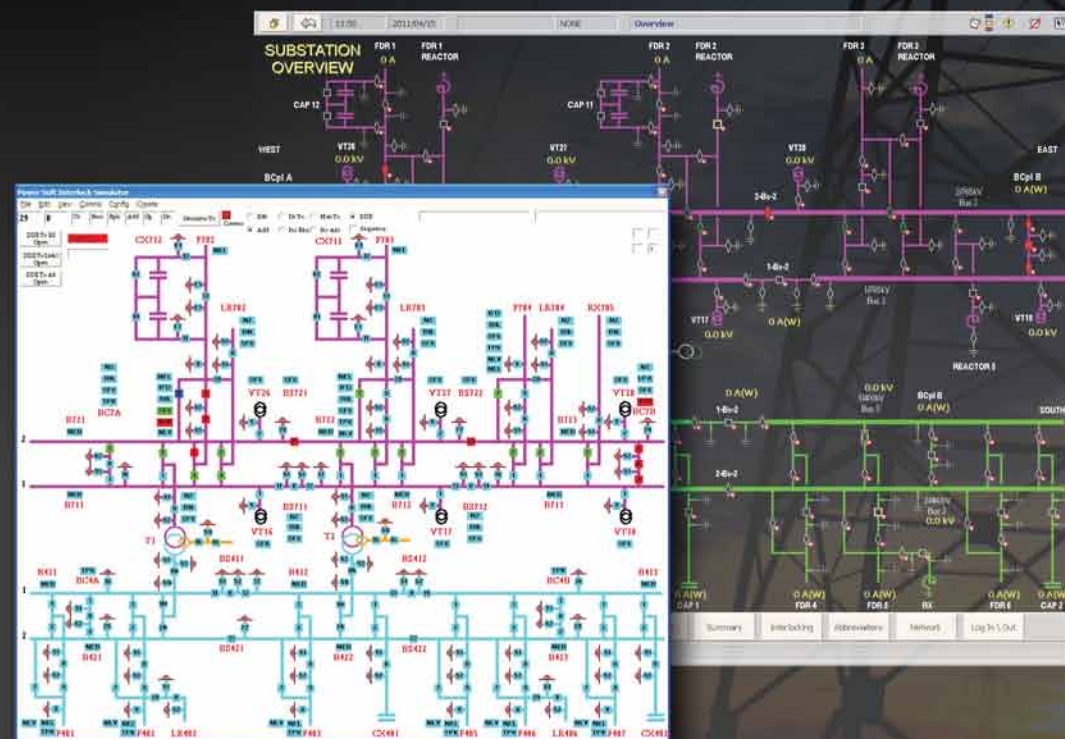
P.O. Box 10150, Centurion, 0046, 32 Panorama Road, Rooihuiskraal x1, Centurion, 0154, South Africa  
Tel: +27 12 661-6295 Fax: +27 661-3990

See our catalogue on-line at: [www.sos-ind.co.za](http://www.sos-ind.co.za)

# Substation Interlocking

Drastically reduces the development time, cost and risk of human error in the development of substation interlocking systems by:

- Entering interlocking rules graphically
- Simulator generates interlocking logic documentation automatically
- Simulator automatically generates interlocking software code for different platforms
- Simulator automates interlocking system testing by simulating all plant inputs of all interlocking equations



environment, PDP is faced with some challenges which include servitudes acquisition and environmental issues. These possible delays are mitigated through the application of different procurement strategies, ensuring the deployment of more contractors and resources allocation. If this is done, there can be a depletion in the number of contractors available for the remaining work. PDP has realised this risk and proactively started three years ago with a Lines, Civil and Electrical Construction Forum, where all vendors are informed about new project releases and enquiries that are forecasted. This ensures a sustainable platform is built where growth is triggered in the construction industry through active partnering. This kind of workload impacts throughout the chain

of command, as there is a direct correlation between the amount being spent and the number of individuals needed to work on the project. Bornman and his team maintain a close partnership with these contractors. “With such a workload,” he says, “coupled with a general skills shortage, all those involved need to plan ahead to avoid skills shortages.”

In terms of the projects synopsis in this five year window ending 2013, the transformers capacity installed will reach 20,600 MVAs. In total, the transmission lines will total 4,000 kilometres.

It is also important to note Eskom itself does not construct the line but carries out detailed design and procurement and management

Tel: +27 12 998 4991  
Fax: +27 86 505 6471

Mobile: +27 82 923 3504  
E-mail: theun@psis.co.za

**POWERSOFT**



# From concept to completion NETGroup has the solutions...

## Our key deliverables for your power system needs:

### Quality Engineering Consulting Solutions

We provide the following services and solutions on transmission, distribution and industrial infrastructure:

- Engineering, Procurement and Construction Monitoring Services (EPCM)
- Turnkey Solutions (EPC)
- Specialist power system testing, measurement and analysis
- PTM&C consulting, design and commissioning services
- ICAP, SCADA and substation automation solutions
- Project and Program Management Services
- Renewable energy design and network integration study services

### Expert Utility Management Consulting

We provide the following services and solutions to electricity distributors:

- Geospatial load forecasting
- Power System master planning, Network development planning and Refurbishment planning
- Technical information system services, including strategy and system blueprints, process development services and data management services
- Utility technical management, restructuring and turn-around services

### Reliable Energy and Revenue Management

We provide the following services and solutions to electricity retailers:

- Field data capturing
- Meter management
- Customer data management
- Billing data quality analysis and management
- Load demand management
- Energy efficiency

### Focused Electricity Industry Training

Our subject matter experts (SME's) present the following accredited power system courses to power system practitioners:

- MS Excel for Engineers, CESA-076-06/2013 – 2 CPD points
- Power GLF load forecasting, CESA 010-06/2011 – 3 CPD points
- Power System protection, CESA-079-05/2013 – 4 CPD points
- Power System calculations, CESA-080-08/2013 – 3 CPD points
- Instrument transformers, CESA-078-08/2013 – 2 CPD points
- Other CPD accreditations pending

For more information phone George Mahlangu on 082 610 6691 or Pieter Conradie on 082 650 5443 or go to [www.netgroup.co.za](http://www.netgroup.co.za)

Member of CESA



Level 3 BBBEE



CIDB accredited



functions. In order to save costs, Eskom procures all its conductor, hardware and insulators to be used by various contractors. “Our role is to design, procure and manage,” Bornman says. “In line with our contracting strategy, we put together a complete bill of quantities and construction package that specifies all the necessary details for the construction tender. The actual supply and construction of the transmission line and substation work is left to specialist contractors.”

With much of the work on the 765kV lines being carried out at heights of 50 metres, there is a greater risk of accidents and injuries. Therefore great emphasis is placed on working with contractors to ensure that they carry out the proper procedures and supervision of work so that incidents are avoided. “At some point our LTIR ratio (lost time incident rate) was unacceptably high. We have a target of 0.4 and at its worst the figure hit 0.74. However, through hard work and partnerships with our contractors, the efforts we have put in are bearing fruit as the current figure is down to 0.3. This is testimony that safety is a priority in all our projects.”

A number of innovative proactive measures were taken. PDP has formed a Contractor SHEQ Forum with the whole construction industry, where the





**Makhwanazi Electrical Contractors cc**



Tel: (011) 362 6718 / 6792  
 Fax: (011) 362 6719  
[www.makhwanazielectrical.co.za](http://www.makhwanazielectrical.co.za)



**Makhwanazi Electrical Contractors is a black owned company with a focus on the provision of products and services for medium to high voltage systems.**

*We specialise almost exclusively in:*

- ★ The building substations and refurbishments
- ★ Electrification and building of lines up to 400kV,
- ★ Cabling (HT&LT)
- ★ Electrical maintenance
- ★ HT joints & terminations
- ★ Transformers maintenance & minisubs
- ★ Installation of street lights
- ★ Meter audit

Makhwanazi Electrical Contractors has the necessary skills and experience available to provide servicing, maintenance and repair services.



ACHIEVING  
**Business excellence**  
 ONLINE

Bringing you the **REAL-LIFE** STORIES of world class companies from across the globe

**REGISTER FREE**  
 to receive exclusive content

[www.bus-ex.com](http://www.bus-ex.com)




industry is informed about the detailed requirements, latest developments and strategies being developed. This is done quarterly. PDP has actively formed working groups with the construction industry in developing strategies and solutions for issues like sub-contractor


management, training due to language barriers, supervising skills, design for safety and risk assessments. In addition, through reviews and utilising panel interviews, PDP interacts with the worst performing contractors to establish



solutions for a turnaround.

Apart from focusing on making sure that new transmission lines and substations are built, PDP, together with its contractors, always gives back to the communities. A number of corporate social investment projects have benefited communities and improved the lives of local people. PDP constantly partners with contractors to identify needs in rural communities, with initiatives executed through the contractors. Bornman concludes: "This is part of the legacy to South Africa that our teams are delivering. These projects are in the interest of the country and we have the duty to execute them in a professional and safe manner, building Eskom's image and reputation." [www.eskom.co.za](http://www.eskom.co.za)





Aon South Africa is Eskom's Risk and Insurance Advisor of choice. Eskom entrust the "POWER" of South Africa in Aon's ability to produce a tailor-made insurance solution for their power generation projects.

Aon has designed an all encompassing composite floater construction insurance programme to cover the construction related insurances for all of Eskom's power generation and distribution infrastructure into the next decade.

**Risk Consulting**  
**Insurance Broking**  
**Employee Benefits**  
**Actuarial Services**  
**Reinsurance**

**Contact: +27 11 944 7000**  
**[www.aon.co.za](http://www.aon.co.za)**  
Authorised financial services provider # 20555



**ARGA**  
Patternmakers (Pty) Ltd




**ARGA BATTERY STANDS**

The company, started in 1973 by Garry Daniels and Arthur Simpson, designs and manufactures battery stands/ racks of different types for Eskom and other clients in South Africa. They are made from SABS approved, and Eskom approved, South African materials, painted with chemical resistant, black paint and supplied in knock-down, easy to assemble kits.



**We also make Kwikstart Firelighters**



**Tel: 0027 11 609 1305**  
**Fax: 0027 11 452 6032**  
**E-mail: [arga@telkomsa.net](mailto:arga@telkomsa.net)**  
**Enquiries welcome**

ESKOM:

POWER DELIVERY PROJECTS

[www.eskom.co.za](http://www.eskom.co.za)