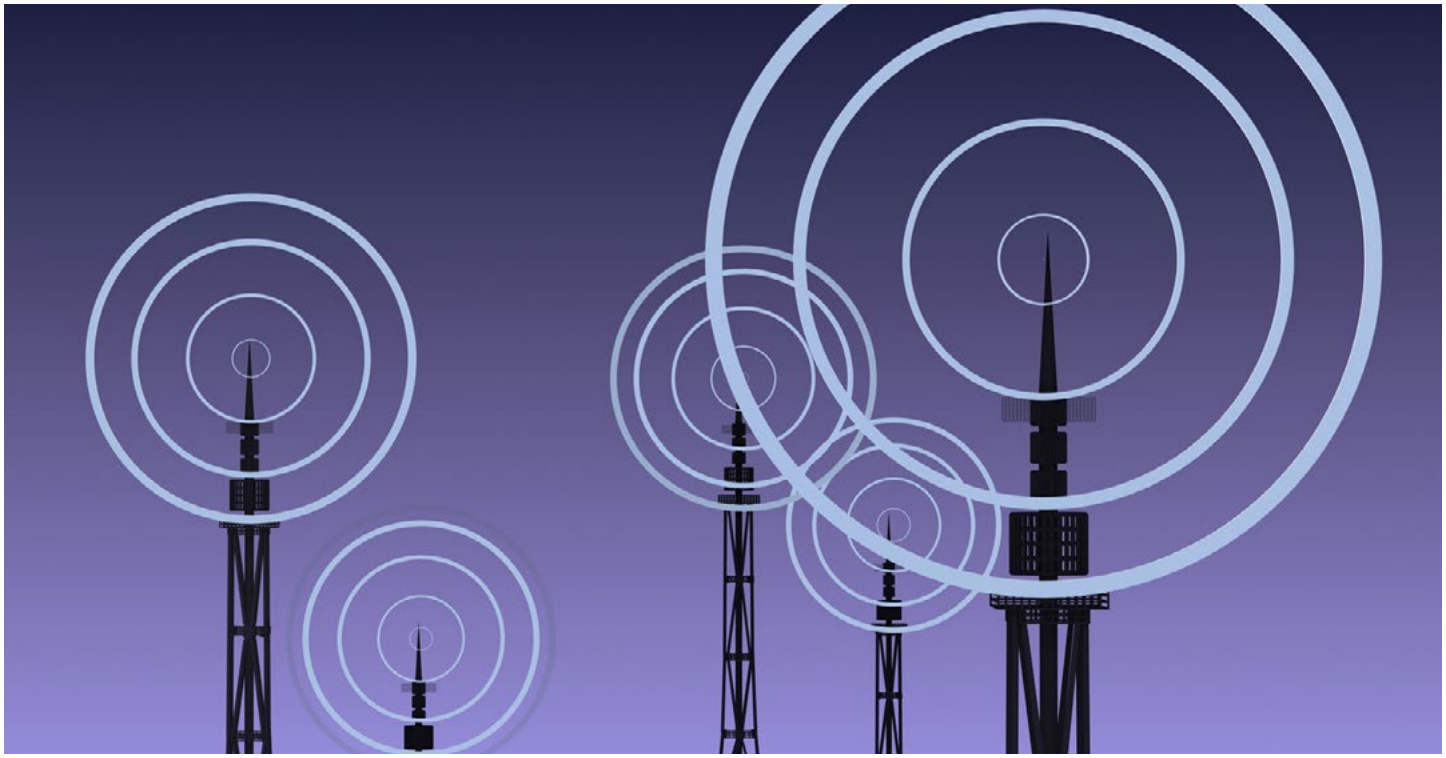


Towering ambitions: can Africa's cell sites hit the elusive 99.8% uptime?

In a continent where connectivity is not just a luxury but a lifeline, Africa's telecom towers stand as silent sentinels of the digital age. Yet, these essential structures are struggling to meet a critical benchmark: 99.8% uptime. This target, while seemingly small in difference from current performance levels, marks a major leap in reliability and economic impact. With uptime directly linked to digital service availability, the challenge is both technical and transformative.

The elusive benchmark

Africa's telecommunications towers have made significant strides in recent years, but reaching 99.8% uptime remains a challenge for many operators on the continent. According to industry reports, Africa's average tower uptime is around 95–97%. The reasons behind the shortfall are manifold.

"Africa's towers often face challenges in achieving 99.8% uptime, particularly in rural and remote areas," says Anoj Singh, Vice President of Global MNO Business at Vanu. "While urban areas with better infrastructure may approach this benchmark, the overall performance is hindered by several factors such as reliability of grid power, infrastructure gaps, harsh environmental conditions, theft and vandalism."

"Achieving 99.8% uptime remains challenging for many towers in Africa due to various factors, including energy-related issues, vandalism and theft, and maintenance delays," agrees Al Mahdi Chakri, Head of Portfolio Development for Mobile Networks MEA at Nokia. "For power, TowerCos need to ensure that their power solutions are properly designed and account for traffic growth, which can lead to increased power consumption."

Chu Yanli, Vice President, ZTE Corporation, asserts that "Africa's power grid infrastructure is in a phase of continuous development, where power stability in certain regions may impact the sustained operation of base station equipment. There is room for optimisation in the configuration and maintenance strategies of backup power sources (such as diesel generators and

batteries), requiring systematic improvements to ensure the continuous uptime and operational capacity of telecom towers."

Indeed, the biggest challenge faced by infrastructure providers in this continent lies in energy efficiency and power reliability. Many towers still depend on expensive and polluting diesel generators because of unreliable electricity grids. Limited digitalisation also makes it harder to maintain towers efficiently.

Network congestion and outdated backhaul infrastructure compound these challenges. In many rural areas, insufficient bandwidth during peak hours can lead to outages, frustrating users and reducing revenue for operators. Moreover, the vast geographical expanse of Africa, coupled with local transportation constraints, presents accessibility challenges for equipment.

"Traditional scheduled maintenance models face efficiency pressures when pursuing high availability targets, necessitating the introduction of intelligent operation and maintenance (O&M) technologies for support," notes Yanli. "There is a need to strengthen specialised maintenance and debugging skills for local energy equipment (including PV systems, oil generators, lithium batteries, etc.), which currently limits the flexibility in troubleshooting timelines. Additionally, the decentralised nature of O&M resources imposes certain constraints on response efficiency."

Yet, not everyone agrees the situation is so bleak. Christopher Greaves of TowerXchange offers a counterpoint: "most Towercos do achieve 99.8% or above uptime in Africa due to stringent SLAs, but this comes at significant cost in energy (and in some markets theft replacement) capex and opex. There is an emerging discussion in the African Towerco sector as to whether the 99.8% uptime requirement is practical given the burden this places on pass-on cost to MNOs."

> "While the more established tower companies in Africa such as IHS Towers and Helios Towers guarantee a 99.7–99.9% uptime, the smaller infrastructure owners struggle to meet a 99.8% uptime SLA."

Tech to the rescue

Technology, it seems, may offer a solution. From AI-powered monitoring systems to hybrid renewable energy setups, innovation is becoming the lifeline to higher uptime.

While the more established tower companies in Africa such as IHS Towers and Helios Towers guarantee a 99.7–99.9% uptime, the smaller infrastructure owners struggle to meet a 99.8% uptime SLA. Technology can bridge this gap. Renewable and sustainable energy storage solutions can counter grid instability; robust remote monitoring solutions help to track energy consumption, outages, and faults, and leverage AI/ML frameworks to predict and prevent failures.

One of the most transformative developments in this space is remote tower monitoring. No longer a luxury, it has become a necessity.

"Remote monitoring is paramount for remote tower availability," notes Chakri. "In fact, remote towers using self-optimising, predictive maintenance and automation lead to improvement at different levels. It allows more optimised usage of the different energy sources used in the tower, which increases efficiency while reducing cost."

Greaves elaborates: "Remote tower monitoring is having a major impact in the efficiency and ability of Towercos to manage their distributed tower assets. Benefits include the reduction in site visits, saving transportation cost and improving efficiency of time for ground teams. It allows for the adoption of predictive maintenance to reduce risk of downtime."

Singh emphasises the broader implications: "Remote monitoring is enabling tower operators to maintain services in off-grid or remotest of remote locations, improving connectivity in underserved regions."

Meanwhile, Yanli highlights that technology is also the answer to energy management challenges that challenge tower uptime.

"By deploying intelligent operation and maintenance management systems, operators can monitor the energy operation status of sites in real-time, promptly identify issues, and conduct remote diagnostics and repairs, reducing the frequency and duration of on-site maintenance by personnel and improving maintenance efficiency," explains Yanli. Moreover, "by deploying solar power supply systems and enhancing battery energy storage systems, such as hybrid solar-battery or grid-battery power supply, reduce reliance on the grid and improve energy efficiency. Currently, the industry is vigorously promoting comprehensive energy solutions like hybrid solar and lithium battery-grid power supply for telecom tower stations."

Of course, enhancing equipment protection and environmental adaptability in the design phase is also key to supporting increased uptime and reliability.

"To address harsh natural environments, operators can take measures to strengthen equipment protection. For example, use equipment enclosures resistant to high temperatures, corrosion, dust, and water, adopt outdoor cabinets with IP55 or higher ratings, and configure flexible temperature control solutions to adapt to high-temperature and high-humidity environmental conditions." Yanli further recommends "establishing a comprehensive anti-theft system: implement integrated anti-theft measures such as top-level anti-theft cabinets, smart electronic locks, site video surveillance, and remote RMS management to reduce the risk of battery theft and site outages."

Operational efficiency meets sustainability

The addition of advanced technologies doesn't just boost performance; it also contributes to sustainability and cost-efficiency.

Remote monitoring solutions and efficient site management tools go hand in hand to transform the tower sector in Africa by reducing costs and improving reliability. They help in increased uptime, lower expenses, boost in energy efficiencies, and enhanced security to prevent theft.

"To achieve higher uptime levels, TowerCos and MNOs face increased capital expenditures (CAPEX) due to infrastructure upgrades, such as backup power systems (lithium batteries, generators, solar hybrid solutions), enhanced site security, and advanced monitoring. For example, one operator in South Africa needed to upgrade 4,000+ sites with new power systems and anti-theft measures, significantly raising initial investment costs," notes Yanli.

Operational costs (OPEX) also rise due to higher maintenance expenses for generator fuel, battery replacements, and energy consumption. However, improved uptime can reduce revenue

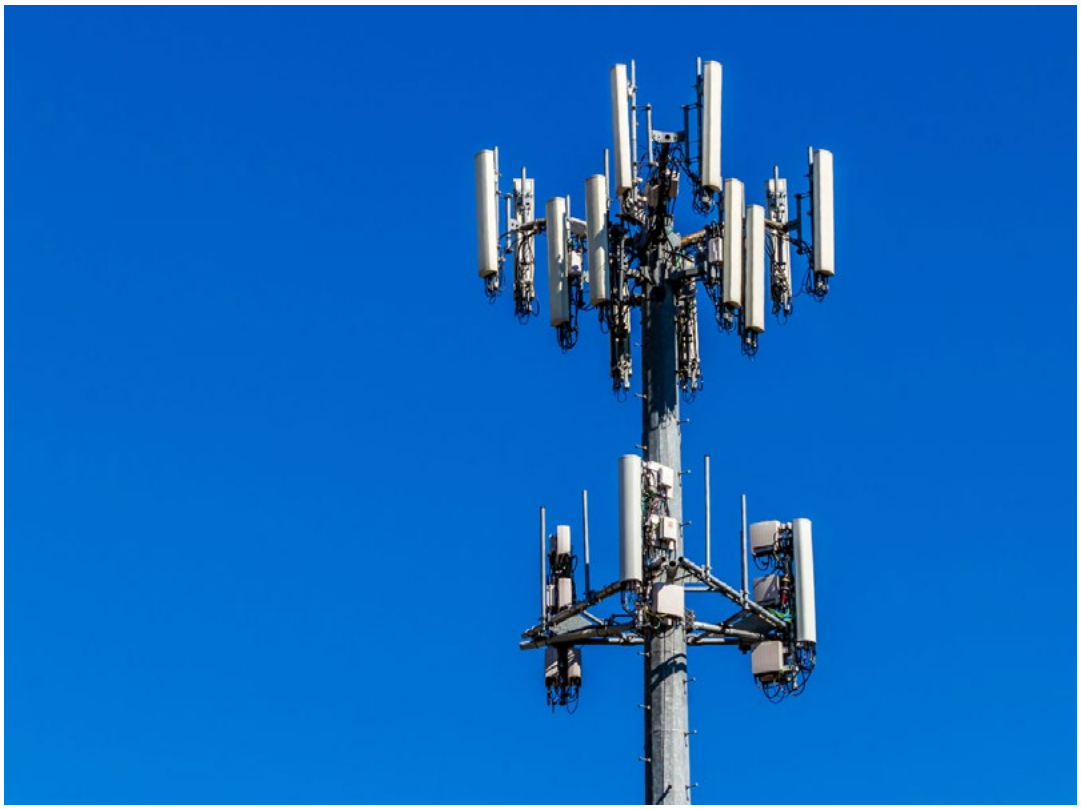
Chu Yanli, ZTE Corporation

Christopher Greaves, TowerXchange

losses from outages.

"Short-term service costs may increase due to higher infrastructure investments, potentially leading to elevated leasing fees for MNOs or slightly higher end-user tariffs," adds Yanli. However, "long-term benefits include improved network accessibility, particularly in regions with unreliable grids (e.g., South Africa's daily power outages). Enhanced uptime is critical for 5G and enterprise applications."

While pursuing higher uptime demands significant financial and operational efforts, the long-term gains in network reliability, customer retention, and support for mission-critical services justify the investment. Future trends, such as renewable energy adoption and AI-powered O&M, could further optimise costs while sustaining high availability.



Looking ahead

The path to 99.8% uptime is not uniform; it is paved with custom solutions, site-specific strategies, and a relentless focus on technological innovation. Yet for every challenge, there is also opportunity.

Yanli believes that the most promising developments may in fact stem changes in government policies, which "can introduce support for telecom infrastructure development, such as tax reductions, subsidies, and streamlined approval processes, which can lower operational costs for providers and enhance their ability to invest in and maintain telecom towers."

African governments and international organisations are increasing investments in power infrastructure for remote areas, improving energy access through initiatives like microgrids. This technology can connect multiple telecom towers to a small, independent power network, enabling power sharing and complementarity.

"This can improve the stability of power supply across the entire network and reduce the impact of single-point failures," says Yanli. "Additionally, close collaboration between energy companies and telecom operators can facilitate the joint development and maintenance of energy infrastructure, optimising resource allocation and sharing to improve the reliability and economic viability of power supply."

Further, as renewable energy technologies continue to advance and costs decrease, telecommunication base stations may well increasingly adopt solar photovoltaic as their primary power source.

"The integration of energy storage into hybrid power supply solutions will also become more prevalent," asserts Yanli. "These systems can intelligently switch between different energy sources, ensuring continuous power supply and maintaining operations even during harsh weather or grid failures. This necessitates more intelligent centralised management systems. Through these systems, energy usage can be monitored and optimised in real-time, energy demands can be forecasted, and automatic switching to energy storage systems can occur when power supply is insufficient. This will further enhance energy utilisation efficiency and system reliability."

Also focusing on Africa's unstable power supplies, Greaves expects to see technology adopted fastest in the energy component of tower operations: "this is where most of the pain points are. AI is becoming increasingly better understood and operations/technology executives are paying more attention to how AI can be utilised to drive operational and technical efficiencies. Most TowerCos in Africa have adopted some form of power-as-a-service or in-house energy generation, and AI is proving to be a critical tool in helping balance run-time of complex hybrid energy systems utilising a combination of renewable, battery, grid, and back-up generator power. Digital twin technology has also been around for a few years now, and seen some early adoption, but has not quite seen widespread take-up due to cost and questions of practicality. But as TowerCos shift their strategic focus away from M&A towards lease-up and increasing colocation, the use-case of digital twins may strengthen to help TowerCos manage increasingly complex sites."

Beyond energy, Greaves notes that "there is also an increasing move towards predictive maintenance to prevent the risk of site downtime by mitigating risks ahead of time. Other IoT and AI-based platforms can help to improve efficiency of on-site energy equipment and grid balancing to reduce energy costs and extend capex replacement cycles for equipment."

Singh is optimistic about what's to come: "Adaption of remote monitoring is expected to grow, drive better service delivery, cost efficiency and reliability across the African continent. This shift is vital to support Africa's expanding telecom market and increasing demand for connectivity."

In a sector where uptime is more than a metric — it's a mandate — Africa's tower industry is showing signs of resilience, adaptability, and innovation. While 99.8% might remain a tough target, it's no longer out of reach. Indeed, the question isn't if African towers can achieve 99.8% uptime, but how fast and how sustainably we can get there. ■

Al Mahdi Chakri, Nokia