WHAT'S WATT

December 2022

Featuring: ACTOM – decarbonising the future.

ACTOM

Group revises business strategy to address worsening crises locally and abroad

In the past six months ACTOM has come through relatively unscathed from COVID-19, as we have seen a major reduction in infections of our staff, with no fatalities occurring during this calendar year.

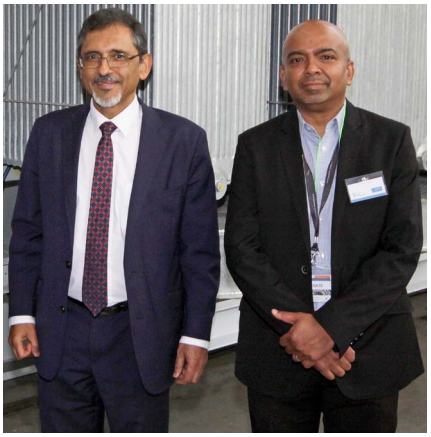
The war in Ukraine continues to create chaos and disruption in global markets, with major supply chain shocks. This has had a negative impact on globalisation and we have had to rethink our strategy on stock and localisation in some areas. We've been forced to increase stockholding in some businesses to cater for increased raw material lead times.

The current global economic outlook is extremely volatile, as we've seen a major increase in inflation across the world, which has resulted in increased interest rates, which in turn has caused a reduction in global GDP, with various economies going into recession and emerging economy currencies weakening. Commodity prices have also reduced.

The rand has dropped to exceptionally weak levels. This however bodes well for local manufacturing and exports.

The global digital revolution continues to advance. In line with this trend, ACTOM has developed various initiatives embracing new technologies which have been adapted into our product offering to ultimately optimise system efficiency for our customer base. We've successfully introduced drone technology into boiler inspections and have embarked on incorporating online condition monitoring for the equipment we provide.

We are also further diversifying



Minister of Trade and Industry, Ebrahim Patel, with Mervyn Naidoo during a recent visit to the Power Transformers factory.

our offering to customers by providing operation and maintenance of their plant. We view this as a major strategic initiative going forward.

Despite very tough operating conditions and a host of worsening problems beyond our control that are making the running of our operations extremely challenging, I'm happy to say that our financial performance has vastly improved year on year, with the group's orders on hand and key metrics ahead of last year on a year-to-date basis.

Among a number of problems South Africa is burdened with is its energy crisis, where demand now outstrips supply by approximately four to six gigawatts. It has plunged the country into frequent load-shedding that is having a severely disruptive effect on business activity. We've consequently taken a strategic decision to review our policies on energy and water with the aim of placing the business on a more sustainable footing. This involves rolling out renewable energy sources in our various operations based on criticality.

The energy crisis has however led to an increase in renewable energy projects. We are starting to see a surge in private sector generation projects, so a marked increase in demand for renewable energy-related products is expected. We are looking to increase capacity within the group to diversify and increase manufacture of these products to meet the growing demand for them.

The unemployment crisis continues to grow. In addressing this difficult problem, we in industry need to set for ourselves the goal of increasing manufacturing activity as much as possible to create more job opportunities for unemployed people, combined with providing more skills training to better equip them for gainful employment.

Over the past year capacity within our training centres has been increased to ensure that skills are available and aligned with market requirements.

I'm pleased to note that our lost time injury frequency rate (LTIFR) is 0.69. I would like to thank all involved for their active involvement in making our workplace safer.

Finally, I'd like to thank our management team and staff for their continued commitment to the business. While we still expect the global economic environment to continue being volatile, we must stay focussed on managing as best we can those matters that are within our control.

I'd like to wish all staff and their families a blessed Christmas and a happy New Year.

Mervyn Naidoo

What's Inside

***Cover**: As South Africa is the world's 13th-biggest emitter of greenhouse gases, with Eskom's 15 coal-fired plants the leading contributor, the JETP agreement secured $8.5 billion to help South Africa transition away from fossil fuel and reduce its emissions.*

ACTOM – decarbonising the future

Global citizens need to evolve from burning fossil fuels and reduce our carbon footprints.

Climate change is real and undeniable! The effects are already visible, and the result of not acting immediately will undoubtedly be catastrophic to civilisation as we know it.

As per the United Nations, burning fossil fuels – coal, oil, and gas – is by far the largest contributor to global climate change, accounting for over 75 per cent of global greenhouse gas emissions and nearly 90 per cent of all carbon dioxide emissions.

As greenhouse gas emissions blanket the Earth, they trap the sun's heat. This leads to global warming and climate change. The world is now warming faster than at any point in recorded history. Warmer temperatures over time are changing weather patterns and disrupting the normal balance of nature. This poses many risks to human beings and all other forms of life on Earth.

According to the US Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), global carbon dioxide is more than 50% higher than pre-industrial levels. In May 2022, the carbon dioxide in the air measured 421 parts per million, pushing the atmosphere further into uncharted territory.

This increased atmospheric CO_2 is trapping heat radiating from the planet's surface, which would otherwise have escaped into space and is unleashing a cascade of weather impacts. Countries across the globe are experiencing episodes of extreme heat, drought, wildfires, heavier precipitation, flooding, tropical storms and increasing sea surface temperatures, rising sea levels, and ocean deoxygenation.

In 2020, South Africa was labelled the most polluting country in Africa. That year, South Africa emitted nearly 452 million tons of CO_2, ranking Egypt second at approximately 214 million tons. Algeria, Nigeria, and Morocco were other large producers of CO_2 emissions on the continent.

The above begs the question, how do we fix this planet for our children? The answer is Decarbonisation.

Decarbonisation refers to reducing carbon intensity by lowering the amount of greenhouse gas emissions produced by burning fossil fuels. Reducing the amount of carbon dioxide occurring due to transport and power generation is essential to meet global temperature standards set by the Paris Agreement.

In September 2021, South Africa announced that it intends to limit Greenhouse Gas (GHG) emissions to between 398 and 510 Metric tons of carbon dioxide equivalent ($MtCO_2e$) by 2025 and between 350 and 420 $MtCO_2e$ by 2030, significantly lower than targets communicated in 2016. These new targets will also see South Africa's emissions decline from 2025, a decade earlier than planned.

At COP26, the South African government forged the Just Energy Transition Partnership (JETP) (aka "just transition") jointly with the governments of the United Kingdom, the United States, France, Germany, and the European Union.

The just energy transition focuses on the transition of South Africa's energy sector as the country navigates the shift away from coal towards cleaner energy sources.

As South Africa is the world's 13th-biggest emitter of greenhouse gases, with Eskom's 15 coal-fired plants the leading contributor, the JETP agreement secured $8.5 billion to help South Africa transition away from fossil fuel and reduce its emissions.

South Africa's 2019 energy blueprint- currently under review- envisions coal accounting for 59% of electricity output by 2030, down from more than 80% currently. About 18 gigawatts of Eskom's older coal capacity is scheduled to be shut down by 2035. Kusile and Medupi, the only remaining plants that use the fuel expected to still be operational by 2050.

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Renewable technologies have evolved rapidly, significantly reducing the cost of producing electricity. The weighted average cost that Eskom will be procuring power from the wind and solar PV projects is approximately 47,3 South African cents per kW/hour. This is cheaper than the new build coal-fired power stations, considering that the wind and solar solutions include the cost of capital expenditure.

Onshore wind and solar power feature strongly in South Africa's renewable energy mix, due to be contracted from independent power producers by the end of September 2022 under the government's rolling procurement programme.

As of September 2022, 25 renewable energy projects worth R50-bln have been selected for development in South Africa.

The chosen projects, which will provide an estimated 14 000 jobs, are expected to start generating electricity by April 2024. Together they will produce an estimated 4,500-Gigawatt hour (GWh) of green electricity each year, helping to avoid nearly five million tonnes of CO_2 per annum once fully operational.

The long-term solution to decarbonisation is clear: South Africa and the rest of the world need to expediently evolve from burning fossil fuels as our primary energy source to adopting cleaner renewable energy sources.

We approached **Mervyn Naidoo**, Chief Executive Officer, ACTOM, for his view on where South Africa is with decarbonisation, where we should be and how he believes we get there.

"In my opinion, decarbonisation in South Africa is a major and real issue which needs to be addressed, the major problem being in the energy sector. The authorities need to identify the largest contributors to these emissions in SA and force a phased action plan tracked to resolution," Naidoo said.

"The implications of non-action will be dire as there will be tax consequences of non-compliance, and I suspect there will also be adverse effects regarding global trade restrictions.

One of our biggest obstacles is that SA has many other burning priorities that rank above this important matter. As a result, it is, unfortunately, getting pushed aside. To name a few,

- We have serious financial constraints within which to affect the required changes.
- The required actions to migrate away from coal and fossil fuels will have a major adverse impact on unemployment, and there is a political reluctance to address these issues.
- One of the other major actions required should be to migrate travel to modes such as rail, which will help decarbonisation. This is, however, very complex in SA due to multiple stakeholders such as the taxi industry etc.

To this end, businesses and civil society must engage with the government to develop long-term sustainable solutions. In the short term, businesses, including SEO, need to focus on identifying and addressing quick fixes to reduce the current emissions of the existing plant.

From ACTOM's perspective, the short-term solution is that we have world-class decarbonisation technology solutions and are currently playing and will continue to play a significant role in reducing existing plant emissions.

In the long term, ACTOM can manufacture the bulk of electrical products going into renewable energy power generation plants.

Together with our global strategic partners, we have positioned ourselves to expand our production facilities and product ranges to cope with the approximately 25GW of renewable power developed in SA over the next ten years," Naidoo concluded.

ACTOM Turbo Machines are proud of doing their bit to lower their carbon footprint in the Solar PV roof installation at their factory in Sasolburg.

While there is a major dependency on government and business to lay the foundations for a cleaner and greener future, this article would be negligent if we ignored the role each person can and should be playing in reducing their carbon footprint.

According to the United Nations, herewith are a few pointers on how you, as an individual, can reduce your carbon footprint:

- Eat locally produced and in-season foods
- Reduce food waste
- Compost your food waste
- Wash your clothing in cold water
- Drive less
- When buying food, ensure the packaging is biodegradable
- Reuse, reduce and recycle
- Buy from energy-conscious companies – like ACTOM.

Recycling food and other organic waste into compost provides various environmental benefits, including improving soil health, reducing greenhouse gas emissions, recycling nutrients, and mitigating the impact of droughts

Sibusiso Duma appointed Representative for CIGRE's local T&D Study Committee

CIGRE, the global power systems forum of which ACTOM became a member in mid-2020, recently appointed Sibusiso Duma, Engineering Manager of High Voltage Equipment (HVE), as Representative of its Transmission & Distribution (T&D) Equipment Study Committee for Southern Africa.

The committee, known as the A3 Study Committee, is one of a total of 16 study committees representing sub-sectors of a range of industrial sectors that act on CIGRE's behalf in furthering its aim of developing and providing technical solutions in power applications in their respective fields.

"I'm delighted that Sibusiso has been chosen for this post and congratulate him for it, as it is very well-deserved. This is a very important appointment from ACTOM's point of view, as it is sure to strengthen its ability to gain the significant benefits available to it through its membership of CIGRE," said **Casbah Zwane**, HVE's Divisional CEO.

"As the Representative for the A3 Study Committee in the region, Sibusiso occupies a pivotal position that gives him access to all cutting-edge advances and innovations relating to T&D equipment around the world as soon as they become available and made known to all players in this field. In addition, the A3 Study Committee provides a useful forum for everyone involved to extend their knowledge and understanding of new developments in T&D technologies as they happen. All this can only be to the good as far as ACTOM is concerned," Casbah commented.

Sibusiso, who holds a B-Tech degree in Power Engineering and an MBA, has 22 years' work experience in a variety of technical and management positions in industry.

His appointment for six years as Representative of the A3 Study Committee for Southern Africa took effect when he attended CIGRE's biennial world conference in Paris in August this year.

"My duties, amongst other things, include chairing A3 Study Committee meetings, providing feedback to the Southern African community on global activities in A3, overseeing the work of the local A3 Working Groups, and encouraging young engineers and experts to join and participate in the A3 Committee," Sibusiso said.

The local A3 Working Groups, which undertake projects that include research, design, problem-solving, provision of guidance, producing technical brochures and green books, conducting training sessions and running workshops, maintain regular contact with many of CIGRE's other A3 Working Groups around the world.

Sibusiso Duma.

Sibusiso is one of the first non-Eskom employees to be appointed by CIGRE as a Study Committee Representative in the region. "The CIGRE study committees in Southern Africa have been dominated by representatives from Eskom until recently, but this is now changing," he commented.

John Thompson named winner of Chairman's Award for 2021/22 financial year

John Thompson, the most frequent winner of the Chairman's Award since its inception in 2012, was once again triumphant in winning this much sought-after top prize for business excellence in the difficult and incident-packed 2021/22 financial year.

In a year peppered with incidents ranging from severe unrest and floods in KwaZulu to violence-marred strikes in Gauteng, as well as the emergence of frequent load-shedding countrywide and the continued threat of the COVID-19 pandemic, both of which further disrupted business operations, besides exacerbating the hardships of South Africa's already long-suffering population – the poor especially – John Thompson succeeded against the odds in turning out a scintillating performance.

It ticked all the right boxes in, firstly, achieving earnings before interest and taxes (EBIT) growth of 13% over the previous year, secondly, an extremely high cash conversion level of 65%, and thirdly, a highly impressive growth in export orders of 53%.

John Thompson also scored very high marks on all four of the other criteria that are taken into account in measuring the performance of divisions competing for the Chairman's Award, achieving a Level 1 black economic empowerment (BEE) rating and attaining 97% for risk management, 98% for environmental performance and a lost time injury frequency rate (LTIFR) of 0.39.

The Chairman's Award presentations form part of ACTOM's Annual Review meeting, which was held this year at Emperor's Palace, Kempton Park, on June 28. Chairman **Andries Mthethwa** and Group CEO **Mervyn Naidoo** shared the duty of presenting the awards in the various categories that the competition covers.

ACTOM Turbo Machines – in which Metalplus is included as a business unit in this division – came a close second to John Thompson in winning the Runner-up Award in the divisional contest section of the competition, with Marthinusen & Coutts named sole winner of a Divisional Certificate of Excellence.

In the competition's business units section, four units were selected as winners of Business Unit Certificates of Excellence, these being John Thompson's Utility Boilers & Environmental unit, ACTOM Industry, Static Power and ACTOM Electrical Products. Business units are assessed in the competition solely on the basis of the EBIT growth and cash flow levels they achieve during the year under review.

Finally, the award for the best semi-technical article in What's Watt during the past year went to **Rhett Kelly**, MV Switchgear's Design & Development Manager, for his article in the December 2021 issue of the magazine entitled "MV Switchgear completes type tests on new SBV4XE switchgear product".

Andries Mthethwa congratulates John-Paul Andre, John Thompson's Divisional CEO, after presenting him with the Chairman's Award trophy, while Mervyn Naidoo displays the framed winner's certificate.

ACTOM divisions win electrical equipment supply contracts as BESS programme kicks off

Early this year Eskom launched the first phase of its two-phase battery energy storage system (BESS) programme with its appointment of two international companies to oversee the design, execution and management of the programme.

The companies, Hyosung Heavy Industries of South Korea and Pinggao Group of China, wasted no time in appointing local engineering, procurement and construction (EPC) contractors to execute the BESS projects comprising the initial phase, which Eskom characterises as the "proof of concept" phase.

This was followed by the awarding of contracts by the EPC contractors to local manufacturers and service providers to provide the equipment and services required for the projects.

For the BESS programme the government has lifted many of the stringent local content requirements that normally apply to state-driven capital projects – such as, for example, the national Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

"The relaxation of the local content requirements opens the door to suppliers from other parts of the world to participate in the BESS projects, thereby increasing the level of competition that local suppliers have to face. As a local manufacturer we understand that we cannot rely on protectionism and need to compete on a global platform and have structured our manufacturing operations and product offerings accordingly," said **Steve Jordaan**, Divisional CEO of ACTOM Power Transformers.

"The fact that the initial BESS projects have unusually short lead times to completion works to the advantage of local suppliers already in good standing with Eskom, as their already approved products are saved from the time-consuming design and approval processes which many overseas suppliers will be obliged to go through. The Developers, EPC's and ultimate client have the added benefit of local support for the product over the life of the project," he remarked.

These advantages apply to all the ACTOM Transmission & Distribution divisions that have been awarded contracts to manufacture and supply electrical equipment for BESS projects, namely ACTOM Power Transformers, ACTOM MV Switchgear, ACTOM High Voltage Equipment and ACTOM Distribution Transformers.

An ACTOM Power Transformers 40MVA Class 1 power distribution transformer in a substation.

In early-September Power Transformers was awarded a contract for the manufacture and supply of three 40MVA power transformers required for the 132kV/22kV collector substation that is currently under construction for the 80MW Skaapvlei project in the Western Cape – the biggest of the BESS projects being undertaken by Pinggao in the current phase. The EPC contractor for Skaapvlei is Midrand-based Proconics.

"The transformers for Skaapvlei are repeat designs of units we've previously produced for Eskom. This saves us from having to design and obtain design signoffs on them, so greatly helping to ensure that we'll be able to manufacture and supply them within the exceptionally short contract period of only seven months," Steve commented.

MV Switchgear was awarded contracts in June and July for the manufacture and supply of medium voltage primary switchgear and ring main units for the collector substations of three BESS projects being developed under Hyosung's overall control. These are the 40MW Pongola and 8MW Elandskop projects in Kwazulu-Natal as well as the 20MW Hex project in the Western Cape. The EPC company for Pongola and Elandskop is Roodepoort-based Tractionel Enterprise, while Besamandla of Cape Town is the EPC for Hex.

"The existing 11kV Hex distribution substation's switchboard, which consists of MV Switchgear's SBV4E gear, is being extended to serve as the collector substation for the Hex project, for which we are contracted to supply and install four more SBV4E indoor panels," said **Rhett Kelly**, the division's Design & Development Manager.

The primary switchgear to be supplied by MV Switchgear for the 22kV Pongola collector substation comprises nine panels of GMAe gas-insulated fixed pattern indoor switchgear from Schneider Electric, an international producer of low and medium voltage equipment with which ACTOM has a longstanding local value-added reseller (VAR) agreement. For the 11kV Elandskop collector substation the division will supply a four-panel board of its premier brand AMV12 air-insulated withdrawable pattern indoor switchgear.

MV Switchgear's popular gas-insulated RMV ring main units are to be deployed in all three of the abovementioned BESS projects These comprise six 11kV units for Hex, three 11kV units for Elandskop and twelve 22kV units for Pongola.

"For all three projects we are required to provide custom-designed internal arc classified enclosures to house the various combinations of extensible and non-extensible RMV ring main units, each with a separate low voltage auxiliary compartment to house the protection relay and supervisory control and data acquisition (SCADA) equipment. All the various switchgear

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products have been through stringent Eskom evaluation processes, including desktop, factory and sample evaluations," said Rhett.

High Voltage Equipment has been awarded contracts for the supply of various substation equipment for Hyosung's Pongola, Elandskop and Hex projects as well as Pinggao's 80MW Skaapvlei and 9.5MW Paleisheuwel projects in the Western Cape, with Proconics of Midrand being the EPC contractor for both. The equipment to be supplied by the division for these five projects comprise disconnectors, voltage & current transformers, circuit breakers and surge arresters ranging from 6,6kV to 132kV.

ACTOM Distribution Transformers was contracted in July 2022 by Besamandla of Cape Town, the EPC for the Hex project in the Western Cape, to supply 11kV 360A 400V NECRT's for the project's collector substation. These units are scheduled for delivery in March 2023.

An 11kV NECRT (left) and a 33kV NECRT from Distribution Transformers, which designs and manufactures the entire range from 2.2kV to 44kV; 300A to 960A.

NECRT's, which are a combination of neutral electromagnetic couplers with neutral earthing resistors and an auxiliary transformer in one, are designed to act as shock absorbers when earthing power transformers with Delta connected windings. They limit the earth fault current under abnormal conditions.

The particular units for the Hex collector substation will be designed to limit the earth fault current to 300A.

Distribution Transformers currently enjoys dominance in the supply of NECRT's on the Eskom national contract.

ACTOM launch new offerings at Electra Mining 2022

ACTOM once again attracted enormous interest among the thousands of visitors who attended the five-day Electra Mining Africa 2022 exhibition at the Johannesburg Expo Centre in early September.

The biennial exhibition, the biggest mining, manufacturing, electrical & power trade show in Southern Africa, featured more than 650 exhibitors.

ACTOM's main exhibition stand, featuring a variety of equipment, videos and product & process displays, included the introduction of a number of new product and service offerings, with technical and sales staff from each of the participating group businesses on hand to explain to visitors the features of the various offerings on display.

New offerings showcased on the stand included Power Transformers' recently-launched online condition monitoring system for transformers (**See story on Pg 17**), High Voltage Equipment's ester fluid insulated metering instrument transformer (**See story on Pg 14**) and Static Power's renewable solar battery charger for industrial solar energy generation applications.

A right side view of ACTOM's main exhibition stand at Electra Mining Africa 2022

LH Marthinusen focused on presenting the role played by its Fan Service division in industry, particularly the service backup support it provides in Southern Africa on the large axial variable pitch induced draught (ID) fans produced by the world-renowned industrial fans manufacturer TLT-Turbo of Germany.

MV Switchgear had on display its primary switchgear product AMV12, its popular and widely-used RMV gas-insulated ring main unit and its recently-launched entirely in-house developed and manufactured switchgear product SBV4XE, while the group's Technical Training Centre, which has greatly expanded the range of training courses it offers to industry outside of ACTOM, while continuing to provide comprehensive apprenticeship training for businesses within the group, pro-

John Thompson's Air Pollution Control stand.

markets it caters to.

Other group businesses represented on ACTOM's main exhibition stand were Distribution Transformers, Protection & Control, Marthinusen & Coutts, Electrical Machines, Metalplus and Current Electric.

Two of John Thompson's business units, Air Pollution Control (APC) and the Utility Boilers & Environmental (B&E) unit, each had their own separate exhibition stands at the show.

APC displayed two of its smaller dust collection units, as well as a model of a large bag filter unit, while the main focus of the B&E unit's exhibition stand was on the benefits to the local market offered by its recently signed cooperation agreement with STEAG Energy Services, an international company that provides services for power assets.

vided insights via a video presentation into some of the new courses it now has on offer.

Reid & Mitchell showed a promotional video presenting an overview on the range of services it offers and the

ACTOM – uplifting our communities

As we reflect on a year rapidly coming to an end, it is clear that for the average South African, 2022 has once again been plagued with challenges and hardships. We have experienced the worst load shedding that this country has ever seen. Several provinces have had to cope with water restrictions, interest rates have spiked, and let's not discuss the soaring cost of living, all while unemployment rates run out of control.

Reflecting on the above, it is easy to fall into a pit of despair. Stop! Don't forget our brave and talented woman's football team, overcoming all challenges to win the Women's African Cup of Nations tournament for the first time.

Whilst the woman's football team is only one good news story amongst many, it is, however, germane, as it provides an insight into the importance for government, business, and good citizens to provide resources and development opportunities. Essentially,

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Prospective electrician students receiving instruction from their lecturer at LH Marthinusen's Skills Development Centre in Denver, Johannesburg.

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Grade 11 learners from Sizwe Secondary School showing their appreciation to ACTOM who supplies the school with extra tutors and equipment in both the subjects of maths and life sciences.

we need to create the foundation on which the people of this wonderful country can build and grow.

The above begs the question of this article, have we, as ACTOM, done enough to develop our employees and the communities within which we operate?

As the largest manufacturer, solution provider, repairer, maintainer, and distributor of electro-mechanical equipment in Africa, ACTOM is firmly committed to the goals enshrined in South Africa's Constitution. As such committed to significantly contributing to uplifting the socio-economic conditions of the communities within which we operate.

Regarding the above, we cannot say that we have done enough; however, we are proud of the strides we have made in ensuring our certification as a level 1 B-BBEE company with 59.65% black and 35.63% black women ownership.

Our determination to be truly representative of the communities within which we operate is also supported by a philosophy of equal opportunity. To this end, we have also adopted a multifaceted and diversified approach to training and development, from grassroots programs to developing softer entrepreneurial skills and technical internship programs, amongst other initiatives.

At grassroots level: ACTOM has become actively involved in developing local communities within which we operate through the adopt a school program. Sylvester Makamu, HR Executive, ACTOM, says: "We are always looking at making a difference in our community. We are proud to form part in educating the future with our programs in Balmoral College, and Sizwe Secondary School."

Following on from the grassroots level, our focus shifts to developing softer entrepreneurial skills. Mervyn Naidoo, ACTOM Chief Executive, is that training is fundamental in creating an environment where the unemployed can become productive members of society and economically active. "If you train the unemployed, they can create a living for themselves." "On any day, there is a blocked drain, a broken toilet, or some other maintenance issue somewhere in our factories, talent lurks everywhere; we just need to look for it", Naidoo added. Our thinking is to give the unemployed basic skills that can feed into the ACTOM Enterprise Initiative, where we develop people to become entrepreneurs, with whom we can contract to maintain our properties. Naidoo said, "we can then encourage our peers and competitors to use, and assist, in growing these smaller companies", the consequence of which could have a multiplier effect".

Completing the cycle, the group also operates three technical-certified apprenticeship training centres. Namely:

- The Technical Training Centre at Knights, Germiston, provides apprenticeship training for electricians, fitters, turners, tool jig & die-makers, welders, and armature winders.
- John Thompson's technical training centres at Bellville, Western Cape, and Isando, Johannesburg, provide apprentice welders and boilermakers training.
- LH Marthinusen's technical training centre at Denver, Johannesburg, provides apprenticeship training for armature winders. The LH Marthinussen School of Engineering and Maintenance is also the first to offer independent technical facilities to train artisans in electro-mechanical winding. The training centre is accredited by the Department of Education & Training and the National Artisan Moderating Body as a trade test centre.

David Sullivan, Divisional Chief Executive, LH Marthinusen, stated, "We have also found that many of our customers have young engineers or technicians who have passed the theoretical training programmes but have never seen the inside of a motor or transformer. To this end, we have

tailor-made practical courses utilising internal and external facilitators".

In closing, ACTOM is, and always will be, in search of talent and creative solutions to further develop and create opportunities for our employees. The short answer to the original question is that enough can never be enough, considering the poverty level that plagues our country's economic growth and stability.

John Thompson's 2021 biofuels test project yielded valuable data for future use

Introduction

John Thompson was contracted by Unilever Ghana Ltd to design, install and commission a biomass boiler to produce steam for their factory in Tema, Ghana. The boiler was designed to burn various types of biomass fuels. The project was successfully completed in August 2018.

The boiler plant consists of the following equipment:

- Europac TU1050 packaged boiler.
- Triumph chaingrate biomass stoker.
- H-fin economiser.
- High efficiency multicyclone grit collector.
- Bag filter.

The boiler was fitted with various enhancements to aid the combustion of biomass and to comply with the Air Emissions Act. These include a chaingrate stoker with an extended ignition arch which optimises biomass combustion, a bottom primary air (BPA) fan, a side secondary air (SSA) fan and a combustion air heater. An economiser was fitted to increase the overall boiler efficiency.

The primary fuel used since commissioning has been palm kernel shells (PKS). PKS are the shell fractions left after the nut has been removed for crushing in a palm oil mill.

The boiler has performed extremely well operating on PKS for the past three years.

Trials on alternative biomass fuels

In March 2021 Unilever requested John Thompson to conduct trials on alternative biomass fuels available in Ghana to diversify their fuel supply chain.

The biomass market has been growing exponentially in the last couple of years and these tests offered John Thompson the ideal opportunity to test its products and evaluate the performance thereof in actual operating conditions.

Test data from operational plants is critical for John Thompson to validate that the boilers and ancillary equipment

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The John Thompson biomass-fuelled boiler and ancillary equipment in Unilever's Tema, Ghana factory used in the biomass fuels trials conducted by a John Thompson test team last year.

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offered to our clients are the best engineered solutions.

Test parameters

The testing took place at the Unilever factory in Tema, Ghana, over a period of approximately two weeks in August 2021.

It involved operating the boiler on the most popular biomass fuels available in West Africa, optimising combustion settings and collecting combustion and emissions data. The fuel storage and feeding system was also monitored during the testing.

The combustion tests were conducted by two John Thompson engineers and the emissions sampling was done by specialist emissions sampling scientists from South Africa.

The following fuels were tested:

- Palm kernel shells.
- Wood pellets.
- Cashew nut shells.
- Cacao shells.

Test project's benefits

Valuable data was collected, enabling John Thompson to better understand the performance of their equipment under normal operating conditions with different biomass fuels.

The data and expertise gained from these tests enables John Thompson to:

- Evaluate the combustion characteristics and air requirements of each fuel.
- Evaluate the fouling characteristics of each fuel.
- Validate the theoretical designs with actual data to improve design accuracy.
- Better advise their clients on the capabilities of their equipment.
- Gain valuable sales data to present to prospective clients.

By Rudolf Marais
Design Engineer - Package Boilers
John Thompson

City of Cape Town awards Power Systems a second 132kV GIS switching station contract

The socket pieces of the 132kV cable connectors being fitted into a feeder bay cable chamber for the City of Cape Town's Morgen Gronde GIS under the watchful eye of the connector supplier's specialist supervisor.

The City of Cape Town has awarded a second contract to ACTOM Power Systems for the electrical component of an indoor GIS switching station envisaged for network strengthening purposes.

Both the earlier R100-million contract, awarded in November 2021, for a 132kV 20-bay GIS facility at the new Morgen Gronde switching station in Brackenfell and this latest R95-million contract, awarded in September this year, for a 132kV 15-bay GIS installation at the yet-to-be built Triangle switching station in the neighbouring suburb of Triangle Farm collectively form part of an intensive distribution backbone enhancement earmarked to meet the rapidly growing electricity demand in the area.

"Brackenfell is fast becoming a growth hub for data centres, which in addition to their characteristically large electricity consumption offtake, inherently require a stable and secure source of power. Hence the prioritisation of this localised power injection initiative to be achieved in tandem through these new switching stations," commented **John McClure**, Power Systems' General Manager.

Power Systems and its Chinese GIS supplier form a formidable pairing, as both have an excellent track record and a reputable standing in their respective fields.

"An especially noteworthy advantage of the GIS product range tendered is that it not only conforms fully to

relevant international IEC standards, but is also highly competitive from a value proposition perspective when compared to the traditionally-sourced European origin equivalents," John stated.

Other advantages of this GIS product include its relatively compact footprint, resulting in reduced building and real estate requirements, with commensurate savings to the overall project budget.

Also, there is already a considerable installed base of this specific range of 132kV GIS within South Africa, thereby providing a pool of easily assessable references that can offer peace of mind to potential customers.

"Our approach makes use of locally-based service technicians for the GIS installation and commissioning works who have undergone extensive off-shore training in this specific range of GIS, which adds another layer of expertise and after-sales service capability to our offering," John added.

He noted that the City of Cape Town has very exacting specifications and expectations of both the engineering, procurement & construction (EPC) contractors and the electrical equipment it accepts.

"In bidding for the two GIS contracts, we were successful in meeting these requirements, despite not being able to have any face-to-face meetings with either our customer or suppliers over the past couple of years, due to a combination of COVID-related travel and social distancing restrictions. However, a concerted effort is being made to improve on this going forward.

"All negotiations and interactions therefore were conducted through virtual platforms, which was trying at times, as it exacerbated language barriers and prolonged the time needs for all parties to find each other and get up to speed. However, with some perseverance and patience we were able to overcome all these challenges in the end," John remarked.

Similar to the Morgen Gronde contract, the Triangle job also includes the implementation of a fully automated substation control system that incorporates a protection, telecontrol and SCADA overlay and will be provided by a local subcontractor who specialises in this domain.

In both instances ACTOM group companies Static Power and Electrical Products will supply DC chargers & battery banks and control cable & accessories respectively.

The Morgen Gronde contract is on track for completion in May 2023, while the Triangle contract should follow shortly after by February 2024.

Arnot appointed exclusive local distributor of well-proven rubber-to-metal parts for traction motors

ACTOM's Arnot Vibration Solutions business unit recently negotiated a distribution agreement with Dellner Polymer Solutions of the UK giving it sole distribution rights in Southern Africa for the sale of Dellner's anti-vibration rubber-to-metal parts deployed in the bogies of locomotives.

"We have supplied these self-same parts into the local market for many years under their former brand name of Silentbloc prior to the recent acquisition of this product range by the international Sweden-based Dellner Group, the parent company of Dellner Polymer Solutions," explained **Paul Steggink**, Arnot's Product Manager, who added that the product comprises mainly bushes and ball-joints for locomotive bogies.

Coinciding with the international change, a change also occurred in South Africa which altered the distribution arrangements relating to the product:

"We had previously long been supplying Silentbloc anti-vibration products to a local company for installation in the bogies of Transnet locomotives. Due to the changed circumstances we set out to negotiate the new exclusive distribution agreement with Dellner Polymer Solutions to ensure that we could maintain supply of these products for that purpose. With the new agreement we are looking at supplying the product directly to Transnet instead of via an intermediary company," Paul stated.

Paul Steggink displays the two products Arnot supplies under the distribution agreement it signed recently with Dellner Polymer Solutions: (Left) The axle box ball joint used on the axle box links of Transnet's 15E and 19E locomotives, and (right) the traction motor ball joint used on the bogie at the traction motors of the 15E and 19E locomotives.

"The exclusivity of the agreement also substantially widens the scope of opportunities available to us to market and sell this well-proven product to other railway operators in the Southern African region," he concluded.

HVE launches the first of its ester fluid insulated instrument transformers

High Voltage Equipment (HVE) has started to adapt its instrument transformer range to use environmentally-friendly ester fluid in place of mineral oil as their insulating medium.

"We have developed and tested the first of these, an 11kV pole-mounted ester fluid insulated metering instrument transformer, which we unveiled on ACTOM's exhibition stand at Electra Mining Africa 2022 in Johannesburg in early-September this year, where it was well-received and evoked a lot of interest," said **Etienne Venter**, HVE's Senior Design Engineer, who led the team responsible for designing the new product.

The changeover to ester fluid will be applied progressively in coming months up to mid-2023 to the division's entire instrument transformer range, which comprises current transformers, voltage transformers and various types of metering instrument transformers of between 3,3kV and 132kV.

"We will continue to offer and supply conventional mineral oil insulated units to the market, but expect our new ester fluid filled units to be widely adopted. Demand for them is likely to increase steadily over time – especially among power utilities, municipalities and the renewable energy sector – in line with the accelerating worldwide trend towards the decarbonisation of transmission and distribution equipment," Etienne commented.

Ester fluid is a biodegradable and high-level dielectric insulating fluid. Its positive features from both environmental and performance viewpoints include:

- It reduces the risk of environmental damage in the case of spillages.
- It is recyclable at the end of the service life of the equipment, resulting in low disposal costs.
- It offers a higher flash point than mineral oil, resulting in nil risk of a fire in the event of a major failure of the equipment.
- It has a high temperature stability, so can be subjected to high temperatures for longer than mineral oil.
- It has higher thermal conductivity than mineral oil, making it better suited for regulating transformer temperatures.
- It promotes extended asset lifetimes, due to the slower aging rate of the cellulose paper in a transformer. It draws moisture out of cellulose insulation, thereby extending its life.

HVE's Senior Design Engineer Etienne Venter and Sean Dos-Santos.(right), Production Manager for the Instrument Transformer & MV Circuit Breaker factories, with the new ester fluid insulated metering instrument transformer the division launched into the market recently.

HVE develops and introduces vertical break isolator for heavy industry applications

ACTOM High Voltage Equipment (HVE) recently introduced a vertical break (VB) 33kV isolator with composite rubber insulators for the first time, with the aim of meeting the special requirements of industrial operations faced with limited space constraints in their high voltage distribution substations.

"These units are designed mainly for heavy industry, high pollution, indoor substations such as smelters and are also suited for the railway network, where high current switches are required for use on the electric locomotive fleets," **Craig Aaron**, HVE's Senior Product Support Manager, explained.

"The VB isolator is type-tested in accordance with the international IEC 62271 standard for indoor substations. It has a much smaller footprint and is much lighter in weight than our standard horizontal double side break isolators. These units can be used as conventional isolators or customised into live to earth configuration, eliminating any operation failure of the mechanical interlocking during the operation of the isolator or earth switch, with the use of one operating mechanism.

"Once the unit is operated from the live position it automatically closes in the earth position, making it safe for operators to use. The unit is designed with self-wiping low-friction contacts for low maintenance and easy operation. The hinged part is manufactured with laminations for the current to be transferred with no sliding or touch contacts, to eliminate any unnecessary maintenance.

"In addition, all our VB units can be

engineered and customised to ensure that every customer's specific requirement is fully met." Craig stated

HVE is currently extending the range down to 11kV and 22kV network. All VB isolators produced for the market, despite being specially customised for each individual user, will have a cost saving for the smaller footprint and having one operating mechanism to operate the live and earth switch.

HVE's VB isolators are the only locally manufactured vertical break isolators designed for the industrial market that are currently available.

"Our 33kV VB isolator has a current carrying capacity ranging from 1600A to 2500A, making it particularly well-suited to high current heavy industrial applications," said Craig, adding that the new product can be used for single- or multi-phase and in live-to-earth options.

HVE received its first order from a large steel smelter in Ekurhuleni shortly after giving notice of its intention to introduce the new product into the market after successfully completing type tests on the prototype for it.

The order, supplied in July, was for two 33kV 2500A 31,5kA 170BIL live-to-earth motorised units – one to replace an aging isolator in the existing smelter plant and the second for installation in a new substation that has been established to distribute power to a plant extension that is currently under construction.

Leo Timmerman (left), chief designer of the vertical break isolator, and Draughtman Owen August with a prototype unit of the new product in HVE's Knight factory.

MV Switchgear commences production of vacuum interrupters for US switchgear manufacturer

A partnership agreement has been signed between MV Switchgear and a US switchgear manufacturer in which the local division undertakes to manufacture vacuum interrupters (VI's) for a new product being launched into the US market.

"The company, which specialises in the manufacture of high voltage switchgear and automation products for transmission and distribution systems, is developing a novel switchgear product range incorporating vacuum interrupter technology. It approached us due to our well-established reputation as a manufacturer of high quality VI's – an additional attraction for them in partnering with us being that we don't supply VI's to any of their competitors or suppliers," **Rhett Kelly**, MV Switchgear's Design & Development Manager, explained.

Danie Hanekom (right), Manager of the Vacuum Interrupter plant, and John Schultz, the former Manager of the plant, in front of one of the plant's two braze furnaces.

MV Switchgear's Vacuum Interrupters South Africa (VISA) plant, the only VI manufacturing facility in the Southern Hemisphere, has been in operation for over 30 years. The partnership agreement with the US company marks the first time the plant is to embark on large-scale manufacturing of VI's for another switchgear manufacturer, as to date it has manufactured VI's primarily for its own products.

In terms of the agreement, signed in May 2020, MV Switchgear undertook to build prototype VI's and various VI parts in accordance with the US company's designs as part of the technology development process and thereafter will manufacture the VI's for full-scale production.

"Production commenced this year with capacity for up to 20 000 VI's per

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year. The agreement also makes provision for us to make VI parts as well as manufacture and assemble the VI's. So far, we've proven to the US company our ability to make the parts that are required," Rhett pointed out.

The VI's are of a different design configuration than those MV Switchgear currently produces. The differences include greater compactness, the new VI's being about an eighth of the size of the existing product, while having a much higher voltage rating of 27kV, as against 12kV, unique vapour and bellows shield designs, stringent tolerances and utilising specialised non-conventional materials.

"We have had to expand our quality management system and controls in order to meet the US company's stringent requirements," said Rhett.

In order to meet the increased volumes required, the US company has invested a substantial amount of money for ACTOM to upgrade the existing VISA plant.

Part of this amount has gone towards refurbishing and upgrading an existing second braze furnace that has been out of service for several years, as just one operating braze furnace has been sufficient until now to serve MV Switchgear's internal production requirements.

The other part of the investment is to establish a semi-automated VI test facility in the plant to manage the testing of the increased volumes of units due to be produced.

The custom-designed testing programme includes power frequency voltage withstand testing, high voltage conditioning of the contacts, power frequency arc conditioning, resistance measurement, pressure measurement using a magnetron, and X-ray emission testing.

The braze furnace refurbishment was completed at the beginning of last year, while installation and commissioning of the semi-automated test facility was completed in August this year.

MV Switchgear awarded switchgear contract for 40MW PV solar plant at Gauteng gold mine

Early last year MV Switchgear was awarded a contract for the manufacture, supply, installation and cold commissioning of all the MV switchgear equipment required for a 40MW Photo Voltaic (PV) solar power generation plant being established at a gold mine in Gauteng

The solar plant, covering an area of over 100ha, will generate over 20% of the average electrical energy consumption of the mine.

The fast-track contract awarded to MV Switchgear comprised three parts, namely:

- An extension to an existing 11kV substation switchboard to accommodate the additional load coming in from the solar plant. For this extension MV Switchgear has produced, supplied and installed 18 double-busbar panels of its premier switchgear product AMV12.
- Two containerised collector substations, each containing 12 x 11kV GELPAG solid insulated switchgear (SIS) units. GELPAG's positive features include high operational efficiency, low maintenance, compactness and built-in immunity to pollution and humidity. It is one of only a few MV switchgear products in the world capable of using solid dielectric insulation without forced cooling for continuous current ratings up to 3150A.
- Ten 17,5kV solar circuit-breakers, each housed in an outdoor kiosk. The circuit-breaker kiosks are installed at various points throughout the solar plant site to feed the solar-generated power from transformers via cables to the collector substations. These panels in turn transfer the collected power to the extended 11kV substation.

Due to the significant advantages of GELPAG solid insulated switchgear, as outlined above, the customer had no hesitation in accepting it as an alternative solution to gas-insulated switchgear (GIS) for the collector substations.

"An additional noteworthy feature of the GELPAG SIS switchgear is that it has the capability of reaching a higher continuous current (i.e. 4000A) and short-circuit current (i.e. 40kA) ratings when compared to alternative products of similar technology on offer in the market," commented **Caroline Baptista**, Senior Sales Engineer at MV Switchgear.

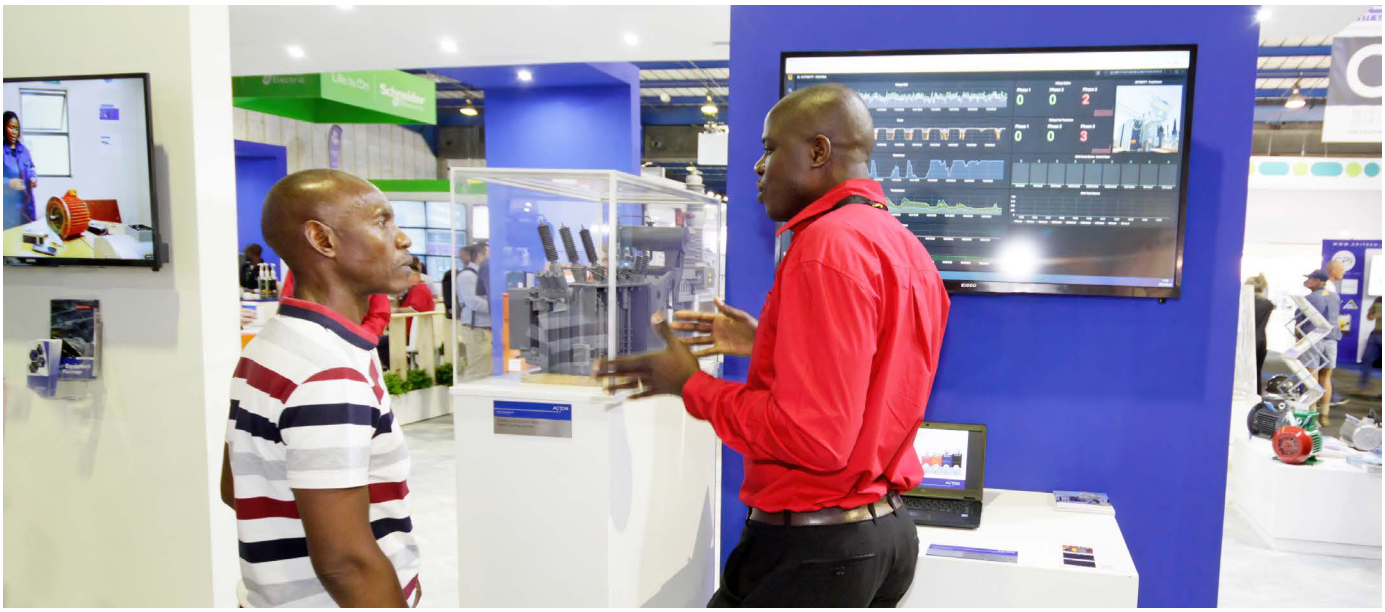
"GELPAG SIS switchgear is an ideal product for applications such as this solar farm, where reliable, compact switchgear is required. As the South African partners for this product, MV Switchgear locally supports the equipment throughout its lifespan, which gives the customer peace of mind," she pointed out.

One of two 12-panel GELPAG SIS switchboards installed in containerised collector substations supplied by MV Switchgear to serve the Gauteng gold mine's PV solar plant.

A separate contract was awarded to MV Switchgear After-Sales to refurbish the existing protection schemes for the 11kV substation's main switchboard.

Both the substation extension and the collector substations have been supplied with battery tripping units from ACTOM's Static Power business unit.

Power Transformers launches unique online condition monitoring system for transformers



Standing at the demonstration station Power Transformers had set up on ACTOM's exhibition stand at Electra Mining Africa 2022 to explain how its newly-launched transformer condition monitoring system works is Boldwin Hlongwani, the division's Business Development Manager, explaining some of the features of the system to a visitor at the show.

ACTOM Power Transformers has developed, in partnership with a leading local IT company, an online condition monitoring system for its transformers in the field.

Initiated two years ago and launched at this year's Enlit Africa energy and power exhibition in Cape Town in June, the system monitors any faults or irregularities in operating transformers the instant they occur to enable customers to take remedial action timeously to prevent or minimise damage.

"The system ensures that customers are kept constantly informed in real time about all key aspects of the condition of their transformers, including all the power-related factors that include voltage, current, load, power factor, harmonics and operating anomalies, as well as the temperatures of the winding and the oil, plus the ambient and hotspot temperatures," said **Wilma Muller**, Power Transformers' Sales Manager

"Our offer of condition monitoring equipment is combined with Power Transformers monitoring the transformers on behalf of the customer and included in the service level agreement is a yearly visit to the customer's site. On alerts to possible problems we consult with the customer on a way forward to address the problem. The most important aspect about monitoring the transformers is to detect and address a problem as soon as possible."

The service level agreement covers the provision by Power Transformers of a yearly standard maintenance service for a minimum period of three years.

"During this period we monitor the unit and report on operational anomalies, alarms and trips. As part of the service level agreement we make annual visits to the customer's site to do basic maintenance, including sampling and testing of oil. A report is submitted to the customer annually on the loading and operation of the transformer in that year," Wilma explained.

The division also undertakes to retrofit the condition monitoring system to earlier-acquired ACTOM power transformers where their owners and operators want to enjoy the benefits and advantages the monitoring system and service level agreement package offers. "At a later stage we'll look at making the system available for use on non-ACTOM branded power transformers as well," Wilma stated.

To enable real time condition monitoring, the system incorporates use of three key IT technologies:

- Internet of Things (IIoT), which gives the transformers a voice, so enabling them to communicate their health and status.
- Cloud computing, which involves putting the information that is collected into a convenient place to make it available to other systems.
- BI Stack, comprising graphic tools, reporting tools and alerting tools and also including a data exchange mechanism.

These technologies interface with the detection equipment already installed in the transformer, comprising protection equipment, alarms and trips and with various types of additional equipment attached or linked to the transformer to detect and communicate other key condition factors not already catered for within the transformer itself. These include a power analyser, an optional dissolved gas analyser and a cooler controller.

Power Transformers' online monitoring system, which is unique in its field in terms of the scope and depth of its capabilities to immediately detect and transmit anomalies in transformers as soon as they arise, so enabling prompt action to be taken to remedy them, was tested and proven in two pilot projects conducted by the development team at two PV solar plant sites in the Free State in 2021.

At the launch of the online monitoring system in June at Enlit Africa, the system attracted a great deal of attention and interest among visitors to the ACTOM stand. Keen interest was also shown by numerous visitors who attended the five-day Electra Mining Africa 2022 exhibition at the Johannesburg Expo Centre in early-September.

"We have had many enquiries during and following these two shows and expect many owners and users of power transformers to adopt the condition monitoring package we are offering, which is unique in the industry in South Africa," Wilma concluded.

Power Transformers at the forefront among local producers of inverter transformers

ACTOM Power Transformers (APT) is currently increasing the production capacity of its Wadeville, Germiston, plant, mainly to meet the substantial upsurge in demand expected from South Africa's rapidly growing renewable energy generation sector.

APT has identified IPP renewables as a growing market segment with Rounds 5 and 6 of the REIPPPP gathering momentum and recent legislative changes around power generation by the private sector driving further demand for power transformers.

Round 6 which is targeted to generate a total of 4200MW of power, received a total of 33 PV Solar and 23 Wind generation bids, totalling 9600MW's. The projects in this round are also substantially larger than those of previous rounds due to the relaxation of cap limitations.

"All these new public and private sector projects add up to greatly increased demand for electrical infrastructural equipment with ACTOM's Transmission & Distribution divisions being in a strong position to supply 'balance of plant' equipment," said **Steve Jordaan**, Power Transformers' Divisional CEO.

In conjunction with its Switzerland-based transformer design partner, APT successfully developed a full range of inverter transformers for both wind and solar inverter applications and recently expanded the size range up to 12MVA. "This is in line with the larger capacity projects that are being introduced in Round 6 compared with the earlier rounds of the national renewables programme, along with the larger-sized individual wind and solar generator units that are being brought into play in the latest round," Steve remarked.

"This application requires specific design criteria for the step-up transformers to mitigate the effects of harmonics and dynamic response characteristics of the inverters," Steve explained.

Under REIPPPP round 4.5, 109 X 2.7MVA 0.69/33kV inverter transformers were supplied to the Perdekraal and Kangnas wind farm projects. "These have proven to be efficient and completely 'gas free', which places APT at the forefront among local manufacturers of inverter transformers for renewable energy generation projects," Steve stated.

"Furthermore, APT offers the solution of combining the low voltage and medium voltage switchgear with the step-up inverter transformers in a skid-mount or containerised configuration, which is generally preferred by Developers and EPC's. This greatly simplifies the installation of the equipment and mitigates interconnecting cable faults on site," he commented.

The plant expansion caters for the skid-mount/containerised products as well as the larger inverter transformers up to 12MVA and increases the division's production capacity by more than 40% per annum. The expansion, which includes the installation of a second vapour phase oven, additional vertical and horizontal winding machines, two additional assembly stations as well as a state-of-the-art air cushion system, is due for completion by the end of March next year.

One of the padmount 2.7MVA 0.69/33kV inverter transformers produced for the wind turbines of the Kangnas wind farm in the Northern Cape in Round 4.5 of the national REIPPPP programme.

LH Marthinusen wins ACTOM's first ever Fanserve contract for Eskom power stations

ACTOM has won a long-term Eskom power stations fan maintenance contract for the first time.

The multi-million rand four-year Fanserve contract for six power stations – Matla, Kusile, Kriel, Majuba, Duvha and Arnot – was awarded to the Fan Service division of LH Marthinusen (LHM) in November 2021.

The contract, which took effect on January 1 this year, is for the ongoing maintenance of the stations' draught plant, comprising induced draught (ID), forced draught (FD) and primary air (PA) fans.

"After a prolonged and challenging tender process, LHM's tender was one of just two that were short-listed out of the initial seven submitted for consideration. This was followed by a rigorous auditing process to investigate our technical capabilities, including determining if we were properly equipped with the advanced systems needed for us to perform the complex and demanding work involved. In addition, numerous negotiations were held between LHM and Eskom prior to the award of the contract," said **Craig Johnson**, General Manager of LHM's Fan Service division.

The internationally renowned fan manufacturer TLT-Turbo GmbH of Germany, for which LHM is the Authorised after-market Service Partner, is the OEM of the variable pitch ID fans in the three most modern power stations in Eskom's fleet, namely Majuba, Medupi and Kusile.

"The importance of the fact that LHM, as TLT-Turbo's Authorised Service Partner, is now playing a key role in providing all maintenance services and technical backup on the draught fans of six Eskom power stations, including those at two of the three stations equipped with TLT-Turbo ID fans cannot be overstated," Craig commented.

LHM has established permanent sites at the six stations and is in the process of establishing modern systems to manage the maintenance and outage work at the stations.

A major undertaking is the skills development of all the people responsible for the maintenance and upkeep of the draught plant at each of the stations. To facilitate this LHM is incorporating some of the draught plant specialist training modules into its recently-

expanded Skills Development Centre at its main repair and refurbishment facility in Denver, Johannesburg.

Contracts Manager **Gareth Bodley**, who has overall contract responsibility for all six stations, said the contract requires a permanent maintenance team at each site to perform regular inspections and maintenance work. It also covers the intensified maintenance and repair work that has to be carried out during the periodic outages that are planned for each of the power stations' generation units.

"Each outage requires up to 40 maintenance people who have to be properly briefed beforehand on the scope of work they are required to perform. Every outage is planned in advance, with regular meetings being held with senior staff of the power station concerned," Gareth explained.

In addition to setting up site offices, workshops, spares stores, handling equipment and vehicles at each site, LHM had to recruit the suitably skilled people needed to make up each of the permanent on-site teams, as well as prepare for the shutdowns scheduled for the various generation units.

Members of LHM's site team at Kusile power station inspect the condition of the ID fans. The 4m diameter fans each consume 9MW at full load.

"These call for the hiring of extra skilled and experienced people over and above the permanent site-teams, as well as a large number of semi-skilled workers and assistants who make up the bulk of our workforce during a shutdown," Gareth pointed out.

The contract also demands the provision of skills development programmes for local communities, including hiring of local labour for the shutdowns, as well as contracting local small enterprises to provide various products and support services needed by the on-site teams.

LH Marthinusen expands Denver-based Skills Development Centre

LH Marthinusen (LHM) recently completed the expansion and complete upgrade of their SETA accredited Skills Development Centre at the division's main operating facility in Denver, Johannesburg.

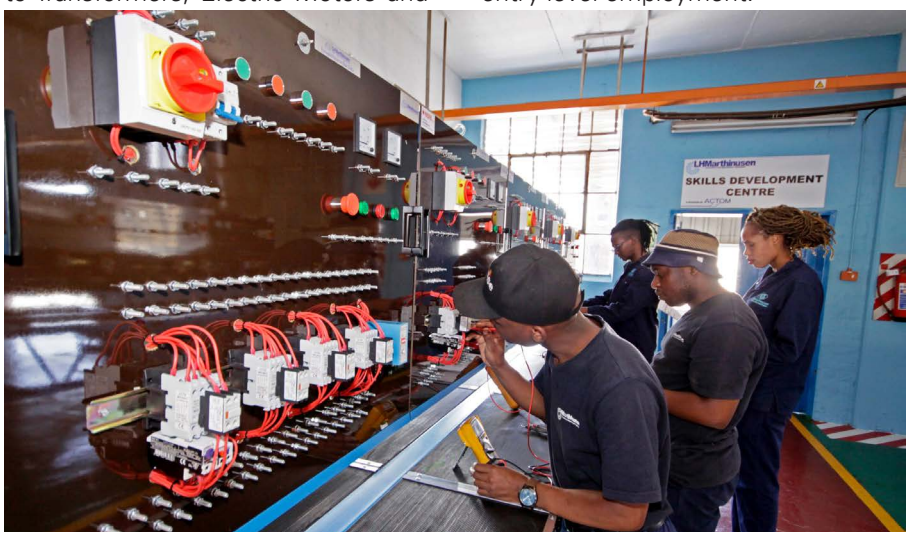
The Centre, which until recently could only provide training for up to 24 armature winder apprentices, has been expanded to accommodate a total of 80 apprentices and now caters for electrician, welding and fitter-and-turner trades as well. 20 Engineers in Training (EIT's) are also afforded the opportunity to complete their practical experience modules, followed by a 1-year internship.

The expansion was driven by LHM's realisation that South Africa's economic future depends heavily on a skilled, employable youth.

"Opportunities for young people to obtain these desperately sought-after skills are limited, hence it is of paramount importance that the private sector play their part in upskilling young people so that they might find employment and grow the economy," said **Nepile Nyakane**, Manager of the Centre.

The Centre also offers training for customers and the industry at large. Training courses vary from tailored short courses to 4-year apprenticeships, depending on the budget available. LHM are uniquely positioned to offer trainees with hands-on exposure to Transformers, Electric Motors and Industrial Fans.

Upskilling the local community is very much in focus as well. Plans are in place to once again offer electrician's assistant short courses on Saturday mornings with the view of providing unskilled individuals from the surrounding areas with the basic abilities to secure entry level employment.



First year apprentice electricians perform set exercises of putting their newly-acquired knowledge into practice on switchboards in LHM's recently-extended Skills Development Centre.

Marthinusen & Coutts and ACTOM Turbo Machines share in 147MVA generator GO success

Marthinusen & Coutts (M&C) and ACTOM Turbo Machines jointly successfully performed the General Overhaul (GO) of Sasol's Secunda gas turbine driven 147MVA (120MW) generator.

Sasol uses a feed stream of natural gas piped from Mozambique to drive the 2 X 147MVA turbines and generators.

This major GO was performed after approximately 100 000 hours runtime.

Mike Chamberlain, M&C's Marketing & Commercial Executive, who project managed the GO, said that in addition to the ACTOM bid being competitively priced, he believes that the good track records both M&C and ACTOM Turbo have independently established with Sasol on a variety of projects played an important part in its decision to award the GO contract to them.

"In addition, M&C and ACTOM Turbo have successfully worked together on a substantial number of projects in the past," Mike commented.

M&C was appointed lead contractor on the GO for the 147MVA generator and took direct responsibility for all the electrical work involved, while ACTOM Turbo was charged with the responsibility of executing all the mechanical work.

The core portion of the contract was carried out during a 34-day shutdown period late last year, when the generator's 34t, 9m long, 1m diameter rotor was removed and transported to M&C's Benoni Power Generation workshop for removal of the rotor's coil retaining rings, inspecting and cleaning the windings and overhangs, plus high-speed balancing of the rotor, before being returned to site for reinstallation.

"At the same time testing and cleaning of the stator windings were carried out on site, and loose wedges were repaired. We also did in-situ Partial Discharge and Tan Delta testing, as well as end-winding resonance frequency tests on the 11kV stator," said Mike.

The GO procedures were completed with the reassembly of the generator on site and performance of a test run witnessed by the client.

However, before any of the above-mentioned GO procedures could be carried out, the teams were confronted during the 28-day lead-in period prior to the shutdown with unexpected complications they had to solve first.

Special equipment was provided for removal of the rotor out of the stator core, on a sliding rig with trolleys running on a track to bring it out into a central position on the frame structure, from where it could be lifted by a 120t mobile crane for transport to the workshop.

The rotor threading frame structure, comprising three steel A-frame pedestals anchored on concrete plinths, was intended to provide support to the rotor threading structure used to remove – and later re-install – the rotor.

"As a precaution before commencing the work, we assembled and checked the threading frame structure in our workshop. All the welds on the A-frame pedestals failed inspection and were re-welded," said Mike.

"However, on site we found that the structure did not fit, due to cable racks and electrical boxes being in the way, so the railway beam was cut away to clear these obstructions. We also had to weld on extensions to the railway tracks to make it the right length.

"Furthermore, the railway track was inadequate for supporting the weight of the rotor, resulting in us having to increase its strength. It was also necessary to manufacture a new more stable coupling side trolley and modify the skid plate on which the sliding skid runs to ensure proper protection of the stator windings during removal of the rotor."

The contract was completed within the shutdown period with days to spare.

"In executing this large and complex contract, M&C and ACTOM Turbo demonstrated their ability to perform a full electro-mechanical service, giving the customer one point of contact for the entire project," Mike concluded.

ACTOM Turbo Machines removing the 147MVA rotor from the stator.

Marthinusen & Coutts beats the odds in difficult manufacturing project

When Voith Hydro invited Marthinusen & Coutts (M&C) earlier this year to quote for the manufacture of four new replacement field coils and poles for a 25MVA generator at a hydroelectric power station in Cameroon, the division soon discovered upon investigation that the project was beset with seemingly insurmountable difficulties.

"We are often called upon to manufacture items by applying reverse engineering procedures when the OEM's design drawings for the equipment are unavailable, but usually we're able to gain access to the original component itself to work from," said **Craig Smorenburg**, M&C's Works Executive.

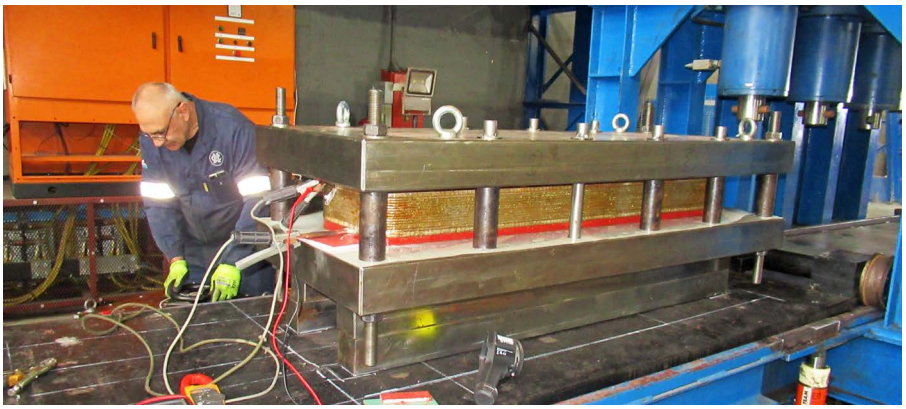
"However, in this instance the original coils and poles had been stolen out of a 24 600kVA 36-pole generator in the power station. We were provided with rough dimensions, which were sufficient for our quotation, but not accurate enough to work from."

M&C sent two senior technical

staff-members to the 264MW Edéa power station on the Sanaga River near the town of Edéa in Cameroon to try and obtain more accurate dimensions and any other information they could gather. What they got included useful photographic evidence, along with the more reliable dimensions.

"These were invaluable, but could not alone have enabled us to perform the task were we not able to draw on the pooled knowledge and experience of the experts that made up M&C's team. A crucial part of the whole process was the design and manufacture of the tooling and jigs required for the manufacture of the coils and poles," Craig commented.

The field coils were of a complex design that consisted of a double-bank series coil with a unique method of connection between the north and south poles.



Technician Leonard Currie tests one of the salient pole coils M&C manufactured for a generator at a hydroelectric power station in Cameroon.

"Another unusual feature was that the copper dimensions required on-edge bending to wind a continuous coil," Craig pointed out.

M&C manufactured the required items on the customised coil press at its Power Generation & Large Motor facility in Benoni, having prepared the necessary designs mainly on the strength of the photographs they'd been provided with.

The contract was completed on schedule at the end of September.

Frequent load-shedding prompts ACTOM Turbo to switch to self-generated solar power

With frequent load-shedding adversely affecting business operations throughout South Africa, in addition to the many other ill-effects it causes countrywide, ACTOM Turbo Machines set out to replace its traditional source of electricity supply with self-generated solar power to ensure continuity of operations at its Sasolburg premises.

ACTOM Turbo is the first division in the ACTOM group to switch entirely to self-generated renewable energy as power source.

In March this year the division contracted a reputable local supplier of PV solar systems to supply and install solar panels on the roofs of its two workshops to meet all its power requirements at the site, in place of the municipality-supplied power it had been reliant on until then.

As with most businesses faced with the high incidence of load-shedding, which has become an unwelcome new norm, ACTOM Turbo had long since acquired diesel-powered generators to produce backup power for its works during load-shedding. Now, since the solar system went into operation at the end of April, the division only uses municipal supply, along with its generators when load-shedding occurs, to a very limited extent and at a fraction of the cost it previously had to pay for them.

A view of ACTOM Turbo's site, with the entire roof of the large workshop on the right covered with solar panels, while they cover half the roof of the smaller workshop on the left.

"We don't have battery bank back-up for storage of our solar-generated power, so we draw on municipal supply at the beginning of each working day for the initial feed to get the solar system going. We also need it when we have to work at night and on rainy and cloudy days when the solar system can't supply sufficient power to meet our needs," explained **Niel Fourie**, ACTOM Turbo's SHEQ Manager, who manages the day-to-day operation of the solar system.

Chris Bezuidenhout, Divisional CEO of the division, said: "We are proud to be the first in the group to switch over to renewable energy to power our operations. Apart from the fact that it means a 60% saving in expenditure on electricity supply every month compared with the traditional power sources, it ensures that we contribute in our own small way towards reducing the global carbon footprint, which is causing so much damage to the planet and threatening the future existence of everyone and everything on it."

Metalplus attracts new work after acquiring state-of-the-art automated CMT welding system

Within a month of taking delivery of automated welding equipment to perform cold metal transfer (CMT) welding, Metalplus received no less than four orders from large industrial customers to repair a diverse range of machine components.

Metalplus' acquisition of the state-of-the-art new equipment means it no longer has to subcontract out the specialised welding work CMT equipment performs.

"With CMT we can weld a 1mm thick sheet without distortion, so enabling us to do repairs on, typically, the thin-walled impellers of compressors and pumps, small diameter shafts, as well as applying hard-metal coatings to steam valves and other hard-wearing components requiring special protection against wear," said **Roman Mornau**, Metalplus' Divisional CEO.

The robotic welding system enables welding of complex three-dimensional shapes. "In addition to its special capability of performing very fine work without distortion, as well as its speed and accuracy, the CMT system has the further advantage of very low welding energy impact into the parent metal compared with conventional welding technologies," Roman pointed out.

Within a month of putting the system into operation at its Robertsham, Johannesburg, workshop in mid-August, Metalplus was awarded the following contracts:

- repair of the inner bore of the con-rod of a large industrial compressor for a leading local manufacturer of large compressors.
- hard-facing of the scraper rings of ash-handling equipment for a large local petrochemical company.
- repairing the shaft of a steam turbine that drives a compressor for a large international air separation company.
- repairing thin-walled stainless steel impellers of a multi-stage high pressure pump for a large local petrochemical company.

Metalplus' Welding Programmer Ric Da Costa is shown using the CMT robotic welding station to perform vertical up weld repairs on a 10MW turbine rotor.

The CMT equipment comprises a six-axes robotic arm to precisely control the welding point, a two-axes manipulator to rotate and pivot items to be welded, and a computerised CMT welding machine.

"The robotic devices are synchronised and fully integrated into the computerised CMT welding machine – all controlled by a single user interface with relative ease of programming," Roman said.

To achieve a low-temperature weld the CMT process uses an initial arc strike to create sufficient heat for the parent metal to be in solution, and then allows the filler material to form a droplet immediately above the welded area so that no further heat is transferred to the weld by the electric arc. "The droplet simply falls onto the molten surface of the component to be welded. This is repeated at specific increments that are programmed for the application to achieve the desired weld shape," Roman explained.

If the work item is small it may be connected directly to the manipulator, but when a large component, such as a turbine rotor, has to be worked on then a universal joint is installed between the manipulator and the work piece to rotate the heavy rotor on rollers, with the ability to programme an optimum welding speed.

"Thanks to its flexibility, the system provides repair solutions for a multitude of applications," Roman stated.

Key appointments

Donovan Stevens has been appointed Divisional CEO of MV Switchgear with effect from October 1, 2022.

Leonard de Villiers has been appointed General Manager of Signalling with effect from September 1, 2022.

Leon Bushney has been appointed Tendering Manager of Power Systems with effect from October 3, 2022.

Gabriel Nel has been appointed Technology Manager of LH Marthinusen with effect from January 11, 2022.

Igor Myagkov has been appointed Engineering Manager – Transformers in LH Marthinusen's Transformer division with effect from June 1, 2022.

Irene Munarini has been appointed Spares Manager of LH Marthinusen with effect from October 1, 2022.

Azhar Asmal has been appointed Financial Manager of Protection & Control with effect from March 1, 2022

Manana Molupe has been appointed HR Manager of Protection & Control with effect from April 1, 2022

Mogantheran Naidoo has been appointed Procurement Manager of John Thompson's Industrial Watertube Boilers business unit with effect from August 1, 2022.

Avinash Ghansoon has been appointed Production Manager of John Thompson's Industrial Watertube Boilers business unit with effect from September 7, 2022.

Andile Shangase has been appointed Construction Manager of John Thompson's Industrial Watertube Boilers business unit with effect from December 6, 2021.

Amina Ismail has been appointed a Contracts Engineer at John Thompson's Industrial Watertube Boilers business unit with effect from July 1, 2022.

Razeen Gangat has been appointed a Contracts Engineer at John Thompson's Industrial Watertube Boilers business unit with effect from August 1, 2022.

Zethu Magenuka has been appointed HR Manager of John Thompson's Utility Boilers & Environmental business unit with effect from October 3, 2022.

Lunga Mazibuko has been appointed Site Manager – Matimba Power Station of John Thompson's Utility Boilers & Environmental business unit with effect from October 1, 2022.

Wilhelm Ferreira has been appointed an Industrial Engineer at Satchwell with effect from September 1, 2022.

Sphiwe Sithole has been appointed a Junior Mechanical Engineer at Reid & Mitchell with effect from November 1, 2022.

Nonkululeko Mgidi has been appointed a Junior Electrical Engineer at Reid & Mitchell with effect from August 1, 2022.


Donovan Stevens


Leonard de Villiers


Leon Bushney


Gabriel Nel


Igor Myagkov


Irene Munarini


Azhar Asmal


Manana Molupe


Mogantheran Naidoo


Avinash Ghansoon


Andile Shangase


Amina Ismail


Razeen Gangat


Zethu Magenuka


Lunga Mazibuko


Wilhelm Ferreira


Sphiwe Sithole


Nonkululeko Mgidi

Leo praised for his awesome contribution to development of isolators

When Leo Timmerman received his long-service award at a special presentation held in his honour at Knights in late-October this year in recognition of his 40 years' service at High Voltage Equipment (HVE), it marked the culmination of an impressive career during which he contributed much towards the division's success in recent decades.

Casbah Zwane, HVE's Divisional CEO, in presenting the award to Leo, said: "He played a key role in the development of isolators over the years, not only on the design side, but in all other aspects, including tendering, type testing, overseeing spare parts components manufacture, site work, sales and training.

"He was the senior member of the design team that developed our current CRD range of 22kV to 132kV isolators and was largely responsible for ensuring that they complied to Eskom's specifications."

When Leo joined the division – then Hudaco Isolators – in 1982, with **Doug Thompson** as his boss, he was put in charge of assembly. Promoted to Workshop Superintendent in 1984, when ownership of the company changed hands to become Cullinan Power Equipment, he first got involved in testing of the company's isolators. In the mid-80's his responsibilities were extended to include quality control and type-testing as new isolators were developed to cater to Eskom's requirements.

Then in 1990 Leo began doing site-work and, shortly before GEC-Alsthom acquired the company – which it renamed High Voltage Equipment – in 1994, he was appointed as Sales Engineer and got involved in costing and tendering for isolators. By this stage HVE, in addition to producing isolators, was also manufacturing busbars and dog-boxes and supplying imported gas-insulated circuit-breakers to the local market.

From 1998 onwards he became more directly involved in designing isolators, under Doug Thompson's guidance.

"A highlight for me was in 2004 to 2006 when we tendered to Eskom for the full range of isolators from 22kV all the way up to 765kV and were suc-

cessful in winning the term contract for the entire range," Leo said.

When Doug retired in 2013 Leo carried on designing isolators and was the leader of the design team that from 2014 onwards developed the now current fully locally manufactured CRD range of isolators from 22kV through to 132kV, successor to the DSB range.

At the end of 2017 HVE was required by Eskom to re-type test the whole array of isolators deployed by the utility, a process that normally takes 18 months to perform.

"To ensure that we were in with a good chance to win Eskom's upcoming term contract for isolators again, we had to arrange to have the re-type testing done in a much shorter time than normal and we did them all in six months. This included having to design, manufacture and test a 66kV 2500A isolator prototype in accordance with a new Eskom spec, as well as providing new designs of earth switches for the 22kV and 33kV units. This ended successfully, with us winning the contract in 2019."

Leo also led the team that designed the recently introduced vertical break isolator (**see story on Pg 14**), as well as a 132kV centre break isolator for the African market that is due to be launched early next year.

Leo describes himself as "a bit of a maverick".

"Sometimes you have to be one to get the job done," he explains.

"For instance, with the re-type testing project we had to do in a hurry for Eskom at the end of 2017 and early in 2018 to ensure we won the isolators term contract again, it was unavoidable having to tread on some people's toes, otherwise we wouldn't have got the job done in time and would've lost the contract."

Commenting on his approach to his work, Leo said: "The attitude of 'it's not my job' doesn't exist in my vocabulary. I've never been afraid of asking questions and learning. I'd like to especially thank Casbah for permitting me to work way past my 'expiry date'. Lastly, I'd like to thank my colleagues for their support and input."

Born and educated in Holland, Leo, 72, emigrated in 1972 to South Africa, where he worked as a maintenance boilermaker in two or three companies in and around Johannesburg before joining Hudaco Isolators.

Leo, married to **Benita** with three daughters and seven grandchildren, retires at the end of this year.

Casbah Zwane, HVE's Divisional CEO, displays the 40-years' long-service certificate he presented to Leo shortly before his retirement at year-end.

Group staffers celebrated Heritage Day with greater enthusiasm than ever this year

Heritage Day has become increasingly popular among staff-members of ACTOM group divisions and business units over the years.

This year, with September 24 falling on a Saturday, many staff-members were prompted to celebrate the occasion by turning up at work on the Friday dressed in the costumes and outfits that are most representative of their respective nationalities, tribes and cultures.

"Heritage Day is all-inclusive by definition and everyone therefore is encouraged to celebrate together and share the various features of their different cultures, including their social customs, religious practices, food and traditional dress modes, so leading to better understanding between the various groups," commented **Sylvester Makamu**, ACTOM's Group HR Executive.

This picture shows the eye-catching make-up Karen Nokuthula Mdlala of John Thompson in Bellville put on to celebrate Heritage Day.

"Now, for the first time in a long while, we've felt free to celebrate Heritage Day without having to be concerned about the possibility of being infected with COVID-19. It's a liberating feeling to no longer have to be subject to the limitations on social contact that were in force over the past two years," Sylvester concluded.

MV Switchgear and Protection & Control staff at Knights, Germiston, threw themselves with great enthusiasm into the spirit of Heritage Day, as did many staff members of LH Marthinusen in Denver, Johannesburg,

and of Power Transformers in Wadeville, Germiston, with many pictures being taken by colleagues of the cheerful participants in their colourful finery.

Staff-members of most other ACTOM businesses around the country also dressed up and got together on the Friday to enjoy themselves in celebrating the occasion.

MV Switchgear staff-members in traditional dress make a colourful display as they pose for the camera while celebrating Heritage Day.

LHM staffers celebrate Mandela Day by participating in two charity initiatives

A group of LH Marthinusen (LHM) staff-members celebrated Mandela Day (July 18) this year by visiting Kids Haven in Benoni on that day to give the home's occupants some attention and care and make the day memorable for them.

Kids Haven is a charity organisation that provides protection and care for vulnerable children and youngsters, including the homeless, ranging in age from 3 to 20.

"The home's aim is to educate the children in its care, while at the same time helping to make them feel safe and have a sense of belonging," said **Moreka Gomez**, LHM's Financial Manager.

"During our time there we spent about an hour playing games with the pre-schoolers, followed by a similar period talking to and listening to the teenage girls, who told us about their ambitions and the many problems they face in trying to achieve their goals. They were very willing to listen to the advice some of the members of our group offered, while we learnt a lot and gained a better understanding of their challenges. We found the experience very touching and enlightening."

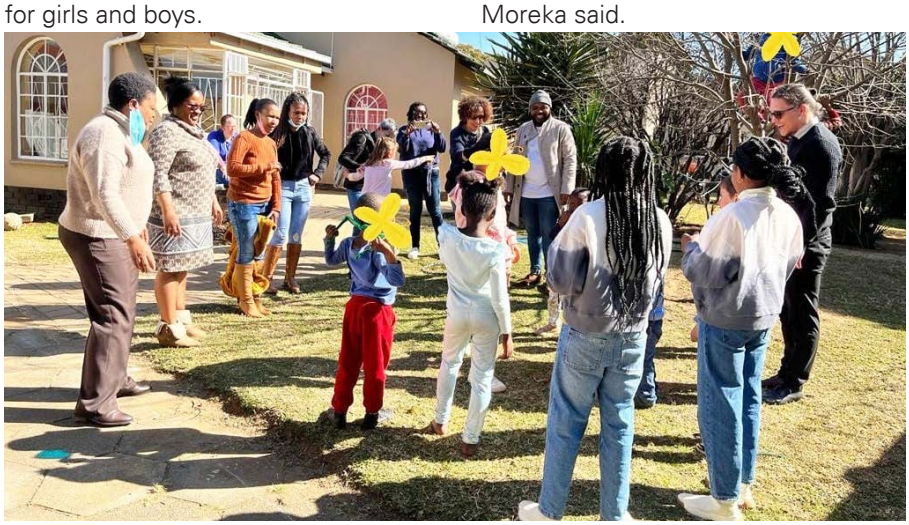
LHM will regularly donate toiletries to the home, including sanitary pads for the girls. "We also hope to help further by providing education and training to matriculating youths," Moreka added.

In the same week, in response to an appeal by a senior manager at Majuba power station near Volksrust in Mpumalanga, LHM's Fan Service maintenance team at the station agreed to arrange the purchase and supply of Dignity Packs for leaners of a community school nearby. The Dignity Packs contained, in addition to sanitary pads, a variety of other useful toiletries for girls and boys.

"The Dignity Packs were mainly for the teenage girl learners at the school, who often have to miss classes due to not having sanitary items to care for themselves," Moreka explained.

This initiative resulted in more than 160 Dignity Packs being put together by LHM staffers.

"The handout took place at the Ulwazi Primary School on the 10th of August, where four of our women staff members attended to represent LHM and assist with the handout," Moreka said.



LH Marthinusen staff get acquainted with some of the younger children at Kid's Haven on Mandela Day before going on to spend time in conversation with the older children and young adults who stay there.

ACTOM businesses

POWER
John Thompson, Bellville: (021) 959-8400
John Thompson, Isando: (011) 392-0900
www.johnthompson.co.za
John Thompson is a leader in energy and environmental solutions through value engineering and innovation. We are firmly focussed on serving global and local markets and we offer the following products and services: design, engineering, manufacture, construction, repairs, maintenance, retrofit, installation and commissioning of industrial water-tube and packaged fire-tube boilers, and industrial air quality solutions including HVAC, bag filters, scrubbers and ESP systems. Our Boiler and Environmental business unit offers the following solutions for utility plants: maintenance, repairs and retrofit of utility plant boilers, ESP systems, FFP systems, mills, burners, ducting, HP piping and ancillary equipment - geared towards keeping large power plants operating optimally, as well as providing a plant and equipment hire solution for construction work.

John Thompson also provides outsourced steam via its Energy Management Solutions business unit. Our service further includes capacity and efficiency improvements to older boilers, supply of original equipment manufacturer (OEM) spares, reliability studies, metallurgical services and computational fluid design (CFD) modelling.

ENGINEERING PROJECTS & CONTRACTS
Industry: (011) 430-8700
ACTOM Industry, the group's Mine winder experts with modern power electronic drive, control and switchgear technology, providing turnkey solutions worldwide for specialised industrial rotating drive and power applications in mining, metals, paper and process industries. We manage projects from design to commission; inspect & maintain; provide emergency support; do repairs and we perform magnetic rope testing.

Contracting: (011) 430-8700
Contracting is the electrical and instrumentation business unit which provides turnkey solutions for electrical power and instrument & control systems in the mining and manufacturing industries as well as the public sectors.

Power Systems: (011) 430-8700
ACTOM Power Systems, the group's substation construction contractor, is ACTOM's systems integrator, responsible for turnkey projects for the electrical power, mining and manufacturing industries, as well as for public sector infrastructure. It specialises in Renewable balance of plant installations.

Transport: (011) 871-6600
Transport has three trading units:

ACTOM Signalling; design, manufacture, install and maintain railway signalling equipment and turnkey systems.

ACTOM Transport Equipment and Projects (TEP); a contractor and supplier of rolling stock equipment, parts, maintenance and specialised depot machinery and test equipment.

ARNOT Vibration Solutions (AVS); suppliers of anti-vibration products and engineered solutions to a wide range of industries, including rolling stock.

ACTOM Energy: (021) 510-2550
ACTOM Energy is a solutions business and in collaboration with various divisions within the ACTOM Group, provides electrical automation, power automation, protection and control, remote condition monitoring and fluid technologies (motion controls, hydraulic and pneumatic) system integration services across all sectors.

LH Marthinusen - Coastal
Durban: (031) 205-7211
Africa's leading maintenance partner for rotating machines – servicing traction, power generation, mining, utilities, oil & gas and general industry.

HIGH VOLTAGE EQUIPMENT
High Voltage Equipment: (011) 820-5111
High Voltage Equipment, is a designer, manufacturer, supplier and installer of high voltage equipment to power utilities, electricity generation, transmission and distribution industry, mining sector and contracting companies. Manufacturer of isolators, instrument transformers, outdoor circuit breakers and insulated phase busbars. Supplier of high voltage Gas Insulated Switchgear, Compact Hybrid Switchgear, surge arresters, substation and overhead line insulators. HVE specialises in the repairs, supply of spares and maintenance of high voltage equipment.

MEDIUM VOLTAGE SWITCHGEAR
MV Switchgear: (011) 820-5111
www.actomswitchgear.co.za
Leading manufacturer and supplier of air-insulated (AIS) and gas-insulated (GIS) switchgear for use up to 36kV. The product range consists of indoor switchgear, containerized switchgear solutions, compact substations for renewable energy applications, minisubs, free-standing outdoor kiosk ring main units and bulk metering units. The division also specializes in the repair and maintenance of electrical networks.

WPI Power Solutions: (011) 820-5111
24 Hour Emergency Service: (082) 801-3171
WPI specialises in the repair, installation, retrofitting and maintenance of electrical networks via MV Switchgear's After Sales department and WPI regional branch network that is technically well equipped and strategically placed close to the customer base. The department offers 24/7 customer support for substations, MV and LV switchgear and associated products.

Current Electric: (011) 822-2300
Current Electric designs, manufactures and supplies medium voltage current and voltage transformers to switchgear manufacturers and repairers, electrical distributors and a diverse range of end-users locally and internationally.

POWER TRANSFORMERS
Power Transformers: (011) 824-2810
Power Transformers designs, manufactures and supplies a wide range of power transformers from 2MVA to 315MVA up to 275kV to power utilities, renewables projects, electrical contractors, the mining sector, local authorities and industry locally and internationally.

DISTRIBUTION TRANSFORMERS
Distribution Transformers: (011) 820-5111
Distribution Transformers designs,manufactures and supplies distribution transformers ranging from single phase 16kVA to three phase 7MVA up to 44kV, can be Single or Dual MV or LV and NECRT's up to 44kV to power utilities, the mining sector,local authorities and industry,and renewable applications locally and internationally.

LH MARTHINUSEN
LH Marthinusen Johannesburg: (011) 615-6722
Cape Town: (021) 555-8600
www.lhm.co.za
LH Marthinusen repairs and refurbishes transformers, electric motors, alternators and industrial fans. Manufacture of electric motor components, insulation components and specialised transformers and motors. It also provides engineering services for its products to the mining, industrial and petrochemical sectors and local authorities, as well as for the export market.

REID & MITCHELL
Reid & Mitchell: (011) 914-9600
www.reidmitchell.co.za
Reid & Mitchell is a repairer and manufacturer of electrical equipment for open cast mining, steel, rail transportation and marine industries. Motors and generators for excavators, off-highway vehicles, locomotives, drilling and pumping applications. The division is also a specialist repairer of DC motors and generators, including rebuilds, rewinds and commutator manufacture.

Electrical Machines: (011) 899-1111
Electrical Machines supplies medium and low voltage motors, starters, gearboxes and speed reducers to the mining, industrial, processing and utilities markets.

Large Motors designs and manufactures medium voltage motors that include its reputable customised large UNIBOX series and its high specification MS4 totally enclosed fan-cooled (TEFC) cast-iron motors.

Laminations & Tooling manufactures laminated components and tooling for the electric motor manufacturing and repair industries.

Energy Namibia – Electrical Products: +264 (61) 423 150
Supplier of Electrical products throughout Namibia.

Namibia Armature Rewinders (NAR): +264 (64) 220 352
Repairer of electrical machines, hydraulics, boilers, transformers and switchgear throughout Namibia

MARTHINUSEN & COUTTS

Marthinusen & Coutts: (011) 607-1700
www.mandc.co.za
M&C repairs, maintains, services, and carries out specialised manufacture of HV, MV and LV, flameproof, DC and traction motors, transformers, generators, alternators and ancillary power generation equipment up to 373 MVA. M&C also provides a full range of 24/7engineering on-site services and unique motor and generator management and maintenance solutions and programmes.

ACTOM TURBO MACHINES

ACTOM Turbo Machines: (016) 971-1550
www.actomturbo.co.za
ACTOM Turbo Machines is a mechanical turbo-machinery and high-speed rotating equipment service provider, for manufacturing, maintenance, overhauls, repairs, installations and commissioning of all types of steam and gas turbines, compressors, blowers, pumps, fans, gearboxes, centrifuges, as well as general fabrication and machining.

METALPLUS

Metalplus (011) 433-1880
www.metalplus.co.za
Metalplus has earned a reputation over many years in the petro-chemical, power generation, machine repair, mining, and rail & transport industries, for its reliability, accuracy and speedy turnaround times in performing mechanical repairs that include submerged arc micro-welding, machining and grinding. Further to our multitude of shaft and crank shaft repairs our products extend to new shaft manufacturing, casing welding and stitching, hard facing, component manufacturing and specialised welding repairs.

ELECTRICAL EQUIPMENT

Electrical Products: (011) 878-3050
www.actomep.co.za
Electrical Products is ACTOM's trading and representation arm, with a national network of strategically located branches. The business unit supplies products produced by ACTOM divisions and other manufacturers, including cable, cable accessories, lighting equipment, heating and ventilation equipment, circuit breakers, distribution transformers, minisubs, protection and control equipment, electric motors, meters, fusegear and overhead line materials.

Satchwell: (021) 863-2035
Satchwell manufactures and supplies domestic and industrial heating elements, temperature controls, refrigeration components, solar water heating components and appliance spares to the domestic appliance manufacturing industry and the chemical, mining and construction industries, among others.

Genlux Lighting: (011) 825-3144
www.genluxlighting.co.za
Genlux Lighting is a leading designer and manufacturer of luminaires for roadway lighting, floodlighting, outdoor commercial lighting and industrial applications. It produces a wide range of high quality products in both HID and LED technologies.

ACTOM SMART TECHNOLOGIES

Protection & Control: (011) 820-5111
A market leader in the supply of protection, metering and low voltage solutions to the electrical industry. Our offering includes a comprehensive range of automation systems, protection relays, credit, smart and prepayment metering systems and hosted services as well as LV motor control centres and power DB's, variable speed drives (VSD's) and components and accessories.

Static Power: (011) 397-5316
Static. Power specialise in the design and manufacture of AC and DC standby equipment for the Industrial, telecomms, rail and renewable energy markets including thyristor type chargers, (Micro Process Controlled option), industrial batteries, power supplies, industrial UPS's, furnace control panels, power distribution boards and battery tripping units. All systems are designed and engineered to suit their purpose for both the local and export markets. We offer specialized technical training to enhance practical and theoretical knowledge of our products. After Sales division to support and maintain installed equipment in the field.

COM 10: (011) 552-8368
COM10 is a local assembler and integrator of Alpha switchmode rectifiers, DC/DC Converters with sophisticated supervisory controllers, Lead Acid Batteries, stands, battery cubicles and power enclosures.

Alkaline Batteries: (011) 397-5326
Alkaline Batteries is the South African distributor for ALCAD and SAFT nickel cadmium and Lithium Ion batteries as well as the Intelli Connect battery monitoring systems for the industrial, telecoms, rail and re¬newable energy markets. The local assembly plant on the East Rand includes a collecting point for spent nickel cadmium batteries for recycling. Services offered include Installation and Commissioning, Battery Sizing, Testing, Investigations, Maintenance and Repairs, Maintenance and Service Contracts, Discharge Tests and Training.

What's Watt is published by ACTOM (Pty) Ltd to inform staff, customers and other stakeholders of developments within the group.

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ACTOM, your **strategic partner** for **decarbonisation technology solutions** in **reducing** existing plant **emissions**

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