Preparation of our local engineering construction industry in participating in the nuclear new-build fleet programme
AGENDA

• Aveng Overview

• Nuclear power station construction

• Conventional power station construction

• Mobilizing South Africa's construction capability for our nuclear new build fleet
Aveng Group is actively working to increase its geographic footprint in Africa and the Middle East and is expanding into new industries including Power and Water.

Aveng aims to be a leading infrastructure development company providing a diverse range of construction, infrastructure and engineering products, services and solutions for customers, sustainable profitability for shareholders and a great place to work for employees.

Aveng works actively in over 28 countries.

Employs over 34,500 people.

Involved in building iconic structures and landmark buildings in many developing world economies.
### WHO ARE WE?

| **We have** | **A proud history spanning more than 100 years**  
**Operations in construction and engineering, opencast mining, manufacturing and processing** |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>We are</strong></td>
<td><strong>The largest JSE listed construction company (since 1999)</strong></td>
</tr>
</tbody>
</table>
| **We**      | **Employ more than 34 500 people**  
**Work actively in more than 28 countries**  
**Reported revenue of more than (US$5 bn)R34 billion  ended June 2010** |
| **Our**     | **BEE Empowerment rating is a value added Level 3 (138% procurement recognition) for our South African operations**  
**Ownership includes a broad range of leading global institutions and mutual funds** |
| **We have built** | **Many of the iconic structures, landmark buildings, bridges, dams, airports and the majority of SA’s power stations that form the backbone of the South Africa today** |
## GROUP AT A GLANCE

### Aveng Grinaker-LTA
- Construction and engineering: South Africa and Africa
- Building
- Civil engineering
- Concessions
- Earthworks engineering
- Mechanical and electrical
- Mining
- Property development

### McConnell Dowell
- Construction and engineering: Australasia and Pacific
- Civil and marine
- Electrical
- Mechanical
- Pipelines
- Tunnelling and underground

### Aveng E+PC Engineering and Process Company
- Construction and engineering: South Africa and Africa
- Minerals processing
- Operations
- Power and energy
- Water treatment

---

**HOME WITHOUT HARM**
**EVERYONE EVERYDAY**
## GROUP AT A GLANCE

<table>
<thead>
<tr>
<th>Aveng Manufacturing</th>
<th>Aveng Trident Steel</th>
<th>Aveng Moolmans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing and processing</td>
<td>Manufacturing and processing</td>
<td>Opencast Mining</td>
</tr>
<tr>
<td>Infrastructure and construction</td>
<td>Service centres</td>
<td>Operations in southern and West Africa</td>
</tr>
<tr>
<td>mining and Rail services.</td>
<td>Speciality steel</td>
<td></td>
</tr>
<tr>
<td>Reinforcing steel</td>
<td>Steel merchants</td>
<td></td>
</tr>
<tr>
<td>Precast concrete</td>
<td>Sterling tube</td>
<td></td>
</tr>
<tr>
<td>Underground support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rail Services</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NUCLEAR POWER STATION CONSTRUCTION.

KOEBERG POWER STATION
KOEBERG POWER STATION

Break water construction
The successful construction of Koeberg power station delivering power safely and successfully over the past 25 years.
KOEBERG POWER STATION
The first accumulator going into reactor containment
AVENG COMMITMENT TO NUCLEAR

- Eskom project managers responsible for Nuclear Island, Conventional Island and Balance of Plant at Aveng today to mentor our Nuclear Team.

Tom Jacobs

Dave Wynne
CONVENTIONAL POWER STATIONS BY AVENG

- Coal- Fired Power Station construction
- Hydro electric dams construction

- HWANGE
- MUELA
- DRAKENSBERG
- TUTUKA
- HENDRINA
- CABORA BASSA
- CAMDEN
- MATIMBA
- MAJUBA
- KRIEL
- KENDAL
- LETHABO
- KOMATI
- MATLA
- INGULA
- DUVHA
- MEDUPI
- KUSILE
## Major quantities:

- 40 No. 1200 dia piles
- 27,300m² sliding formwork
- 728t mild steel flues

### Table:

<table>
<thead>
<tr>
<th>Client:</th>
<th>Location:</th>
<th>Duration:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eskom</td>
<td>South Africa</td>
<td>January 2007 to September 2008</td>
</tr>
</tbody>
</table>

Design and construction of a 220m high reinforced concrete multi-flue chimney incorporating two flues, including the design and construction of two horizontal gas ducts from the old eastern chimney and western gas duct to the new chimney.
**Client:** Hamon Thermal Engineers and Contractors  
**Location:** Zimbabwe  
**Duration:** April 1996 to March 1999

Construction of natural draft cooling tower 100m dia high, with associated pump bay, C.W. ducts, buildings and filter structures.
MUELA HYDROPOWER PROJECT - LESOTHO

Major quantities:

- 52,000 m³ concrete lining
- 102,800 m³ underground excavation

Longest headrace in the world

<table>
<thead>
<tr>
<th>Client:</th>
<th>Location:</th>
<th>Duration:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesotho Highlands Development Authority</td>
<td>Lesotho</td>
<td>February 1995 to September 1998</td>
</tr>
</tbody>
</table>

Construction of a new 72MW hydro power station
MAJUBA COAL PROJECT

Client: Ingwe Coal Corporation
Location: South Africa
Duration: February 1994 to February 1995

Project management, process design, detailed engineering and design, procurement, construction management and commissioning on a turnkey basis for a coal beneficiation plant.
Client: Eskom
Location: South Africa
Duration: October 1986 to January 1991

Construction of turbine hall and auxiliary bay for units 5 and 6 for a new 665MW coal power station.
HENDRINA COAL FIRED POWER STATION
ACCESS SYSTEM AND DUST MONITORS

Client: Eskom
Location: South Africa
Duration: August 1990 to February 1991

Design, supply and installation of a CAT ladder, platform access and dust monitors. Construction of two 155m high chimneys.
Client: Titaco
Location: South Africa
Duration: May 1989 to July 1989

Construction of civil engineering works for an ash handling plant including pipeline plinths.
KENDAL COAL FIRED POWER STATION CHIMNEY NO. 2

Client: Eskom
Location: South Africa
Duration: November 1986 to September 1988

Design and construction of a 275m high chimney, supply and installation of structural steel flue inlets, staircase tower, louvres, electrical installation and lightning protection.
TUTUKA COAL FIRED POWER STATION CHIMNEY NO. 1

Client: Eskom
Location: South Africa
Duration: May 1983 to December 1984

This project was awarded the 1983 Fulton Award for excellence in the Civil Engineering category.

Construction of a 269m high concrete windshield with internal platforms supporting the three internal brick flues, supply and installation of structural steel flue inlets, staircase tower, louvers, electrical installation and lightning protection.
Client: Eskom
Location: South Africa
Duration: May 1982 to September 1984

Construction of a 269m high concrete windshield with internal concrete platforms supporting the three internal brick flues, supply and installation of structural steel flue inlets, staircase tower, louvers, electrical installation and lightning protection.
Client: Fuller F L Smith
Location: South Africa
Duration: October 1990 to August 1991

Construction of civil engineering works for the wet ash handling plant
Client: Eskom
Completion: 1983 - 1988

Project scope:

• Six cooling towers, each turbine generator of 600MW with 135m high reinforced concrete hyperbolic shells

• Construction of bulk coal stockyard terrace for the 3600MW power station

• Complete civil works to station foundations, boiler and fan foundations, turbine generator blocks, including columns and foundations, cooling water pipe work and pump houses including all buildings, drainage and high voltage yards
The project won The Star Business Award for the most outstanding achievement in the construction industry.

**Client:** Eskom  
**Location:** South Africa  
**Duration:** November 1976 to October 1981

Excavation and construction of an underground 1000MW power station housing the valve hall, machine hall (196m long x 16.3m wide x 50m deep) and transformer hall.
### CABORA BASSA HYDRO-ELECTRIC SCHEME

<table>
<thead>
<tr>
<th><strong>Client:</strong></th>
<th><strong>Location:</strong></th>
<th><strong>Duration:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hidroelectrica de Cabora Bassa</td>
<td>Mozambique</td>
<td>October 1969 to June 1977</td>
</tr>
</tbody>
</table>

Construction of an underground power station complex with a 220m long x 28m wide x 60m high machine hall.
MEDUPI & KUSILE COAL FIRED POWER STATIONS

- Civil Works
- Chimneys and Silos
- Balance of Plant
- Ash Conditioning
- Boiler steel supply
- Mech, elec and piping - Turbines
CONVENTIONAL POWER STATION CONSTRUCTION

• Familiar – yet always developing
  – Coal, Wind, Gas, Solar, Hydro, Pump Storage
  – These will continue to be constructed as per IRP 2010 Rev 2

• Project Management becomes more professional with each project

• Home without harm everyone everyday – safety at all times

• Methods, Tools are in place and continue to develop

• Standard and Codes - Construction, Pressure vessels, lifting, etc

• International Supply Chains in place

• Cascade to all contractors via contract spec’s/terms/conditions

• Multiple contractual packages from enquiry to close out

• One day Nuclear Power Station Construction will become our “CONVENTIONAL”
Learning = Change  
Change = Learning

We are improving from a high base and will grow with the fleet

PREPARATION OF LOCAL ENGINEERING CONSTRUCTION INDUSTRY TO PARTICIPATE IN THE NUCLEAR NEW-BUILD

NEW BUILD NUCLEAR FLEET

SA CAPABILITY

Learning = Change  
Change = Learning

Nuclear Research Facilities


CABORA BASSA  KOEBERG  DRAKENSBERG  KRIEL, MATLA, DUVHA

HWANGE  TUTUKA  CAMDEN  MAJUBA  KOMATI  INGULA

Muela  Hendrina  Matimba  Kriel  Lethabo  Matla  Duvha

CONTINUOUS IMPROVEMENT

PREPARATION OF LOCAL ENGINEERING CONSTRUCTION INDUSTRY TO PARTICIPATE IN THE NUCLEAR NEW-BUILD

We are improving from a high base and will grow with the fleet
MOBILIZING SA’s CONSTRUCTION CAPABILITY FOR OUR NUCLEAR NEW BUILD FLEET

The World of Construction

- Political
- Community/Society
- Technology
- Organisational level
- Codes & Standards
- Finance
- Environment
- Education & Training
- Global Systems
- Country level
- Individual level
### Incremental Changes

**Technology (our SA experience)**
- Methods, tools, standards
- Engineering systems
- Conventional Island
- Balance of Plant
- Marine Works
- Conventional (coal fired) to Nuclear (NECSA involvement)
- Partnering with Nuclear Technology Partner (OEM)
- Transfer of Technology

### Step Changes

**Technology (Nuclear)**
- Nuclear is nuclear not coal
- Reference plants (see it, feel it)
- Improve Records and traceability
- Modular capability (“Ship building/offshore oil rigs”)
- Accurate engineering disposition of issues needed
- Investment in nuclear manufacture
- Migrate Safety and Quality to Nuclear standards
- Sustainable Transfer of Technology
MOBILIZING SA’s CONSTRUCTION CAPABILITY FOR OUR NUCLEAR NEW BUILD FLEET

INCREMENTAL CHANGES

Codes & Standards (Coal)
- World’s largest Coal Fired Power Stations being built 6X694MW
- Migration to understanding nuclear requirements (NECSA)
- Codes & Standards of Safety and Quality (NECSA – ASME III)
- Nuclear culture step up
- Nuclear Energy Act review

STEP CHANGES

Codes & Standards (Nuclear)
- Rigorous classification, systems and components
- High level of oversight to Safety and Quality
- Verification needed before use – IT, Research, Design, Construction methods
- Changes to Regulations, Cost, Program, Attitude to Nuclear
- Needed Integrated management system as per RD-0034
MOBILIZING SA’s CONSTRUCTION CAPABILITY FOR OUR NUCLEAR NEW BUILD FLEET

INCREMENTAL CHANGES

Finance
- Fleet brings – Volumes – Pace
- Fleet brings an accelerated Learning Curve
- Improvements and modifications to Koeberg brings opportunities
- Increase Controls (Cost, Schedule, Safety)
- Developing nuclear competencies
- Funding Models (ECA)
- Sharing financial risks appetite

STEP CHANGES

Finance
- Cost increases
- Fleet Programme enables localisation
- Nuclear brings more economical base load power supply
- SA can become a Global Nuclear Vendor
- Funding models review
- Balance sheet capabilities
INCREMENTSAL CHANGES

Environment
- Nuclear safety challenges following Japan disaster
- Environment challenges to National Environmental Act
- Accepting a Nuclear build requirement in the region
- De-mystifying Nuclear to public

STEP CHANGES

Environment
- Further pre-construction environmental work and heritage interfaces will be necessary
- Implement Environmental management plan with care
- Ensure Delivery of Promises
- Embrace public opinions and concerns.
MOBILIZING SA’s CONSTRUCTION CAPABILITY FOR OUR NUCLEAR NEW BUILD FLEET

INCREMENTAL CHANGES

Education & Training
- SA Skills and qualification shortage (capacity building)
- SA Employment opportunities
- SA Commitment to educate
- SA Commitment to training
- Training centres funding

STEP CHANGES

Education & Training
- Needs for Skills traceability, certification
- Establish a Nuclear safety culture compared to coal fired power stations
- Funding Universities, Colleges, Technikons, Artisan training centres (NECSA - nuclear)
- Establish SA accredited Nuclear Qualifications
- Certainty in career path - Nuclear
• 13 973 people were trained to use and identify protective clothing
• 12 877 people trained to use and maintain hand tools
• 907 local residents (219 women) were assessed for training in various skills
  – 420 were employed by the JV
• 1 361 skills training interventions (160 women)
  – 798 individuals trained (144 women)
• Training in the following disciplines
  – Crane Operations Shutter hand - Concrete hand
  – Construction Supervisor- Foreman
  – Construction Plant Operator
• CSI included construction of two classrooms at the Bella Primary School in Soweto
  – Partners donated architectural and engineering services at no cost
INCREMENTS CHANGES

Political
- Changes to country focus because of Long nuclear fleet build programme
  - Economy & Job creation
  - Electricity demand
  - Political debate
- Political support due to job creation in the region.
- Localisation paramount for nuclear fleet build

STEP CHANGES

Political
- Increased Political and International news
- Partnership to other countries
- Nuclear manufacturing centre
- Infrastructure to boost economy
- Springboard to develop best in class in nuclear for export to the rest of Africa’s nuclear build (global vendor status)
MOBILIZING SA’s CONSTRUCTION CAPABILITY FOR OUR NUCLEAR NEW BUILD FLEET

INCREMENTAL CHANGES

Community/Society
- Participation and retention of stable workforce
- Provide employment to community
- Up-skill and train local communities (Training centres)
- Nuclear safety and quality is key
- Nuclear = sustainable employment in region

STEP CHANGES

Community/Society
- Build nuclear workforce
- Media attention to nuclear safety
- Preferred sites are on the coast – community and environment to engage
- Improve communication with Local community and Trade Unions
- Jobs migrate to Nuclear Careers
- Increase Men & Women in Nuclear
- Nuclear = Life to South African People
CAN WE MOBILIZE SA’s CONSTRUCTION CAPABILITY FOR OUR NUCLEAR NEW BUILD FLEET?

• I believe in **South Africa** with the successful delivery of all the infrastructure for **World Cup 2010** and that South Africa can mobilize our construction capability for our **Nuclear Build** which can create not only base load power but sustainable opportunities for all South Africans.
SOUTH AFRICA CAN DELIVER!

- The World Cup 2010 stadia were ready well ahead of time...
- ...South Africa was ready for the World!
- ...waiting now for Nuclear to build our Nation!
AVENG GRINAKER LTA SUCCESSFULLY DELIVERED SOCCER CITY

A WORLD CLASS STADIUM

HOME WITHOUT HARM
EVERYONE EVERYDAY

AVENG
GRINAKER-LTA

AVENG GROUP
Leaders in infrastructure development
Thank you!