



"A member of the IDC group of companies"

PASSIVE INFRASTRUCTURE AND POWER RESILIENCE AS A FOUNDATION OF QOS DELIVERY

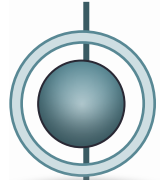
Infratel's Role in Zambia's Telecommunications Value Chain

STEPHEN NGALA

Chief Technical Officer, Infratel Corporation Limited

12th May 2026

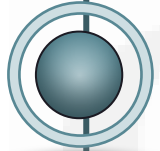
PRESENTATION OBJECTIVES



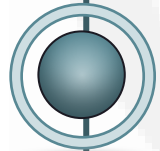
Infratel's Strategic Market Role



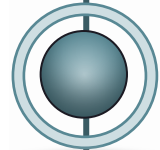
Zambia's Towers Landscape & State



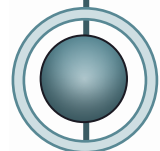
Load Shedding Crisis & Impact



Power Resilience Deployment Strategies

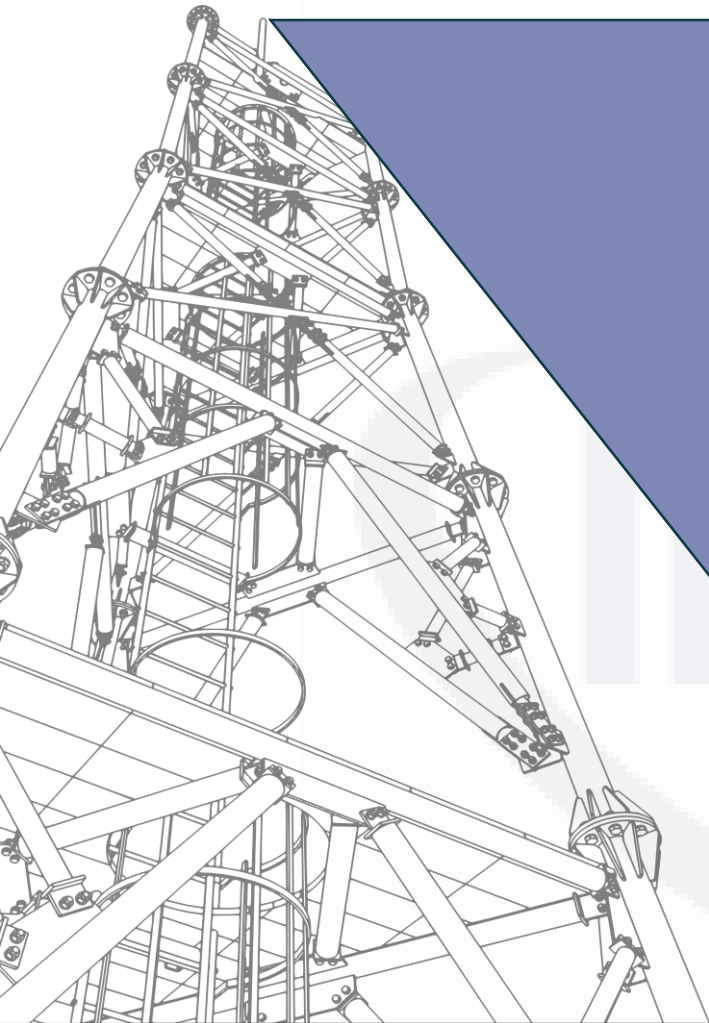


The Role of Passive Infrastructure for QoS Delivery



QoS Delivery Key Challenges & Opportunities

INFRATEL'S STRATEGIC MARKET ROLE



Infratel Corporation Limited is a Zambian telecommunications infrastructure provider and digital solutions partner, delivering shared passive infrastructure and secure, scalable ICT solutions to accelerate national digital transformation objectives

Tower Colocation

Managing **1,256 tower sites**, nationwide, engineered for multi-tenant MNO & wireless usage, maximising asset efficiency and coverage.

Datacentres

Operating **3 Tier III certified datacentre facilities** delivering secure and resilient hosting environments required for mission-critical digital services

DIGITAL SERVICES

1. Cloud & Virtual Infrastructure Solutions
2. Storage, Backup & Business Continuity solutions
3. Cybersecurity & SOC Services
4. Software Development & Digital Platforms

ZAMBIA'S TELECOMMUNICATIONS TOWERS LANDSCAPE

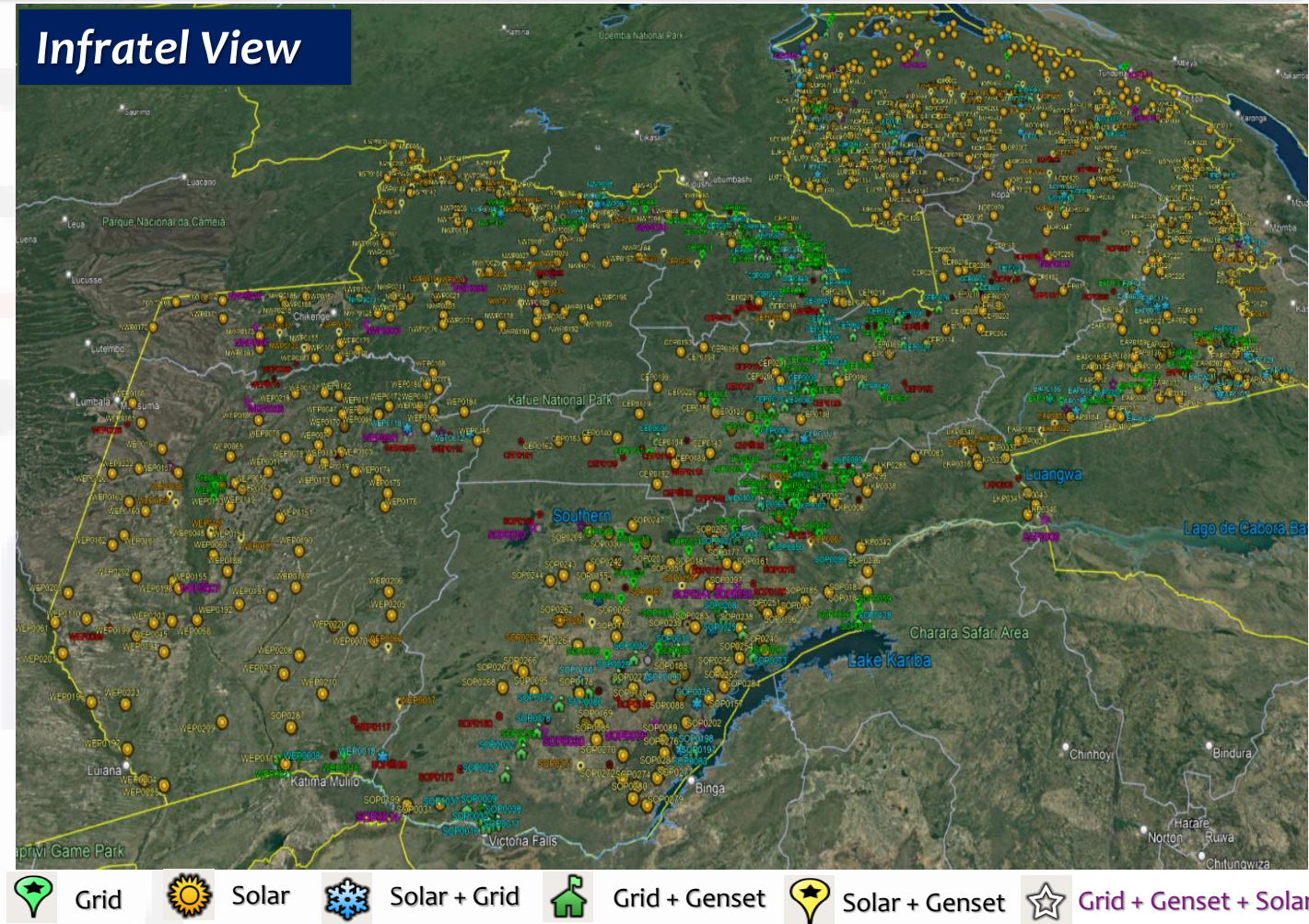
3,751
Communication Towers

IHS: 1,992 (53.1%)
Infratel: 1,256 (33.5%)
Others: 501 (13.4%)

Urban Focus: Predominantly grid-connected with high-capacity fibre backhaul.

Rural Dynamics: Relying on solar-hybrid systems and microwave links.

Tech Shift: Accelerating 4G/5G rollout to replace legacy 2G/3G systems.



CURRENT STATE OF ZAMBIA'S PASSIVE INFRASTRUCTURE

“1” Structural Stability

Towers remain structurally sound and engineered for long-term load bearing. The physical foundation is stable and capable of supporting current and future radio equipment.



Hybrid Power Solutions Adoption

Rising adoption of green energy solutions such as solar and Lithium-ion batteries on tower sites to mitigate dependence on diesel

Power Systems Obsolescence

Ageing power systems utilising legacy lead-acid technology. There is a critical capacity gap in on-site energy storage, making 24/7 uptime nearly impossible under current grid conditions.



Security Risks

High incidence of diesel, battery and cable theft, and site vandalism remains a major threat to network continuity.



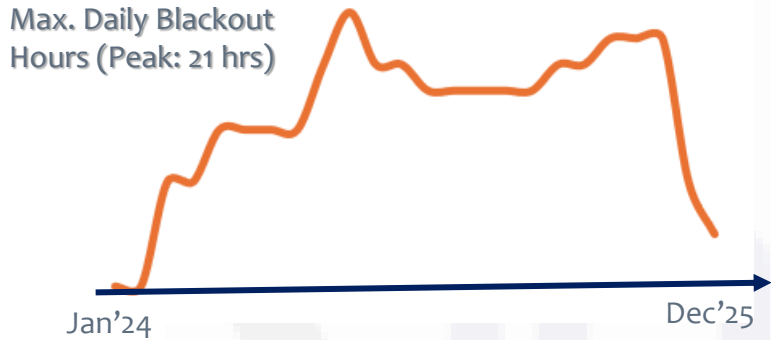
Environmental Stress

High risks of weather induced load shedding accelerate equipment and battery degradation.

THE LOAD SHEDDING CRISIS: DROUGHT-INDUCED POWER DEFICITS

Climate Impact & Trends

In the 2023/24 rain season, Zambia experienced the worst drought, by impact, in over 40 years resulting in loadshedding stretching up to 21 hours in 2024 and 2025



(World Bank, 2020)

Zambia is highly vulnerable to drought, which typically occurs every 4 to 5 years

Zambia's mean annual rainfall has been decreasing by almost 2.3% per decade since 1960

Network Consequences

Service Degradation

Extended grid outages leading to increased cell downtime, frequent call drops, and failed data sessions.



Increased Operating Costs

Heavy reliance on diesel generators to power tower sites, significantly increasing fuel and maintenance costs

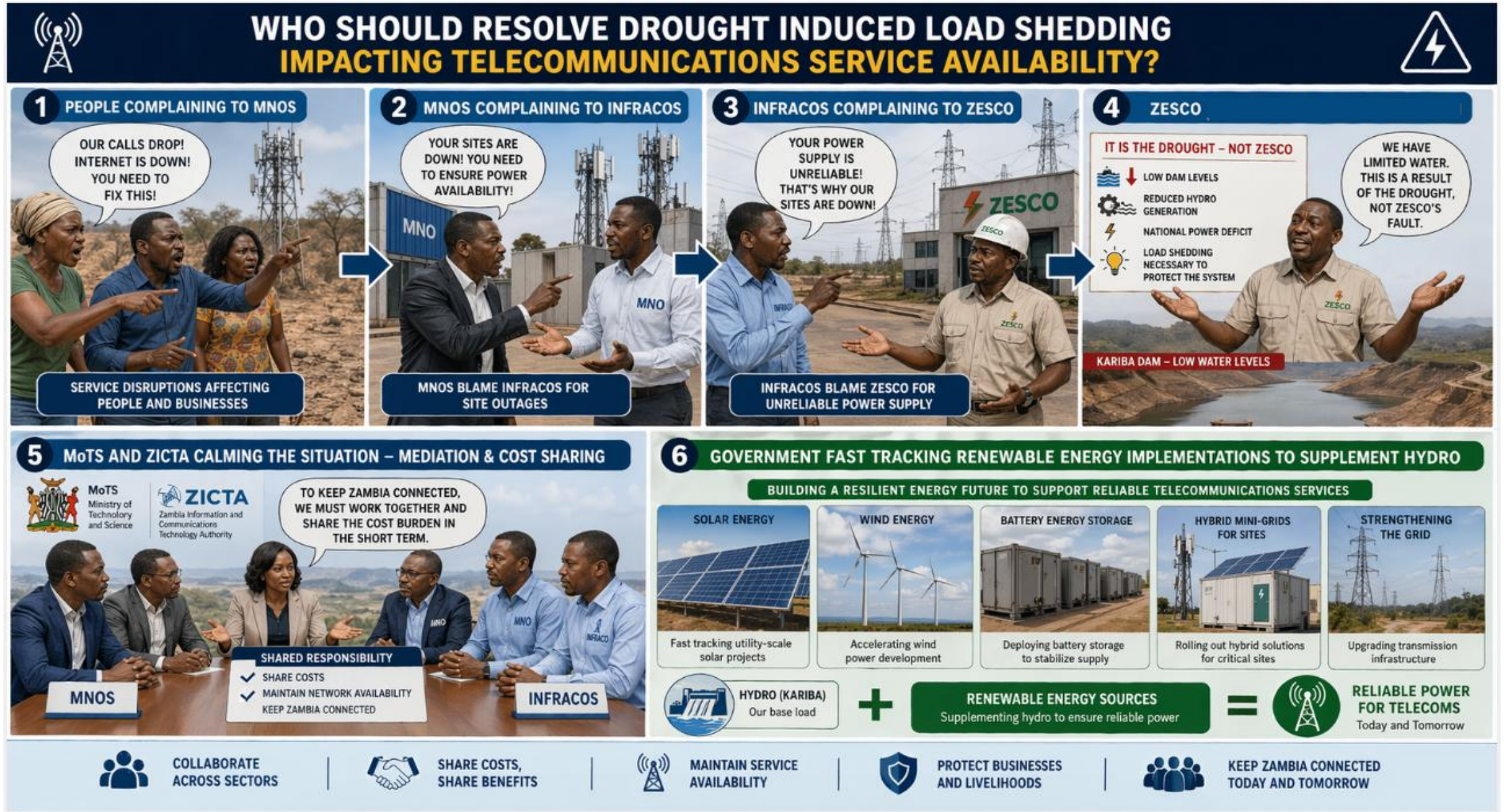


Equipment Damage and Shortened Lifespan

Accelerated wear and tear on telecom equipment, especially batteries, increasing failure rates and replacement needs

Sustained investment in robust tower-site resilience is critical, as climate variability continues to pose a persistent and escalating risk

RESOLVING ZAMBIA'S TELECOM POWER CRISIS: THE COMPLEX WEB TOWARDS RESOLUTION



Power Resilience Strategies Deployed to Address Load Shedding Impact

To combat the energy deficit, Infratel has deployed a robust three-tier power strategy to ensure towers' power resilience

1



Immediate Response (Keep Sites Online)

- **Fuel Logistics & Refuelling Operations**
 - Extra fuel funding (Collaborations)
 - Expanding DG tanks
 - Increase fuel delivery bowsers
 - Site access coordination
- **Diesel Generator Deployments**
 - Target Mobile diesel generators (MDGs) for critical sites
- **Diesel Generator Maintenance**
 - Increased servicing frequency



OPEX

2



Medium-Term (Optimisation)

- **Battery Backup Expansion**
 - Design requirements for increased battery autonomy (≥ 12 hours)
- **Battery Technology Upgrades**
 - Transition from lead-acid to Lithium-ion batteries
- **Solar Integration**
 - Integrate solar panels on selected high tenancy sites
- **Remote Monitoring Systems**
 - Real-time power fault detection



CAPEX

3



Long-Term (Sustainability)

- **Large scale renewable integration**
 - Mini-grid partnerships
 - Solar farms implementations
- **ZESCO Collaboration**
 - Critical telecom infrastructure prioritisation
- **Energy-as-a-Service (EaaS) Prioritisation**
 - EaaS partner collaborations
- **Tax waivers**
 - Negotiate zero rate import duties & VAT on renewable energy



TowerCos have absorbed significant operational costs to keep networks running. However, long-term resilience requires national renewable energy expansion and shared stakeholder responsibility.

INFRATEL's Role in the QoS Delivery Value Chain



Passive Infrastructure Provision

- Tower sites
- Towers
- Shelters
- Site security

✓ Wider coverage reach



Power Availability Management

- Generators
- Batteries
- Solar hybrid systems
- Fuel logistics

✓ Higher network uptime



Network Uptime Support

- Preventive Maintenance
- Corrective Maintenance
- Remote Monitoring (RMS)
- Rapid Fault response

✓ Lower downtime risk



Capacity Expansion Support

- New site rollout
- Rural expansion
- Network densification

✓ Faster scalability



Infrastructure Sharing

- Shared towers
- Shared energy systems
- Shared transmission assets

✓ Lower service delivery costs



Key Challenges in Supporting National QoS objectives

The Major Challenges Include:

STRUCTURAL CHALLENGES

- ✗ **Energy Instability**
Grid instability & diesel dependence
- ✗ **Rural Economics**
Low ROI & high CAPEX in remote regions
- ✗ **Infrastructure Security**
Vandalism & theft of critical assets
- ✗ **Payments Non-Compliance**
Delays and failures by some MNOs to settle their monthly obligations
- ✗ **Operational & Technology**
Legacy infrastructure and Integration of hybrid energy systems, & Real-time monitoring, automation, and predictive maintenance

STRATEGIC SOLUTIONS

- **Power Resilience**
Sustainable hybrid energy transition
- **Policy Alignment**
Streamlined permitting & sharing incentives
- **Ecosystem Security**
Collaborative industry protection measures

Key Opportunities in Supporting National Service Quality Objectives

- ✓ Efficient infrastructure is foundational for 5G, IoT and mission-critical applications
- ✓ The opportunity for Infratel is to reposition itself from a passive provider to a resilience-driven enabler of QoS
- ✓ Opportunities Include:

(High Impact + Lower Investment)

- Infrastructure sharing expansion
- Remote monitoring & analytics
- Maintenance/OPEX optimisation

(High Impact + High Investment)

- Accelerate hybrid energy rollout
- Rural connectivity scale-up

(Emerging Models + Medium Impact)

- Energy-as-a-Service (EaaS) to MNOs
- Smart energy management systems

(Strategic Long-Term)

- 5G-ready infrastructure
- Green energy leadership
- PPP-driven national projects

CONCLUSION

Infratel stands committed to continue being a key enabler in Zambia's telecom value chain by:

- **Fortifying energy resilience through hybrid power implementations in a challenging energy environment**
- **Maintaining and Improving tower infrastructure**
- **Enhancing proactive power infrastructure maintenance through advanced RMS system implementation**
- **Supporting government digital transformation and universal access objectives**
- **Strategic partnerships/collaborations and continued investment to sustain future growth and service quality**

Quality of Service (QoS) and Quality of Experience (QoE) are not just technical metrics,
They are direct outcomes of infrastructure availability and resilience. *anywhere.*



Enabling Digital Zambia



Thank you

