

# RAILWAYS™

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imagination at work

GE Transportation as  
a Strategic and Value  
Adding Partner to Africa



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# GE Transportation As a Strategic And Value Adding Partner To Africa

Integral to developing industrial and economic strength in any modern economy is an efficient, functional rail system that enables the movement of heavy equipment and freight across territories. Africa could learn from international models, where railways are privatised or operated under long-term concessions, with governments providing the regulatory framework to achieve success.

President and chief executive officer of General Electric (GE) Transportation Africa and GE South Africa, Thomas Konditi says that governments should invest in the physical railway lines (the long-term infrastructure) and then focus their energies on creating the efficiencies that attract private sector investment, recognising that the private sector has the business acumen, skills and experience to promote economic growth and development. The underlying principle to this approach is that strengthening a country's capacity, particularly their infrastructure and transportation systems, is integral in driving growth in developing markets.

## GE's Legacy As A Strategic Partner In Africa

GE Transportation has more than 70 years' worth of experience in the African market, and the company is strategically positioned to add economic value through localisation, skills transfer, operational efficiencies as well as in delivering leaders in the industries that underpin growth.

"Africa has seen a renaissance in the rail sector over the past decade and while the recent commodity depression has dampened the pace of that investment, there is a growing realisation that for Africa to industrialise and diversify its economies, the continent requires a rail network to transport heavy goods and bulk commodities over long distances at a low cost," Konditi states.

GE marketing and market development director for Africa, Edward Baiden, adds that: "Within the locomotive market, GE offers its clients quality technology and localisation policies that effectively translate into building and supporting local suppliers to participate in the manufacturing value chain, as well as providing the technical assistance needed to minimise downtime and maximise efficiencies."

"The dream of an interconnected Africa, from Cape to Cairo, still exists and as each country upgrades their infrastructure, that ideal takes a step

closer to being realised. GE has the capacity and expertise to support the growth of the rail industry in Africa," Baiden says.

## Building Local Capability One Country At A Time

In 2008, GE Transportation formed a joint venture company with the Mineworkers Investment Company (MIC), which became GE South Africa Technologies (GESAT). GE initiated their partnership with South African state-owned railway operator Transnet when GESAT secured its first order of 100 GE Model C30ACi locomotives from Transnet Freight Rail (TFR) in December of 2009.

The contract formed a part of Transnet's ambitious fleet renewal programme, which is an integral component of the South African government's commitment to



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*Thomas Konditi, president and chief executive, GE Transportation Africa and GE South Africa*



One of the 233 GE Evolution Series locomotives, which is a part of Transnet's 1064 locomotive procurement programme.

#### Enhanced tractive effort

with a 548 KN starting and 460 KN continuous effort

#### Ergonomically designed cab for long-haul operations

#### Uncompromised tractive effort

in a lightweight, narrow-gauge application

#### 12-cylinder 4,200 HP GEVO 12 engine

applied in low clearance profile to meet local infrastructure requirements

#### High-adhesion fabricated bogies

#### CCB II electronic air-brake system with vacuum

Model	ES40ACi
No. of Axles	6
Weight:	Maximum 291,000 lbs (132 tonnes)
MT./Axle—Maximum	48,500 lbs/axle / (22 tonnes/axle)
Track Gauge	42" (1,067mm)
Clearance	BE 97-02
Emissions	EU IIIA
Horsepower (Gross)	4,200 HP (3,132Kw)
Horsepower (Tractive)	4,000 HP (2,983Kw)
STE (lbf /Kn)	123,200 lbf (548Kn)
CTE (lbf /Kn)	103,400 lbf (460Kn)
Maximum Speed	61 MPH (100Kph)
Max. Dyn. Braking Effort	64,750 lbf (288Kn)
Total Fuel	(Gal) 2,181 Gal (8,256L)
Useable Fuel	(Gal) 1,949 Gal (7,377L)
Engine Model	GEVO 12
Country Used	South Africa

invest R300 billion in infrastructure and rolling stock over a seven-year period<sup>1</sup>. South Africa's investment in railway infrastructure is intended to boost industrial production, encourage direct foreign investment and create greater economic diversity.

GE's partnership with Transnet has proven to be an investment in job creation, economic advancement and infrastructure growth on both sides of the Atlantic. To fulfil the requirements of the contract, GE had to ensure that more than 30% of the assembly process was completed locally and that the project included skills transfer to local teams. The first 10 out of the 100 locomotives ordered were delivered complete, from the USA. However, the remaining 90 were provided in kit form for local assembly at Transnet's Koedoespoort facility in Pretoria, South Africa.

The realisation of the localisation aspects of the contract demonstrates the shared commitment between parties to grow and revitalise South Africa's rail sector, and has undoubtedly strengthened the long-standing relationship between GE and Transnet. This is evidenced by the fact that the successful and efficient delivery of TFR's initial order has resulted in a second order of 103



"Among the key strategic contributions that the partnership has delivered to South Africa is localisation and skills development in the rail transportation sector."

*Zeenith Ebrahim, chief executive officer, GE South Africa Technologies (GESAT)*

additional units, to be manufactured under the same terms. The chief executive officer of GESAT, Zeenith Ebrahim, highlights the importance of the localisation aspects of the agreement by stating that: "Among the key strategic contributions that the partnership has delivered to South Africa is localisation and skills development in the rail transportation sector."

GESAT has provided thousands of hours' worth of training to their South African workforce and has spent more than R2 billion in preferential procurement, as part of their Competitive Supplier Development Programme (CSDP).

Today, GESAT is delivering in excess of 50% local content on their most recent order of 233GE Evolution Series locomotives, which is a part of Transnet's procurement of 1064 locomotives from various OEMs.

Ebrahim indicates that the journey has not been without challenges, particularly supplier liquidity and access to raw materials, however, she states that: "Our partners have walked the journey with us, which has kept the project running according to plan." The delivery of TFR's order is currently on schedule and will be delivered by the final quarter of 2018.

Ebrahim confirms that during the manufacturing process of the current locomotive order, the company is actively seeking further contracts for the continued utilisation of Transnet's Koedoespoort facility in Pretoria. "There are opportunities for African countries to use national demand to boost their economies, but key to realising that dream is buy-in from the various governments involved," Ebrahim states.



This is particularly relevant as many African countries are dealing with challenges emanating from different rail gauge widths, a hangover from the colonial era when Anglophone and Francophone countries invested in various rail gauges, which makes the seamless transportation of people and goods across African territories impossible under current conditions.

### Ushering In A New Dawn Of World Class Technology On the African Continent

The GE type C30ACi locomotive has proven to be the best-suited model to deliver on the South African Government and TFR's goals.

The locomotive has introduced many 'firsts' to South Africa's locomotive market, including the fact that it was the first AC diesel-electric locomotive to be introduced in sub-Saharan Africa, as well as the first locomotive to meet the UIC II emissions standards of the International Union of Railways (UIC). Most significantly, the GE type C30ACi is first GE locomotive to be fully assembled on African soil.

### Sustainable Railway Technology For Southern Africa

The GE Evolution series locomotive is powered by GE Transportation's 12-cylinder diesel engine. The

Evolution series engine produces the same 4,400HP as its 16-cylinder predecessor, but with greater fuel efficiency. This 45 degree, 12 cylinder, 4 stroke, turbocharged engine provides efficiency, lower emissions and extended overhaul intervals.

The engine uses enhanced cooling and higher-strength materials, which dramatically improves reliability and allows for future increases in power and efficiency. The Evolution series locomotive meets the most stringent emissions standards including USA EPA Tier 3<sup>2</sup> and EU IIIA<sup>3</sup>.

The GE type C30ACi locomotive, ordered by various operators in the SADC region, has the capacity to reduce CO<sub>2</sub> emissions by 1,500 metric tonnes annually, which is equivalent to eliminating the emissions from 310 cars on South Africa's roads. Three C30ACi locomotives are able to haul a load that would require four older models, which could reduce annual diesel fuel consumption by up to 600,000 litres under typical operating conditions.

### Growing Africa For Africa - Regional Integration At The Heart Of Development

GE continues to deliver to the broader Southern Africa market, with Mozambique currently taking

delivery of 100 GE locomotives to transport coal and freight, while Angola has taken delivery of the first 15 of its 100-order of GE locomotives, to offer countries in western and central Africa a strengthened logistics corridor. In addition, Namibia is taking delivery of six locomotives to boost its logistics corridor and drive economic growth.

GE Transportation regional services director Festus Ayeni states that: "It is invigorating to see significant growth opportunities for rail across Africa. Traditionally, rail has been viewed as outdated, colonial infrastructure, however, governments are increasingly recognising rail as the backbone of transport logistics that can boost economies and move goods and people effectively and efficiently."

This attitude change has come as African government leaders travel internationally, particularly within the BRIC (Brazil, Russia, India and China) nations, and are exposed to the impact rail has played in economic growth within the bloc.

Ayeni points out that India has invested in 1000 new locomotives and China has purchased an additional 700, while Russia has the world's largest rolling stock fleet, with 25,000 locomotives driving its economy.

*The GESAT team, delivering in excess of 50% local content towards the class 44.*



“Consequently, as governments mature and realise the value that rail brings to a country’s economy, there are substantial opportunities for investing in rail infrastructure and educating customers on how to revive the continent’s railways,” Ayeni states.

Ayeni goes further to explain that GE is investing in its own infrastructure and service teams to ensure the delivery of after-sales customer support. The company has boosted its support staff contingent to 50 members and has invested in new equipment, effectively bringing their technical expertise to grow individual gross domestic products (GDPs). GE Transportation aims to double its support team by year-end depending on its success in winning and closing several open deals.

However, Ayeni recognises the challenges in growing transportation infrastructure in Africa, particularly given that most economies on the continent are commodity-driven and thus affected by downturns in world commodity prices. Linked to this, is the high cost of infrastructure development, limited government budgets and difficulties accessing the necessary capital. In response

industry has also been viewed very negatively by young professionals in engineering fields and therefore does not attract young engineers. GE is actively recruiting young engineers into the transportation sector with more than half the company’s employees being under 25 years of age.

Ayeni’s sentiments are echoed by the president and CEO for GE Transportation in Africa, Thomas Konditi, who adds that the group is gaining traction in the managed service agreement concept, which guarantees the maintenance and running of its locomotives.

For example, as part of an agreement, GE Transportation ensures that their locomotives will be up and running and will have a predefined level of availability and reliability to minimise downtime and assist clients to achieve maximum output from their investment. A service agreement contract, which can extend up to 12 years after a purchase, draws on GE Transportation’s expertise to calculate the optimal maintenance cycle and limit unplanned failures on the line.

believes that there are a number of crucial areas in which it can add value. Beyond providing new locomotives, Konditi says that the group has the financial expertise to assist clients with acquiring and recapitalising their rolling stock.

Additionally, Konditi states that service partnerships ensure that customers keep their locomotives operating efficiently, while digital linkage, the ability to analyse data and operate the locomotives at optimal speed, efficiency and fuel consumption levels, is already paying dividends in Mozambique.

One practical application of the digitisation that GE is able to offer their clients is evidenced in digitally connecting locomotives to a company’s network. As a result, locomotives can be programmed to operate at optimal efficiencies. For example, if a receiving depot cannot accept a locomotive for a period of time, the network can slow down the train’s speed to accommodate for the delay and therefore saves fuel and prevents backlogs.

Konditi states that this process ensures that operations are both more efficient and reduces unplanned maintenance problems. Data of this nature also helps GE Transportation to build improved, more resilient equipment, as the company has access to critical information, such as the most common equipment failures, among others.

He says that the final element is the ability to apply transportation technology to power applications. Specifically, packaging technology for stationary use. Konditi cites Malanje, in north-east Angola, where the facility required power and has access to diesel, and therefore, GE’s locomotive technology was used to develop a large-scale diesel generation plant. This approach can now be replicated throughout the continent, where customers have access to fuel.

The six-unit installation in Malanje powers nearby towns as well as the local electricity grid, while in Ghana, mines that are too far from the national grid and require between 10 to 12MW have found this application to be a sound solution.



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*Festus Ayeni, regional services director, GE Transportation*

to some of these obstacles, GE is working proactively with a number of governments and private sector players to build partnerships that will enable further development of infrastructure on the continent.

Ayeni adds that rail infrastructure is typically state-owned, but that governments have more important priorities than investing in this infrastructure. The railway

However, Konditi states that the key to GE’s service excellence and core initiatives remains the company’s commitment to skills transfer, as it is through this process that GE Transportation is able to assist organisations to gain operational competence and internal strength.

When working within any African country where there is a functioning rail system, GE Transportation



“Creative solutions are the cornerstone of economic growth and development, and GE Transportation has the experience and expertise to respond to individual country’s problems to boost their rail efficiencies,” Konditi says.

Currently, the group is working in Zambia to modernise existing locomotives that are based on technology dating back to the 1980s, to efficiency levels that are more in line with current standards. Konditi says that buying new locomotives is not always feasible, but by working together, GE Transportation can provide training and services that contribute holistically to economic growth and development.

“GE Transportation strives to be a value-adding partner for its customers - there has to be a strategic benefit to the client beyond the sales transaction of the equipment. We strive to be a partner throughout the entire transportation process,” he concludes.

A testament to this is GE and Transnet’s recent partnership on digital technology, where the two companies plan to further diversify their relationship to digitise Africa’s transport sector.

Their proposed plan will deliver a digital solution that will seamlessly connect shippers and transport operators, making it dramatically easier for a company to understand pricing and capacity on the network, plan a shipment, and get their goods to market.

The solution will connect shippers and transport operators by providing real-time, data-driven insights on the status of shipments. It will take laborious processes, such as payments, customs and inspections from paper to the digital environment. The system creates an on-demand solution for transporting freight, inspired by consumer on-demand transportation models.

Speaking at the Gordon Institute of Business Science, the chairman and

CEO of GE, Jeff Immelt said: “The digital opportunity for industry is now. At GE, we have embraced data and analytics, and see it as a driving force, transforming our operations and those of our customers globally.”

GE Transportation is also sharing leadership best practice with their customers through its Leadership for Customers (LFC) programme, which was held on 31 January to 2 February.

The LFC programme is designed to strengthen the organisational capacity of clients and to build stronger relationships. The programme was attended by 50 customers from across sub-Saharan Africa.

Mr Mamadali Gulamo of Corredor Logístico Integrado do Norte (CLN) Mozambique, who participated in the event, stated: “This experience feels like a new start for CLN Mozambique, and has taught me that we could learn from GE in prioritising customer engagement.”

1. South African National Treasury (2012) National Budget presentation, Chapter 7: Infrastructure: <http://www.treasury.gov.za/documents/national%20budget/2012/review/chapter7.pdf>
2. USA Tier 1-3 Standards set the minimum requirements and industry standards for emission controls and energy efficiencies for non-road diesel engines - DieselNet: <https://www.dieselnet.com/standards/us/nonroad.php>
3. EU IIIA: The EU implemented the AllI standard for non-road diesel engines in 2011, aimed at setting minimum requirements for emission controls and improvements in the energy efficiency of off-road diesel engines. - Power Engineering International: <http://www.powerengineeringint.com/articles/print/volume-18/issue-8/features/diesel-engines-getting-ready-for-stage-iiia.html>