



# ELECTRICAL ENGINEERING CAPABILITY STATEMENT

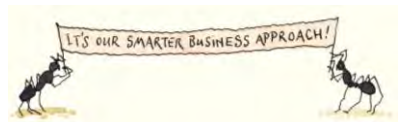


$V/V_u + T/(0.53 A_b f_u) \leq 1.0$   
 $P_s = (RTI)_{eq}$   
 Shear = 0.80 V

$\gamma_{xy} = \partial v / \partial x + \partial u / \partial y$   
 Engineer shear strain is the **total** shear strain, i.e.,

$\epsilon_{xy} = (\partial v / \partial x + \partial u / \partial y) / 2 = \epsilon_{yx}$   
 Shear strain tensor is the **average** of two strains, i.e.,

45°  
 M  
 ±





**BIGEN  
AFRICA**

**BIGEN AFRICA SERVICES (Pty) Ltd**

## ELECTRICAL ENGINEERING

### Engineering Services

Access to efficient sources of energy is critical to South Africa's economic well-being and future growth. While 70% of the population has access to electricity – well above the SADC average of approximately 20% - nearly half of rural households do not have power. The South African Government has prioritised performance in the sector with a clear target of providing the entire country with electricity. To give effect to this intention, the electricity distribution industry is being restructured by consolidating suppliers into Regional Electricity Distributors or REDs.

The National Electricity Regulator is supervising all electricity providers' progress towards this target. A section of the population is benefitting from the Government's reduced electricity tariff for the poor, introduced in November 2001, thereby assisting in achieving the national energy efficiency targets.

**BIGEN AFRICA** – a leading multi-disciplinary group that provides engineering, management consulting and project finance solutions to a wide range of public and private sector clients – has built up extensive experience and expertise over many years in bulk electrical services and electrical distribution infrastructure.

In addition to the design, documentation, administration and commissioning of electrical bulk distribution and infrastructure systems, we specialise in:

- Strategic and Master planning of electrical bulk consumption requirements and infrastructure; Electrical load studies;
- Energy efficiency studies;
- Feasibility studies for new infrastructure development;
- Technical inputs for bulk services and distribution layout planning;
- Total cost analysis of proposals including capital cost, operation and maintenance cost, and cost impact on users;
- Project financing and cost recovery;
- Electrical system protection;
- Electrical Network Asset Management;
- Policy issues and institution support.

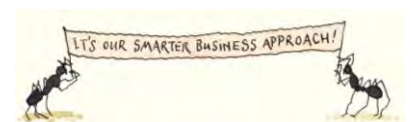
#### The BIGEN AFRICA Electrical Engineering Team

The Electrical Engineering team has the experience, capability and expertise to provide clients with professional services and customised solutions in all electrical projects.

**Areas of expertise:** Electrical engineering, electrification design, asset management, energy efficiency and project management.

**The team:** Team leader Corrie van der Wath (Pr Tech Eng, Pr CPM) is a graduate professional electrical technologist with 18 years experience in electrical engineering. Team members are Anton Boozyen (Pr Eng), GCC and Johan Pieters (Pr Eng), CEM.

**The electrical engineering team has access to a network of professionals who provide knowledge and expertise to support the execution of specialised projects.**





## Our Value – Add Proposition

Our **integrity**, **commitment**, desire to serve, passion for excellence, **empowerment**, **innovative** and **creative** working environment provides our specialist, multi-disciplinary teams with a solid foundation to implement successful projects for our clients.

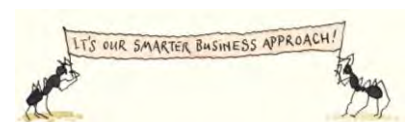
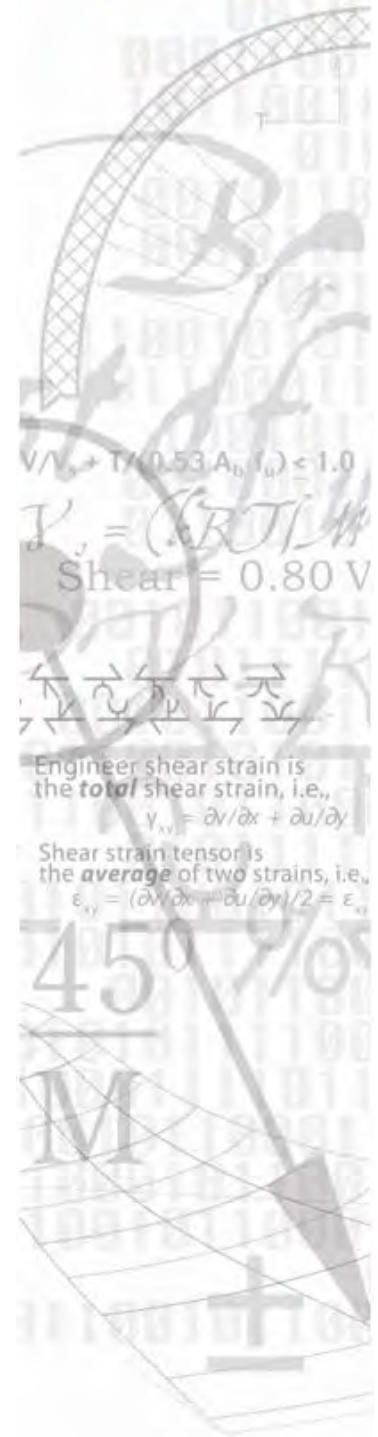
## Our Track Record

Bigen Africa has been involved in an extensive range of electrical infrastructure projects. We have successfully completed the planning, design, project management and construction supervision of large-scale projects for a number of clients. Our services included development planning and design, costing, process implementation to direct and manage existing infrastructure growth, key intervention process identification and implementation to guide public funding and preparing proposals for upgrading and developing electrical infrastructure.

### Relevant experience, effective application

The table below profiles the skills, expertise and experience brought to bear by our multi-talented electrical engineering team in the successful implementation of the following projects:

Vlakfontein Electrification and Street Lighting	Client: City Power. Turn-key project that encompassed all aspects of design, project management and construction for the electrification of 4 000 household stands and the provision of street lighting for the entire township located in the western suburbs of Johannesburg. This included the design of bulk electrical supply to the township, MV line routing within the township and electrical power reticulation design to each household. Careful design considerations allowed for the simultaneous implementation of street lighting in the area. The beneficiaries are from the poorer spectrum of the South African community and the project supported Government's reconstruction and development vision.
Roodeplaat Water Supply Scheme	The project entailed a comprehensive, detailed design of the electrical requirements for the Temba Roodeplaat Water Supply Scheme to increase the available maximum energy supply capacity to the Roodeplaat Water Treatment Works from an existing 3.2MVA to 8.2MVA. This was done by extending the existing Zeekoegat substation and providing new substations at the newly constructed High Lift Pumpstation and Raw Water Treatment Works. The design provided for the 11kV bulk supply from the Pumulani 88/11kV substation to the respective plants and incorporated the various protection schemes and devices.



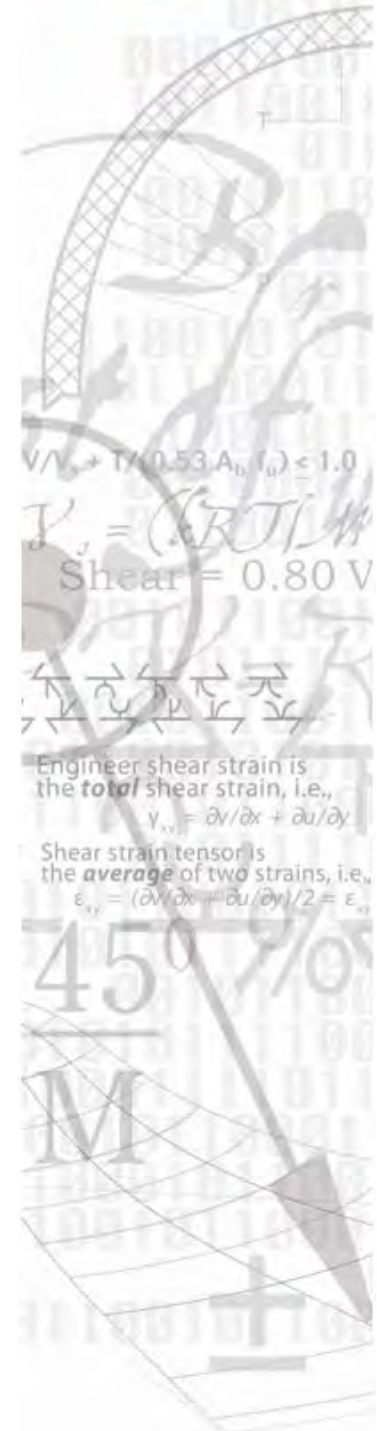


Nonyane Substation	The existing Nonyane substation was overloaded and regular outages occurred, especially during winter. A new 33/11kV substation consisting of 2 x 10MVA transformers was planned and constructed. The immediate problem was resolved by installing a temporary 33/11kV, 5MVA transformer in the existing substation until completion of the new substation.
Winterveldt to Vuka 33kV line	This project involved the design, procurement, construction and project management of approximately 6.1km of single-circuit 33kV "Kingbird" line teeing off from the Winterveldt, Mabopane East line to Vuka substation. The line supplies approximately 50MVA to the Winterveldt area and provided 50 000 new households with electricity.
Master Plan Development	The purpose of the Master Plan is to provide a single document highlighting the various electricity infrastructure development needs. It identifies the varied programmes and project timeframes of stakeholders, and highlights the measurable deliverables on a short-term, mid-term and long-term basis.
Asset Management	In the current economic climate capital to install new infrastructure is becoming scarce. The Bigen Electrical Asset Management process is tailored to ensuring that clients, in particular local authorities, get the maximum benefit from their assets.

### Design and Construction Projects

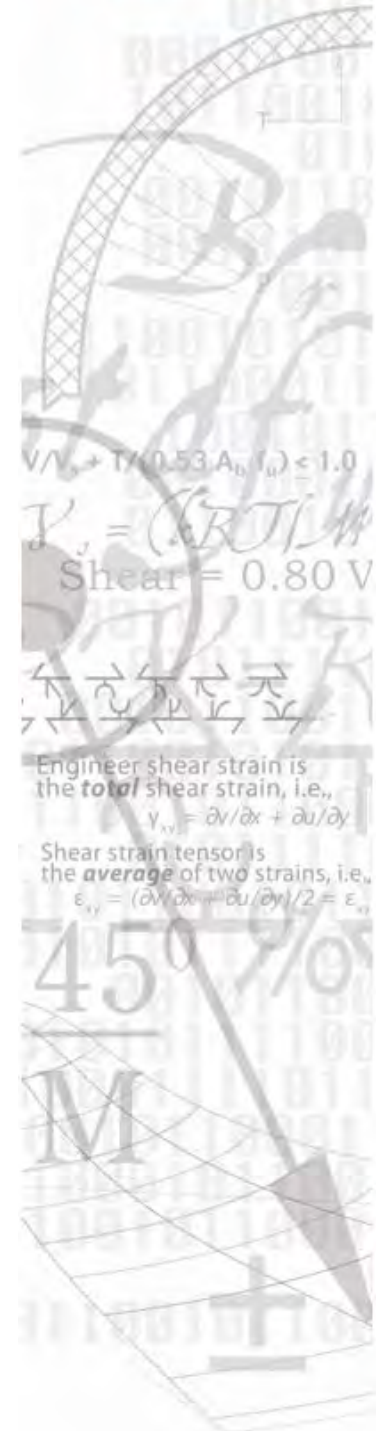
**BIGEN AFRICA** provides design and construction supervision services directly or with joint venture partners on projects. The turnkey design and construction methodology was refined by Bigen Africa in 2002. This included setting up a legal framework and contractual basis for the contracts as well as the development of reporting structures and standardised documentation and procedures. Since the inception of the turnkey design and construct programme in 2002, Bigen Africa has refined the turnkey contract structure to suit various local government structures and varying types of work. Additionally, standardised documentation, invoicing, quality and safety management and reporting procedures have been further enhanced and developed.

Project	Description	Period	Budget
Electrification of Pennyville Township	Electrification of new township developments in the area and the design of an additional 88/11kV substation for bulk supply requirements.	2006 – 2009	R60 million
Electrification of Lehae Township	Electrification of 3000 stands and the development of an 88/11kV substation for bulk supplies.	2008 – 2009	R20 million
Electrification of Soshanguve Township	Jointly conducted with a private development consortium, with the local community and Local Government as stakeholders. Project comprised the development of mixed bonded and subsidised government housing on 15 000 stands, implemented in a phased manner. Other facilities and amenities envisaged include schools and business areas.	2006 – 2010	R150 million





Project	Description	Period	Budget
Electrification of Alexandra X 7 Township	Electrification of 1400 stands and the installation of public lighting.	2008 – 2009	R12 million
Electrification of Olievenhoutbos Township	The electrification of 6 000 stands, which is part of the further development of Olievenhoutbos Township between Johannesburg and Tshwane.	2006 – 2008	R60 million
Electrification of Kosmosdal Township	The project comprised the mixed development of approximately 1 000 residential stands and three industrial areas.	2006 – 2008	R30 million
Electrification of Doornkop Greenfields	Client: City Power. The project is the largest by Bigen Africa Services for the client. The scope involves the provision of electricity supplies, both at MV and LV, for about 20 000 end-consumers in an area that is being developed as a mixed residential township and wide-scale amenity and business site cluster. Bulk supply source. Negotiations with Eskom have been concluded for the provision of the initial bulk supply point at 132kV.	2007 – 2011	R300 million



## Contact Details

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