WIRED FOR CHANGE:
DATA CENTRES GO GREEN

AFRICA'S DATA REVOLUTION IS UNFOLDING AT BREAKNECK SPEED. FROM MOBILE BANKING AND CLOUD COMPUTING TO AI AND SMART CITIES, THE DEMAND FOR DATA IS TRANSFORMING HOW THE CONTINENT WORKS, CONNECTS, AND COMPETES GLOBALLY. BUT THIS TRANSFORMATION CARRIES A CARBON COST.

Data centres, the silent workhorses of the digital age, consume enormous amounts of energy and water. In Africa, where electricity grids are often unstable and water resources scarce, this has prompted a fundamental question: how can the continent scale its digital backbone without undermining its sustainability goals?

DESIGNING FOR EFFICIENCY

Data centre sustainability in Africa begins with design. Modular structures, smart insulation, and passive architecture are no longer fringe concepts — they're foundational principles.

"Across the continent, I see operators becoming far more intentional about sustainable design and operations. We're seeing strategic deployments of modular data centre designs, advanced cooling techniques like cold aisle containment and liquid immersion, and a shift toward facilities that can achieve Power Usage Effectiveness (PUE) ratings below 1.5," notes Marshal Luusa, Partner, KPMG. "In places like South Africa, Kenya, and Nigeria, new builds are targeting global green building standards such as LEED and EDGE. Cooling remains a major focus, especially in water-scarce regions, where operators are replacing traditional water-intensive systems with direct air and closed-loop cooling technologies."

While Shaun Versfeld, data centre director Africa, Haskoning, agrees about an increasing focus on sustainability, he highlights that the extent of implementation varies by region and market maturity.

"A key strategy involves localising design and construction. By sourcing materials and labour locally, operators reduce emissions associated with global transport while supporting local economies," says Versfeld. "While green building certifications such as LEED and EDGE are becoming more common globally, their adoption in Africa remains limited. Most operators are still in the early stages of aligning with these standards, and regulatory or market-driven incentives are not yet widespread."

Luusa adds that "there's also a strong push to use sustainable construction materials and repurpose industrial infrastructure. It's about reimagining not just what we build, but how we build it."

Cooling systems, in particular — a major source of energy and water consumption — are being reimagined. Operators are deploying advanced technologies such as closed-loop systems.

"To further optimise operations, energy management systems are being implemented to monitor and reduce consumption. These systems help track key metrics like Power Usage Effectiveness (PUE) and Water Usage Effectiveness (WUE), which are increasingly used to benchmark performance," says Versfeld. "Although nature-based solutions such as green roofs or rain gardens are gaining attention globally, they are not yet widely adopted in African data centre design. The focus remains on core infrastructure efficiency rather than architectural greening."

Claudia Unterkircher, NTT Data

This sentiment is echoed by Werner Schneeberger, Director – Building Engineering, Africa, at AECOM, who adds that "water is a scarce resource in Africa, and evaporative cooling is seldom used; instead, data centre operators rely on closed loop air-cooled chillers, which uses virtually no water."

Claudia Unterkircher, Senior Director Global Sustainability, NTT Data, explains how NTT's Johannesburg 1 facility exemplifies this shift: "in our Johannesburg 1 Data Center, we prioritise energy efficiency through the use of highly redundant, state-of-the-art systems and are committed to achieving net-zero emissions across our operations by 2030, with a goal of sourcing 100% renewable and low-carbon energy. Water conservation is a critical focus, given South Africa's climate. We utilise a closed-loop chilled water system with air-cooled chillers, which keeps water circulating within the system and results in a water usage effectiveness (WUE) ratio close to zero — significantly reducing our reliance on municipal water supplies."

POWER STRUGGLES

As Africa's digital infrastructure scales, its sustainability hinges on access to clean energy. Countries like Kenya have a head start: around 90% of its electricity comes from renewables, primarily geothermal and hydro.

"Data centre operators are involved and investing in large scale renewable energy projects giving excess energy back to the national grid. Large industry players are ISO certified and control a strict regimen to maintain their certifications, with focus given to energy usage, water consumption and carbon footprint," explains William Myer, Sales Manager, STULZ.

"The integration of renewable energy into data centre operations is progressing across Africa, though unevenly. Kenya stands out as a continental leader, with approximately 90% of its electricity already sourced from renewables, primarily geothermal, hydro, and wind. The government has set an ambitious target to achieve 100% clean energy by 2030 and is actively expanding geothermal capacity through projects like the Olkaria field," says Stijn de Kruijf, lead data centre sustainability, Haskoning.

Luusa confirms that the adoption of renewables remains uneven: "in markets like Nigeria and parts of Central Africa, where national grids are either weak or carbon-intensive, operators are having to get more creative. We're seeing promising innovations: rooftop solar PV installations, battery storage systems for backup, and hybrid microgrids that combine solar, diesel, and battery technologies to reduce carbon intensity. Power Purchase Agreements (PPAs) are also gaining traction, allowing data centres to procure renewable energy directly from independent producers."

"South Africa is undergoing a significant energy transition. The Integrated Resource Plan (IRP) and the South African Renewable Energy Masterplan (SAREM) aim to add up to 5GW of renewable capacity annually, focusing on solar, wind, and battery storage," says de Kruijf. "Nigeria is scaling up solar and mini-grid solutions through its Energy Transition Plan and the World Bank-supported DARES project, with a goal of achieving 30% renewable electricity by 2030. Small Modular Reactors (SMRs) are also being discussed as a potential long-term solution for clean, stable power. South Africa, which already operates the continent's only commercial nuclear power station (Koeberg), is best positioned to explore SMRs. However, adoption elsewhere in Africa is likely to be limited due to regulatory gaps and public perception challenges."

The challenges relating to the implementation of renewable energy, persisting across the continent, include high capital costs, intermittent grid performance and inconsistent regulatory support.

Moreover, Schneeberger highlights that

Stijn de Kruijf, Haskoning

"African data centre operators don't have much flexibility in setting the share of renewables in their utility supply, so they must make their own plans. Smaller operators install rooftop solar PV to provide some supply, but the bigger operators are limited by the space required for a solar installation large enough to make a difference. Even if adjacent land is available, the land cost would not make economic sense. This leaves the bigger operators to develop renewable projects where land is cheaper and then wheel the power to their facilities using the national grid. Wheeling policies are in place in Egypt, Kenya and South Africa, and other countries are working on implementing wheeling policies."

Grid instability remains the Achilles' heel of sustainable development across many African markets. In West Africa, power outages lasting days are not uncommon, forcing operators to rely on diesel generators — costly, carbon-intensive, and counterproductive to sustainability goals.

"Across all markets, not just in Africa, infrastructure reliability has a direct impact on the sustainability of data centres," asserts Cathy Granneman, Programme Manager, Innovation, GRESB. "When a grid is unstable or inconsistent, operators often need to build in layers of redundancy to guarantee uptime, which brings either additional costs or emissions — or both. These operational realities can limit the effectiveness of sustainability strategies, even when the intent is there."

"South Africa's Eskom-related load shedding has forced operators to invest heavily in diesel generators and battery backups, but it's also spurred innovation in energy storage and demand-side optimisation," says Luusa. "Meanwhile, Kenya's cleaner but aging grid enables greener operations, though redundancy planning remains essential. In Morocco and Egypt, substantial government investment in renewables is enabling green digital infrastructure almost by design. The key takeaway? Sustainability strategies must be context specific. They need to align with each country's energy landscape, regulatory readiness, and infrastructure maturity."

"Local infrastructure and energy grid stability have a significant impact on the sustainability practices of data centres across African regions," shares Unterkircher. "In areas where the grid is unstable or prone to outages, data centres are compelled to invest in backup power systems, advanced energy management, and renewable energy solutions to ensure continuous operation and reduce reliance on fossil fuels. This often leads to greater innovation in energy efficiency and the adoption of technologies like solar power, battery storage, and water-saving cooling systems. Ultimately, the reliability of local infrastructure shapes both the urgency and the feasibility of implementing green initiatives in African data centres."

REGULATORY REALITIES

Africa's regulatory landscape is as diverse as its energy mix. Some countries are racing ahead. Others are still drafting their playbooks.

de Kruijf outlines how Kenya's 2019 Energy Act and updated 2025 regulations mandate energy audits and efficiency investments; the government actively promotes geothermal energy and private sector participation in the grid. Nigeria's Environmental Impact Assessment Act requires sustainability considerations in new developments. The Energy Transition Plan and NREAP provide a roadmap for renewable integration. Meanwhile, in South Africa, The National Energy Efficiency Strategy and IRP support renewable growth, while green building policies and tax incentives encourage sustainable construction.

But de Kruijf sounds a note of caution: "bureaucratic red tape, corruption, and slow regulatory enforcement remain barriers in some regions."

Luusa believes that there are encouraging signs, with countries like Rwanda and Kenya actively promoting digital and green infrastructure through tax incentives, supportive energy policies, and regulatory sandboxes. South Africa recently introduced reforms that enable energy wheeling, opening new opportunities for off-site renewable energy procurement.

"Yet significant friction remains," observes Luusa. "Import duties on high-efficiency equipment, lengthy permitting processes, and the absence of cohesive national data strategies in some jurisdictions continue to slow progress. Regulators must develop a deeper understanding of the unique energy and sustainability profiles of digital infrastructure."

Schneeberger agrees that "policies can enable beneficial changes, like allowing more renewables and wheeling. On the other hand, policies can also limit undesired outcomes, such as air quality legislation calling for low emissions generators."

Unterkircher shares her experience with NTT Global Data Centers, stating that "supportive measures, such as clear regulatory frameworks, incentives for renewable energy adoption, and alignment with international standards, help us advance our ambitious sustainability goals, including achieving net-zero emissions in our operations by 2030 and using 100% renewable and low-carbon energy in our facilities. However, regulatory complexities, inconsistencies in policy implementation, and evolving compliance requirements can sometimes slow progress or add operational hurdles."

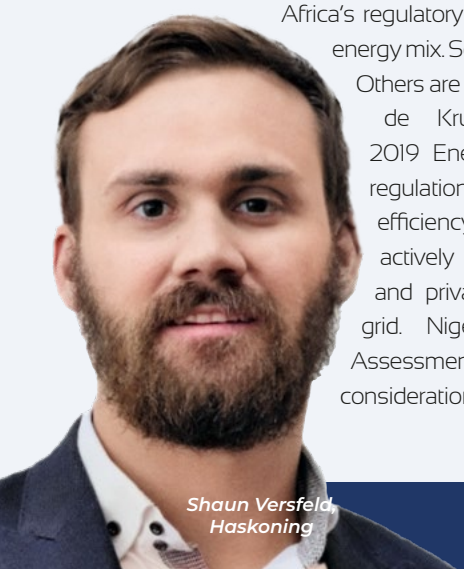
THE RISE OF SMART INFRASTRUCTURE

Artificial Intelligence and the Internet of Things aren't just tech buzzwords — they're operational game-changers, even for the smallest of data centre facilities.

"Globally, AI is playing a growing role in making data centres smarter, more efficient, and more sustainable," shares Granneman. "These technologies enable operators to optimise cooling systems, respond dynamically to changes in power availability, and anticipate maintenance needs before failures occur. In regions where power and water are constrained, these tools may be able to help maximise efficiency from limited resources."

Luusa agrees that AI is revolutionising how data centres are operated, predicting load spikes, dynamically adjusting cooling systems, and improving energy utilisation in real-time. Some facilities report energy savings of up to 30% through AI-powered optimisation algorithms alone.

"IoT sensors are also making infrastructure smarter, enabling predictive maintenance, identifying inefficiencies, and enhancing uptime. We're also witnessing the emergence of digital twins, virtual



Shaun Versfeld, Haskoning

Marshal Luusa, KPMG

replicas that simulate real-time performance and help guide more sustainable infrastructure decisions," says Luusa. "If Africa can leapfrog legacy systems in telecoms, we can do the same in digital infrastructure, leveraging AI, IoT, and blockchain to build intelligent, climate-conscious data ecosystems."

"AI and IoT enable predictive maintenance, real-time energy optimisation, and smarter cooling management," agrees Versfeld. "Although adoption is still in its early stages, these tools are increasingly seen as essential for achieving long-term sustainability goals and operational excellence. As digital infrastructure matures, the role of AI and IoT is expected to grow significantly."

At NTT Global Data Centers, AI and IoT are central to sustainability goals.

"By deploying AI-driven systems, we can optimise energy usage, predict maintenance needs, and manage workloads more intelligently, reducing both operational costs and environmental impact," describes Unterkircher. "IoT solutions provide real-time monitoring of energy, water, and environmental conditions, enabling us to detect anomalies, prevent waste, and ensure efficient resource utilisation. Through the integration of AI and IoT, we are building smarter, greener data centres that set new benchmarks for efficiency and environmental stewardship in Africa."

Myer, however, warns that "the evolution of IoT and AI have resulted in all future projects being placed on hold for re-engineering to facilitate emerging technologies, legacy or existing infrastructure is also being redesigned for limited implementation of new technologies but with the downside that facilities were not designed for operation, weight loads and power-hungry technologies."

ESG IS NO LONGER OPTIONAL

Sustainability isn't just a local consideration anymore. Investors and hyperscale clients — especially those headquartered in Europe or North America — are bringing global ESG standards to Africa's doorstep.

"Sustainability is not only relevant but increasingly strategic for data centres in Africa. As in other regions, energy and water are directly tied to operational costs and reliability," says Granneman. "More importantly, a strong sustainability approach positions operators to meet the expectations of international clients and investors, many of whom have made public net-zero commitments and apply sustainability standards across their supply chains and portfolios. Data centres that prioritise energy efficiency, renewable integration, and transparent emissions reporting are more resilient, more attractive to stakeholders, and better aligned with long-term value creation."

"Clients demand sustainable data centres, and sustainability leads to increased efficiency and reduced OPEX," adds Schneeberger.

Indeed, power costs can account for up to 50% of a data centre's operational budget, making sustainability a pragmatic choice.

"The relevance of sustainability is driven by high energy costs and unreliable grids, making energy efficiency and renewable integration economically essential. Broader energy efficiency legislation is beginning to include data centres as major energy consumers, while environmental impact assessments embed sustainability into the design phase of new projects," asserts de Kruijf. "Investor and customer expectations around ESG performance are also rising, pushing operators to demonstrate environmental responsibility. Even in the absence of local mandates, many African data centres are aligning with global best practices, such as those from the Uptime Institute and The Green Grid, to guide their sustainability efforts."

"Reducing energy use through efficient cooling, intelligent load management, and renewable integration isn't a public relations exercise, it's a profitability strategy," claims Luusa. "At the same time, international clients, particularly hyperscalers and global cloud service providers, are demanding strict ESG compliance. African operators must align with these expectations to remain globally competitive."

Yet, according to Luusa, beneath these strategic drivers lies a deeper, more uncomfortable paradox: as Africa builds data centres to train large language models, millions still lack electric light. This paradox must shape how we define digital progress.

"The reality is stark: in several African countries, more than half the population still lives without reliable access to electricity. National grids remain fragmented, unstable, or altogether absent in many rural areas. Against this backdrop, the rise of AI-ready data centres, power-hungry facilities designed to train and deploy large language models, presents a profound dilemma. How do we reconcile the pursuit of high-performance compute infrastructure with the lived experience of millions who remain off-grid?" asks Luusa. "This tension doesn't undermine the case for AI or digital expansion, it enhances it. AI holds the potential to transform African agriculture, education, healthcare, and governance. But its infrastructure must be developed with a mindset of shared value. That means investing in renewable microgrids that serve both data centres and local communities, enabling edge computing that decentralises power loads, and designing policies that link digital infrastructure growth to national electrification agendas. Sustainability, then, must be viewed not only through the lens of carbon reduction or green building practices, but also through equity and inclusivity. If we build with intentionality, data centres can become. catalysts, not competitors, for broader energy access. Africa's digital infrastructure future must be green, yes, but it must also be just."

A GREENER CONTINENT

Africa is digitising faster than many regions did during their industrialisation. This gives it a rare chance to leapfrog the environmental pitfalls of the past and set a new global standard for sustainable digital infrastructure.

"When I reflect on the evolution of data centres across Africa, it's clear that we're not merely building the physical backbone of the continent's digital economy, we're also laying the groundwork for a greener, more resilient future," concludes Luusa. "Over the past decade, data centres have emerged as essential infrastructure, supporting everything from mobile banking and e-commerce to cloud computing and AI. Yet, as demand for digital services surges, so does the responsibility to ensure that these facilities operate sustainably and efficiently."

By embracing energy-efficient technologies, renewable energy, supportive policy frameworks, and ethical design, the continent can ensure its digital transformation is both powerful and planetary-friendly. ●

Werner Schneeberger, AECOM