Communicating a Vision for Ghana's Future

“Blending Tech with Nature: The Future of Connectivity”

TreeGridTowerZ

This document is written expressly for Ghanaians—primarily our legislators and policymakers—but it also speaks to anyone who cares deeply about Ghana’s future and the role that world-class cellular connectivity can play in Africa’s development. In the pages that follow, we lay out a bold Public–Private Partnership model for deploying “living” TreeGridTowerZ across every corner of Ghana, weaving together ecological stewardship, economic growth and universal digital inclusion. Whether you represent a rural district with limited service, an urban municipality charting its smart-city path, or an investor seeking sustainable infrastructure opportunities, this proposal offers a clear roadmap to position Ghana as the first African nation—and one of only three globally—to achieve absolute land-network coverage, all while preserving and enhancing our natural landscapes.

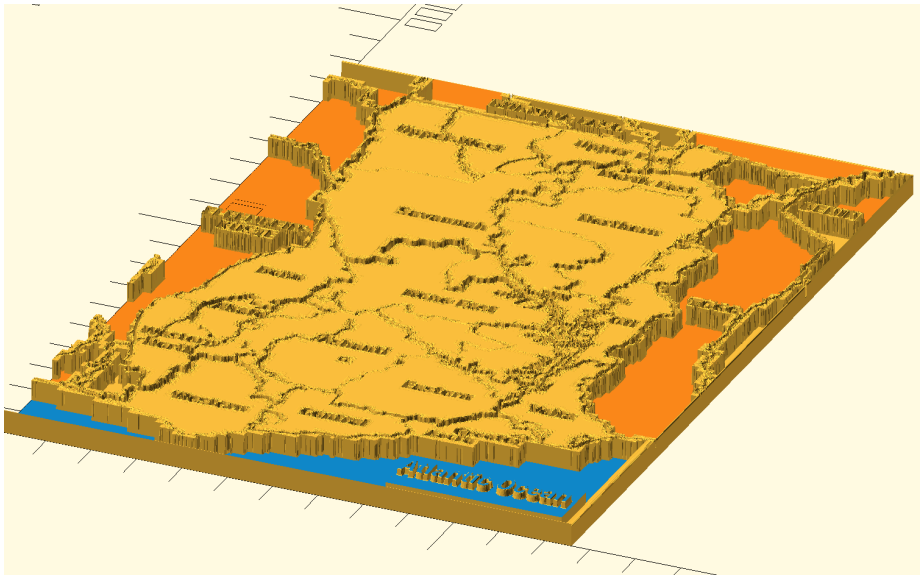
This document was written with the help of MERIDIAN Group of Companies.

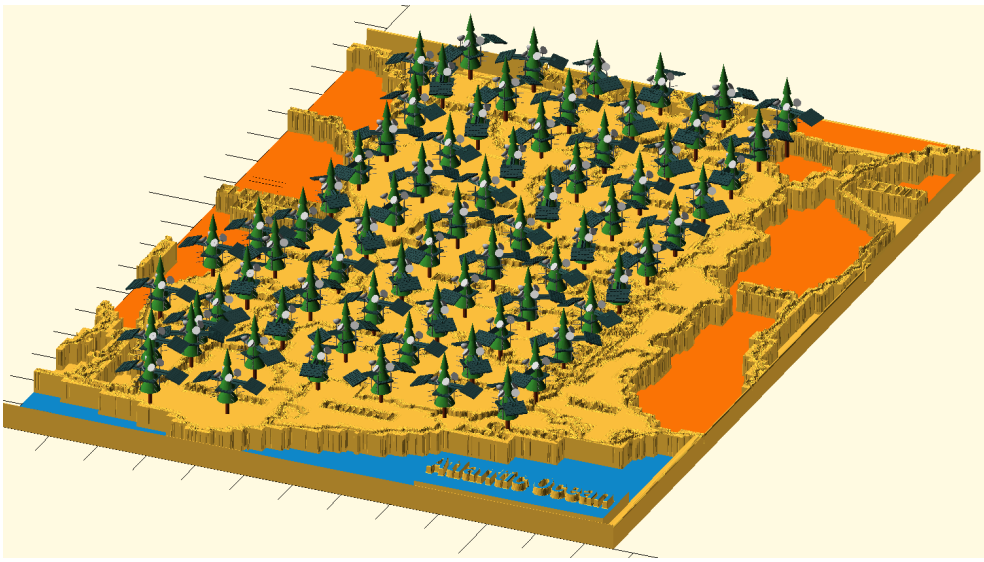
MERIDIAN
MANAGEMENT AND INVESTMENTS

If we look at the entire land area of Ghana

And then create a grid of communications equipment hotspots[1]

- 30 feet in the air,
- 8 kilometres apart





We ***create real estate*** that is infrastructural, useful and value-generating.

How much value does it actually generate?

We asked ChatGPT: “How much money does the average Ghanaian spend per month on total airtime?”

The answer that Chat GPT gave us: Telecom operators make an average of US$5.00 a month per subscriber.

There are 39 Million Mobile subscribers in Ghana[2].

So,

[1] (The figure is not to scale; it is depicted for demonstration purposes only.)

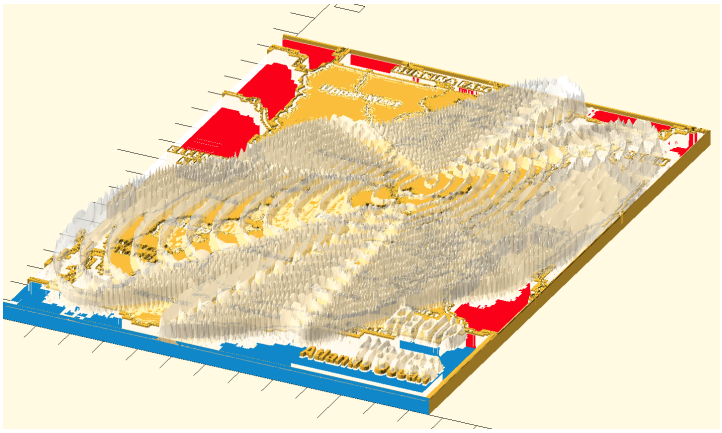
[2] according to Perplexity AI

39,000,000 x $5 = $195,000,000/month = 3,034,200,000 GH₵/month

Number of Subscribers	Amount Spent per Subscriber	Source
39,000,000	$5	ChatGPT (research)
39,000,000	77GH₵	Perplexity AI

So by manifesting this plan, **we create a monthly cash flow of 3 Bn GH₵ per month.**

What are the downsides?



We should observe that this would perpetually steep Ghana in a bath of radio waves…
For the general public, **the scientific consensus is that the low-level radio waves we experience daily are not harmful**. The energy is too low to cause ionization (the type that can lead to cancer).

The LandshifterZ group of companies and affiliated companies[3] TreeGridTowerZ project is an innovative initiative that seeks to integrate cellular network infrastructure with natural and urban landscapes using towers that are built by incorporating living trees. The proposal also aims to provide full network coverage, thus ***putting Ghana in the prestigious position of being the first country in Africa*** *(and the 3rd in the world)* with **absolute** land network coverage; all this while preserving the visual appeal of the surroundings, using designs based on species like African Mahogany and African Teak. Importantly, the proposal also strives to maximize the integration of living systems entwined with technology and human habitation so as to minimize the deterioration of natural ecosystem services rendered by ecological agents - thus leaving a more livable, comfortable and harmonious world for later generations.
This proposal outlines a Public-Private Partnership (PPP) initiative to establish nationwide cellular tree towers in Ghana. The project aims to expand digital infrastructure, enhance mobile connectivity, and support economic growth, in alignment with Ghana's Digital Agenda and ICT4AD policy.

[3] This includes LandShifterZ Ghana LTD (Ghana), LandShifterZ Designs LTD (Canada), LandShifterZ LTD (UK) and our affiliate - Terreform 1 (USA)

*Note: Although TreeGridTowerZ is an infrastructure project suggested at a national scale, LandshifterZ group of companies and affiliated companies[1] is not proposing to be the body that builds the infrastructure (the towers). Instead we believe that this is an opportunity for landowners in Ghana.

Project Objectives

The primary objectives of this project are:

• Achieve nationwide cellular network coverage, including rural areas.

• Increase mobile penetration and broadband access for economic development.

• Create jobs and stimulate local businesses in the telecom sector.

• Generate revenue for the government through licensing, taxes, and partnerships.

Economic & Revenue Impact

This project will generate significant economic benefits, including:

• Increased Foreign Direct Investment (FDI) in Ghana's telecom sector.

• Job creation in tower construction, maintenance, and telecom services.

• Revenue for the government through regulatory fees, spectrum charges, and taxation.

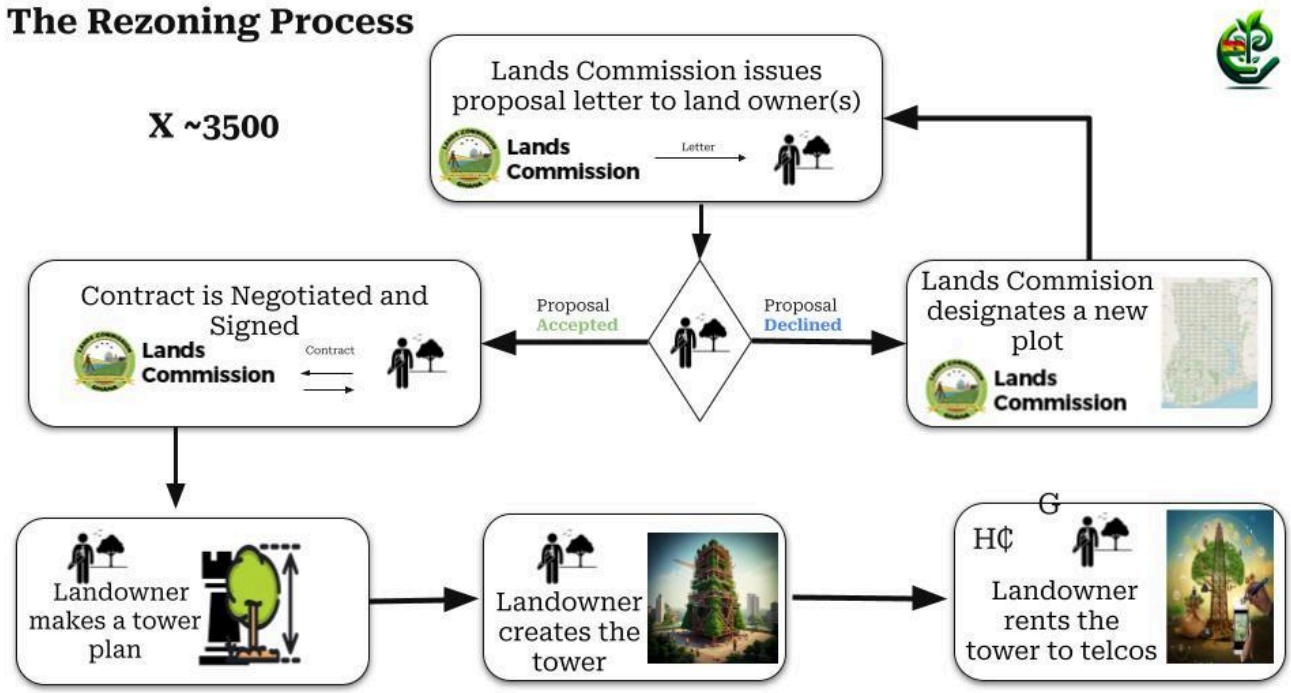
• Digital inclusion, enabling e-commerce, e-government, and financial technology expansion.

Regulatory & Environmental Considerations

• National Communications Authority (NCA) licensing requirements.

• Ghana Environmental Protection Agency (EPA) guidelines on radiation safety.

• Land-use regulations from the Lands Commission and traditional authorities



Public-Private Partnership (PPP) Framework

To ensure efficient funding and operation, we propose a PPP model where:

- The government provides regulatory support and fast-tracks approvals.
- Private sector investors finance and construct the cellular tree towers.
- The government earns a share of the revenue generated from telecom leases.
- Telecom operators lease tower space to expand their network coverage.
- LandShifterZ group of companies and affiliated companies[1] instead is offering to support the landowners to make it easy for them to turn this opportunity into a reality by:
    - Making funding options available to the landowners.
    - Making legal advice available to the landowners.
    - Matching landowners with architectural consultants.
    - Matching landowners with Botanical consultants.
    - Providing landowners with collection tools to streamline the profit flow and distribution.

Implementation Roadmap

The project will be executed in the following phases:

- Phase 1 (0-6 months): Regulatory approvals, land acquisition, and partnerships.

- Phase 2 (6-18 months): Construction and deployment of cellular tree towers.
- Phase 3 (18-24 months): Tower operation, telecom leases, and expansion.

Next Steps & Government Support Required

To move forward, we seek the government's approval and support in:

- Granting the necessary permits, spectrum approvals and zoning redefinitions.
- Facilitating public-private partnership discussions.
- For this project to happen the government must instruct the Lands Commission to conduct a rezoning effort.
- The government must publicly endorse the project so that landowners, investors and government offices will know that this project is not purely a commercial initiative declared by the LandshifterZ group of companies.
- The Lands Commission must be instructed to make the rezoning data available to the LandshifterZ group of companies, including the contact details of the active landowners - and this, so that they may be approached in order to be given assistance and support.

Compelling Case for Rezoning Support (Pending Ministry Approval)

As the Ghana Ministry of Finance deliberates the transformative TreeGridTowerZ proposal, we respectfully outline how the rezoning process aligns with Ghana's national priorities, offering a low-risk, high-impact pathway to digital inclusion and sustainable growth.

The initiative proposes a structured collaboration with the Lands Commission to engage 3,500 landowners strategically located along an 8km connectivity grid—critical for universal coverage. Landowners retain the first right to participate, ensuring adherence to Ghana's land ownership traditions while empowering them with partnership models (e.g., co-ownership, profit-sharing) that convert idle land into revenue-generating assets. For those who decline, the Lands Commission will efficiently reassign sites, prioritizing ecological sensitivity and agricultural viability, thereby safeguarding Ghana's natural heritage.

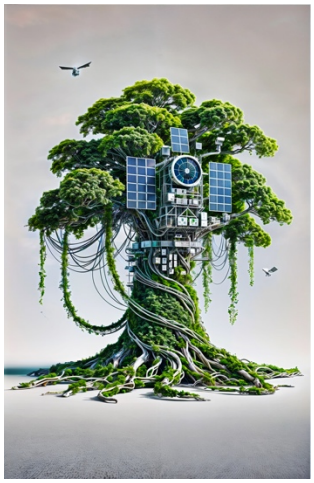
LandShifterZ commits to full technical, legal, and financial support for landowners, minimizing bureaucratic burdens and maximizing local economic benefits—including job creation and digital access for rural communities. This rezoning framework dovetails seamlessly with Ghana's Digital Agenda and Climate Action Goals, positioning the nation to pioneer *Africa's first 100% land-network coverage* while attracting green investment.

By endorsing this rezoning strategy, the Ministry of Finance would catalyze a project that balances innovation with cultural respect, ecological stewardship with economic progress, and public-private collaboration with transparency. We humbly submit that this initiative offers Ghana a unique opportunity to lead in sustainable infrastructure—a legacy of connectivity, equity, and resilience for generations to come.

This proposal remains contingent on the Ministry's wise discretion, and we stand ready to refine its framework to align with Ghana's vision.

Two Possible Approaches to Constructing Communications Towers

Communications towers can be erected with or without the incorporation of living trees and into their constructs.



Traditional methodologies *do not* integrate living systems into man-made constructs. For many, traditional systems are better understood and therefore would be their choice to implement. We will show here another option (the “living system” option) better suited for those that have a respect or a reverence for ecological values. We maintain that the living system option is less expensive and provides a better future for future generations but is more poorly understood and therefore suspect. We also realize that ultimately, every individual tower’s constructors will have to choose their own path between sustainability, costs, achievability, complexity and ROI. We will simply chart the options here as clearly as we can so as to give the decision makers the best set of tools with which to make decisions.

The Role of Landowners and Contractual Agreements

Getting land owners to finance the project:

Getting landowners in Ghana to finance the construction of cellular tree towers on their land requires a strong financial incentive and partnership model. Since tower construction using the traditional tower model (see *Figure 2* above) is expensive (typically $100,000–$300,000 per tower), landowners may not have the funds to invest upfront. However, here are strategies to make this possible:

1. Profit-Sharing or Co-Ownership Model

Instead of just leasing their land, landowners can become co-owners or investors in the tower.

- They contribute a percentage of the construction cost (e.g., 10%-30%).
- In return, they own a share of tower revenues from telecom operators.
- The higher their investment, the bigger their revenue share over time.

✅ Example:

- A landowner contributes $30,000 (for a $150,000 tower).
- They receive 30% ownership and earn a share of lease payments from telecom companies (e.g., $900/month if lease income is $3,000).

How to implement?

- Create a standardized investment structure where landowners buy shares in the tower.
- Form a Telecom Infrastructure Cooperative where multiple landowners pool funds to build towers.

2. Landowner-Backed Loans & Microfinance Support

If landowners lack immediate capital, they can get loans secured by their land to fund tower construction.

- Government-backed loans: The Ghana Investment Promotion Centre (GIPC) or banks can offer low-interest loans to landowners willing to invest in telecom infrastructure.
- Microfinance institutions: Special financing can be provided through rural banks and Susu schemes.
- Revenue-Based Loan Repayment: Instead of fixed loan payments, landowners can pay back loans

✅ Example:

- A landowner takes a $50,000 loan with a 5-year repayment plan.
- Instead of monthly payments, part of the lease income from telecom companies is automatically deducted to repay the loan.

How to implement?

- Partner with banks, government agencies, and microfinance institutions to offer landowner-friendly loans.
- Work with telecom companies to guarantee lease income, making it easier for landowners to get financing.

3. Crowdfunding & Community Investment Model

If individual landowners cannot afford full tower costs, they can raise money collectively from:

- Other landowners & community members (cooperative funding).
- Local businesses interested in better network coverage.
- Diaspora investors who want to support telecom infrastructure in Ghana.

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- A village crowdfunds $100,000 from multiple landowners and businesses.
- The community owns the tower and earns rental income together.

How to implement?

- Create a crowdfunding platform where multiple landowners can invest in towers.
- Offer equity stakes (ownership shares) to investors in exchange for their contributions.

4. Telecom & Tower Company Partnerships

Landowners can partner with telecom companies or independent tower firms to co-finance the project.

- Instead of paying the full cost, landowners provide land as their equity (e.g., 10%-20% stake in the tower).

Telecom companies or tower companies like ATC Ghana fund the rest.

- Revenue is shared based on ownership percentage.
- A telecom company agrees to finance 80% of the tower if the landowner covers 20% ($30,000 for a $150,000 tower).
  - The landowner gets 20% of lease income without bearing full construction costs.

How to implement?

- Sign Joint Venture (JV) agreements with telecom providers.
- Work with tower management firms to create flexible co-financing deals.

Government Incentives & Tax Benefits

The Ghanaian government can encourage landowner investment by offering:

- Tax breaks for landowners who finance towers.
- Grants or subsidies covering part of the cost.
- Revenue guarantees ensuring they get paid even if the tower takes time to generate profit.
- A landowner invests $50,000 in a tower.
- The government provides a $10,000 subsidy and waives property taxes for 5 years.

How to implement?

- Work with government agencies (GIPC, NCA, Lands Commission) to develop tax incentive programs.
- Propose a Telecom Infrastructure Investment Fund to provide matching funds for landowner investors.

Summary of Strategies to Get Landowners to Fund Towers

strategy	How it works	Who Pays ?	Landowner Benefits
Profit-Sharing Model	*Landowners invest and earn a share of rental income.*	*Landowner.*	*Long-term passive income, ownership stake.*
Landowner-backed loans	*Loans secured by land, repaid with tower revenue.*	*Banks/Microfinance*	*Access to financing, gradual repayment*
Crowfunding & community investment	*Multiple Landowners investors co-finance towers.*	*Community/Diaspora*	*Shared profits, community development*
Telecom & Tower Company partnerships	Landowners provide land, telecom companies fund the rest.	*Telecom firms*	Partial ownership, lease income
Government Incentives	Tax breaks, subsidies and funding support.	*Government*	Lower cost

How the land owners make money not just from leasing their land:

The Cellular Tree Tower Project is a unique opportunity for landowners to invest in telecommunications infrastructure. Instead of simply leasing land, landowners can become equity partners and earn long-term revenue from telecom companies renting the towers.

Investment Model Options

Landowners can participate in one of the following investment models:

a) Profit-Sharing Model

Landowners contribute a percentage of the tower construction cost (e.g., 10%-30%) and, in return, earn a share of the rental income from telecom operators.

b) Landowner-Backed Loans
Landowners can take advantage of special loan programs where loan repayment is deducted from tower rental income, reducing financial risk.

c) Community Crowdfunding
Multiple landowners or local businesses can pool funds together to co-finance a tower, allowing shared ownership and profit distribution.

d) Telecom Partnerships
Landowners can partner with telecom companies that provide most of the funding while the landowner contributes land and a small percentage of the cost, earning a revenue share.

Expected Returns
Revenue will be generated through lease agreements with telecom operators. Example: If a landowner invests $30,000 in a $150,000 tower (20% ownership), they can earn approximately $900/month if the tower earns $3,000/month from leases.

Risk & Guarantees
To reduce risk, contracts will include revenue guarantees, insurance options, and government-backed incentives such as tax breaks or subsidies for landowners.
5. Next Steps
Interested landowners should contact the project team for further discussions. An application process will be outlined, including land verification and investment agreements.

How does the Government profit from the project?

The Ghanaian government can generate revenue from a cellular tree tower project that is partly owned by landowners through multiple streams. These include taxes, regulatory fees, licensing, revenue-sharing agreements, and economic incentives. Below are the key ways the government can benefit financially:

1. Regulatory Fees and Licensing Costs

The government can charge telecommunications companies and infrastructure providers for the necessary permits and licenses. These include:

- Telecom Tower License Fees: Issued by the National Communications Authority (NCA) for operating cellular towers.

- Environmental Permit Fees: Paid to the Environmental Protection Agency (EPA) for environmental impact assessments.

- Building Permit Fees: Collected by Metropolitan, Municipal, and District Assemblies (MMDAs) for granting construction approvals.

- Civil Aviation Fees: Paid to the Ghana Civil Aviation Authority (GCAA) for ensuring towers do not obstruct air traffic.

**** Potential Revenue: $5,000 - $50,000 per tower, depending on the fees charged.****

2. Annual Lease Fees or Revenue Sharing from Tower Operators

The government can establish a Public-Private Partnership (PPP) or revenue-sharing model with tower operators

and landowners. This means:

•The government earns a percentage of rental income from telecom operators who lease space on the tower.

•Landowners receive a share of the lease revenue, but the government could impose a tax on these earnings.

•Alternatively, the government could own a percentage of the towers and earn dividends.

**** Potential Revenue: 10% - 30% of lease payments per tower (if structured under a PPP).****

3. Taxes on Telecom Companies & Landowners

•Corporate Income Tax (CIT): Telecom companies and tower operators will pay 25% corporate tax on their profits.

• Value Added Tax (VAT): The government can apply 15% VAT on lease payments, construction services, and tower maintenance.

• Property Tax: The government can impose annual property taxes on the tower site, charged to landowners or tower operators.

****Potential Revenue: Varies based on tower profitability but can generate millions annually from telecom firms and Frequency Fees****

Cellular towers require frequency spectrum to operate. The government, through the NCA, can charge telecom companies for:
•Spectrum allocation fees for using specific frequencies.

•Annual spectrum renewal fees.

Potential Revenue: Can range from $100,000 to millions per telecom operator, depending on spectrum demand.

5. Import Duties and Taxes on Tower Equipment

Most cellular tower components (antennas, base stations, backup generators, etc.) are imported. The Ghana Revenue Authority (GRA) can earn revenue from:
•Import duties (5%-20%) on telecom equipment.

•VAT and excise taxes on imported materials.

Potential Revenue: Millions annually from telecom imports.

6. Employment and Social Security Contributions

The tower project will create jobs in construction, maintenance, and security. The government will collect:
•Pay As You Earn (PAYE) income tax from salaries.

•Social Security contributions (SSNIT) from tower workers.

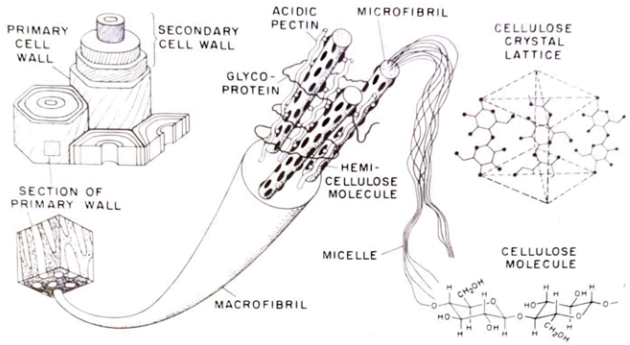
Potential Revenue: Dependent on employment scale but contributes to tax revenue.

7. Internet and Telecom Expansion Leads to Higher GDP & Taxes

By improving mobile network coverage, the government boosts digital services, e-commerce, and mobile banking—all of which lead to more tax revenues from businesses and consumers.*Potential Revenue: Indirect boost to GDP and tax collection from increased digital transactions*

Tower Construction Using the "living system" model

For those who wish to pursue the construction of a tower while preserving the ideals of sustainability and preservation of ecosystem services the costs involved are much diminished. While the cost of a traditional tower begins at $100,000 the cost of a living system model tower, capped at a maximum of $45,000. This is because the great majority of the mass of the tower (in the case of the living system tower) does not have to be brought on site, instead it is sequestered from the air as photosynthesis occurs and the trees integrated into the construct take CO2 from the air and turn it into cellulose and lignin which create the strong hard wooden matrix that holds up the trees.



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Revenue Stream	Potential Revenue
Licensing & Permit Fees	$5,000 - $50,000 per tower
Lease Fees/Revenue sharing	10% - 30% of lease payments
Coporate & Property taxes	25% CIT, annual property tax
Spectrum & Frequency Fees	$100,000+ per operator
Import duties and VAT	Millions annually
Employment Taxes (PAYE,SSNIT)	Tax from tower workers
Increased GDP & Digital Economy growth	Indirect tax benefits

Estimated National Revenue

We assume 3,500 celluar towers will be built nationwide:

Revenue source	Per Tower ($)	Total for 3,500 Towers ($)
One-Time fees & Duties		
Tower Licensing (NCA)	10,000	35,000,000
Building & Environmental permits	5,000	17,500,000
Civil Aviation Approval	2,500	8,750,000
Import Duties & VAT	22,500	78,750,000
Total One-Time Revenue	**40,000**	**140,000,000**
Annual Recurring Revenue		
Lease Revenue Share (20%)	7,200	25,200,000
Corporate Income Tax (CIT)	7,500	26,250,000
Spectrum & Frequency Fees	300,000 (total for all)	300,000
Employment Taxes (PAYE & SSNIT)	5,000	17,500,000
Total Annual Revenue	**$19,700**	$68,950,000 per year

If the government properly structures the regulations, fees, and partnerships, the cellular tree tower project

could generate millions of dollars annually while expanding digital connectivity across Ghana.

Step 1: Key Revenue Sources and Assumptions

We will estimate revenue per tower based on the following:
1. Regulatory Fees & Permits (One-time)
•Tower Licensing Fee (NCA): $10,000 per tower
•Building & Environmental Permit Fees (MMDA & EPA): $5,000 per tower
•Civil Aviation Approval (GCAA): $2,500 per tower
•Total one-time fees per tower: $17,500

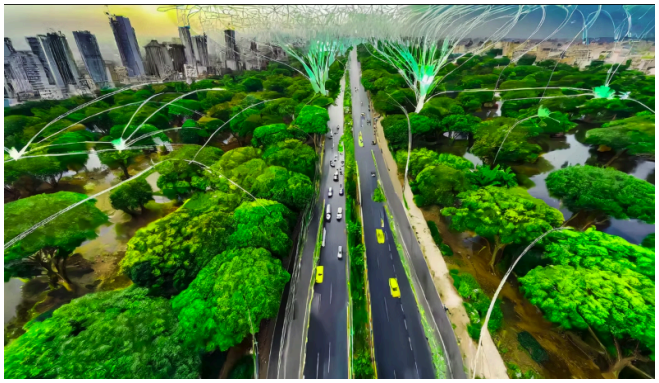
2. Annual Lease Fees & Revenue Sharing
•Telecom operators lease space on the tower: $3,000 per month
•Government takes 20% revenue share
•Annual revenue per tower: $7,200

3. Corporate Income Tax (CIT) on Telecom Companies
•Estimated tower profitability per year: $30,000 per tower
•25% CIT applied: $7,500 per tower per year

4. Spectrum & Frequency Fees (Annual)
- Telecom operators pay for spectrum licenses: $100,000 per operator
- Assume 3 major telecom companies using the tower: $300,000 per year

5. Import Duties & VAT on Equipment (One-time)
- Estimated import value per tower: $150,000
- Duties & VAT (15% total): $22,500 per tower

6. Employment & Social Security (PAYE & SSNIT)
- Estimated 5 full-time workers per tower (construction & maintenance)
- $5,000 in tax & social security per tower per year



Cost of building the towers:

1. *Structural Components*
- Monopole or Lattice Tower: The main support structure, typically fabricated from steel.
- Quantity: 1 unit
- Estimated Price: $950 to $1,600 per ton.
- Foundation: A reinforced concrete base to ensure stability.
- Quantity: Varies based on tower design and soil conditions.
- Estimated Price: $5,000 to $15,000.
- Anchor Bolts: Heavy-duty bolts to secure the tower to its foundation.
- Quantity: Approximately 6 to 12 bolts, depending on design.
- Estimated Price: $50 to $200 per bolt.

2. *Telecommunications Equipment*
- Antenna Panels: Devices that transmit and receive signals.
- Quantity: Typically 3 to 6 panels.
- Estimated Price: $1,000 to $3,000 per panel.
- Remote Radio Units (RRUs): Amplify and process signals near the antenna.
- Quantity: 1 per antenna panel.

- Estimated Price: $200 to $650 per unit. ￼
- Baseband Units (BBUs): Process signals before network transmission.
- Quantity: 1 to 2 units.
- Estimated Price: $5,000 to $10,000 per unit.
- Microwave Dishes (optional): For backhaul communication where fiber is unavailable.
- Quantity: 1 to 2 dishes.
- Estimated Price: $1,500 to $5,000 per dish.
- Cabling (Coaxial/Fiber): Connects antennas to RRUs and BBUs.
- Quantity: Varies based on tower height and design.
- Estimated Price: $5 to $10 per foot.

3. Camouflage (Tree Disguise) Components
   - Faux Bark Coating: Simulates the appearance of a tree trunk.
   - Quantity: Covers the entire monopole.
   - Estimated Price: $1,000 to $1,350 per ton. ￼
   - Artificial Branches: Attached to the tower to mimic tree branches.
   - Quantity: Varies based on design; typically 30 to 50 branches.
   - Estimated Price: $50 to $200 per branch.
   - Synthetic Leaves or Needles: UV-resistant materials that mimic natural foliage.
   - Quantity: Sufficient to cover all artificial branches.
   - Estimated Price: $500 to $2,000 total.

4. Power Supply & Backup Systems
   - Primary Power Supply: Connection to the electrical grid.
   - Quantity: 1 connection.
   - Estimated Price: $2,000 to $5,000.
   - Backup Power (Batteries/Generators): Ensures operation during power outages.
   - Quantity: 1 system.
   - Estimated Price: $10,000 to $30,000.
   - Power Distribution Units (PDUs): Distributes electrical power to equipment.
   - Quantity: 1 to 2 units.
   - Estimated Price: $500 to $2,000 per unit.

5. Networking & Backhaul Components
   - Fiber Optic Backhaul Connection: Preferred method for high-speed data transmission.
   - Quantity: 1 connection.
   - Estimated Price: $10,000 to $50,000, depending on distance.
   - Network Switches & Routers: Manage data flow between the tower and core network.
   - Quantity: 1 to 2 units each.
   - Estimated Price: $1,000 to $5,000 per unit.

6. Security & Access Control
   - Equipment Shelter or Cabinet: Houses sensitive equipment.
   - Quantity: 1 unit.
   - Estimated Price: $10,000 to $20,000.
   - Security Fence: Protects the tower base from unauthorized access.
   - Quantity: Encircles the tower base.
   - Estimated Price: $5,000 to $10,000.
   - Access Gate & Locks: Controlled entry for maintenance personnel.
   - Quantity: 1 gate with locking mechanism.
   - Estimated Price: $500 to

Estimated time line from start to finish

Estimated Timeline for Nationwide Coverage

1. Planning & Regulatory Approvals (6–12 months)

- Securing necessary permits (NCA, GCAA, EPA, MMDAs, RPI, GNFS)
- Site acquisition and feasibility studies
- Network design and optimization

2. Infrastructure Deployment (2–5 years)

- Construction of towers across urban, semi-urban, and rural areas
- Deployment of fiber optic backhaul, power sources, and satellite links for remote areas
- Testing and integration with telecom operators

3. Network Optimization & Expansion (1–2 years)

- Fine-tuning signal strength, load balancing, and 5G/4G integration
- Expansion into remote and underserved communities

Time to Profitability

The profitability of a nationwide tower network depends on:

- Leasing agreements with telecom operators
- Initial capital investment (potentially hundreds of millions of dollars)
- Maintenance costs (staffing, power supply, repairs)
- Market demand (number of telecom subscribers, data consumption growth)

Typically, telecom infrastructure investments take 5–10 years to become profitable. In high-density areas (Accra, Kumasi), towers may generate revenue in 3–5 years, whereas rural areas may take longer due to lower user density and higher operational costs.

Team

1. Mitchell Joachim - Project Lead

Mitchell Joachim is a visionary architect and urban designer with a focus on sustainable and ecological innovation. He is a co-founder of Terreform ONE, a non-profit design group focused on socio-ecological design and urbanism. With a background in architecture, urban planning, and environmental science, Mitchell's work integrates cutting-edge technology with natural systems to create future-oriented infrastructures. His leadership in eco-friendly design makes him an integral part of the LandShifterZ TreeGridTowerZ project, guiding the architectural innovation behind the concept of integrating living trees with communication towers.

2. Ezekiel Golan - Chief Technologist

Ezekiel Golan has been part of the 50 fold expansion of China's national telephony network in the beginning of the 2000s while working for VocalTec (Nasdaq: CALL). This experience makes him well suited to Architecting a National Complete Coverage Network for Ghana which synergises with being a patent holder in the field of horticulture and with expertise in aeroponics, Ezekiel brings a wealth of knowledge in developing and implementing large-scale, eco-friendly planting systems. His contributions to the LandShifterZ TreeGridTowerZ project include the design and management of the aeroponic systems used to cultivate the soft flexible trees essential for the towers.

3. Ingrid Sanghee Edwards

Ingrid is a Creative Engine, drives cultural synergy through brands like CultureVaderZ, DigitalNavigatorZ, ThetaStateOfMind, and 3GOnomics. With degrees in Fine Art and Contemporary Art, her work resonates in association with global biennials and the Pyeongchang Olympics, expressing her dedication to cultural transformation.

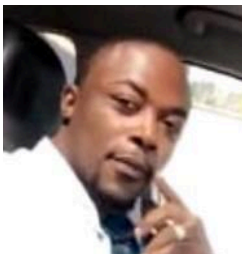
4. Mendel Skulski - Chief Botanical Executive

Mendel Skulski is a seasoned product designer and former president of the Vancouver Mycological Society, where he led initiatives focused on the study and application of fungi in ecological systems. He played a key role in co-building the aeroponic chamber at the New York Navy Yards for Terreform1, showcasing his expertise in advanced horticultural systems. His technical knowledge and hands-on experience in integrating natural processes with cutting-edge technologies make him a vital contributor to the Terreform1 LandShifterZ TreeGridTowerZ project.
Mendel's technical prowess helps ensure that the aeroponically grown trees of the right species are supplied to the project in real time.

5. Amilcar van der Horst - Project Facilitator

Amilcar van der Horst is a RSM Erasmus International Business Administration Graduate of 2012 with a unique background shaped by extensive experience across Africa, including Uganda, Kenya, Burkina Faso, Togo, Mali, Ivory Coast, and Ghana. Drawing on a robust network of influential leaders and top business figures, Amilcar excels in developing practical, impactful solutions tailored to regional challenges. Amilcar's expertise in administrative and strategic roles is complemented by his dedication to fostering meaningful, solution-oriented partnerships that bridge global insights with local needs.

6. Terry Tei - Director LandShifterZ Ghana



Terry Tei is a dynamic entrepreneur and strategic director with a proven track record of bridging global opportunities to Ghana's thriving markets. A seasoned go-getter, Terry has cultivated partnerships with international stakeholders from Amsterdam to New York, leveraging his expertise to channel investments and expertise into transformative local projects. His relentless persistence and business acumen have positioned him as a trusted leader in navigating complex ventures to success.

Timeline: from the first seedling to usability

On average - 4 years. There is no one-size-fits-all for a project spanning thousands of towers. Tower locations and ***species of trees chosen for each tower may vary considerably*** so an average has been approximated.

Implementing the communications technology

Contracts for the rental of the communications cages in the towers can begin to be negotiated and signed immediately upon project commencement. Towers will become operational (ready for equipment installation) gradually, starting from a year of project commencement up to 7 years after.

- The templates are brought piece by piece to the planting site where the trees will mature

Implementation and Operational Strategy

Immediate negotiations for communications technology housing within these towers are crucial for timely project execution. Operational readiness is phased, with full functionality expected between one to seven years post-initiation.

Vancouver Aeroponic Facility for Guaranteed Supply: Managed by Mendel Skulski with Strategic Access to Experts

In order to best guarantee regular supply the aeroponic growth facility will be built in Vancouver and be managed by Mendel Skulski because he has built one before and because he has access to Ezekiel Golan and Mitchell Joachim

The Case for Aeroponic Trees Over Traditional Trees: Efficiency and Innovation

Why Shaped Trees Are Better Than Normal Trees

Shaped trees offer several advantages over traditional trees, making them an ideal choice for this project. First, their lightweight design allows them to be easily transported to remote sites, even in a backpack, enhancing accessibility to difficult-to-reach areas.

Additionally, the project aims to create zoning flexibility that enables tower construction, even on agricultural land or natural reserves. The revenue model capitalizes on the creation of valuable, elevated space on grid points, which is more efficiently rented out when shaped trees are used instead of normal trees. Shaped trees can accommodate functional structures, like stairs, making access to the elevated space simple and convenient, unlike normal trees that require climbing equipment. This ease of use makes shaped trees the superior choice for maximizing the potential of these elevated spaces.

These figure below represents the benefits of aeroponically shaped trees over moving mature trees especially in remote regions across the 5000 towers in Ghana: Aeroponically shaped trees can be moved in a backpack in a remote area surrounded by forrest and this is not the case with mature trees where a road is necessary to move it with heavy equipment, there may not be a tarred road for significant distance of 10s or 100s of kms in some of the remote areas there are TreeGridTowerZ.

Competence in Aeroponic growth and shipping: Ezekiel Golan of Terreform1 LandShifterZ successfully grew two 6-meter trees in an aeroponic facility in Israel, which were showcased at the Aichi Expo 2005 in Japan. These trees were carefully preserved during their 9000 km journey, shipped in a custom-made wooden box lined with moisture retaining lining to ensure they did not lose moisture en route. This accomplishment demonstrates LandshifterZ's expertise in aeroponic cultivation and logistics for international transport of aeroponically grown trees.

Why Mendel? Mendel Skulski is the ideal candidate for managing the aeroponic growth facility due to his hands-on experience in designing and building similar systems. As the former president of the Vancouver Mycological Society, Mendel has a deep understanding of advanced horticultural techniques and ecological systems. His leadership in co-constructing the aeroponic chamber at the New York Navy Yards demonstrates his expertise in creating cutting-edge growth environments, ensuring that the necessary tree species will be grown and supplied in real-time for the project.

Why Mitchell? Mitchell Joachim brings a visionary approach to integrating natural systems with technological infrastructure. **He made history by successfully constructing the first living *Fab Tree Hab*, a livable house entirely made of thriving, living trees**. This groundbreaking achievement exemplifies Mitchell's ability to combine architectural innovation with ecological sustainability. As the co-founder of Terreform ONE, his expertise in sustainable urban design and eco-friendly solutions makes him a key figure in this project.

In addition to his design achievements, Mitchell is a professor at NYU, which has a branch in Accra. His academic ties offer the project valuable connections and access to research and innovation in the region. His leadership ensures that the architectural design of the towers not only meets technical demands but also harmonizes with natural landscapes, driving the project's goal of merging connectivity with environmental preservation.

Why Supply from Canada? Canada is an ideal location for establishing the aeroponic growth facility due to its robust infrastructure, agricultural expertise, and favorable conditions for consistent operations. Vancouver, specifically, offers access to leading horticultural technologies and a strong network of experts in sustainable agriculture, such as Mendel Skulski, who has firsthand experience with aeroponic systems. This wealth of expertise ensures that the facility can operate efficiently and produce high-quality trees that are vital to the project's success.

Additionally, Canada's reliable infrastructure minimizes risks associated with the facility's operations. With constant and stable supplies of electricity, the aeroponic systems can function without disruption, ensuring continuous growth cycles. Unlike locations where energy supplies may be unpredictable, Vancouver's well-developed power grid allows for seamless operation, essential for maintaining consistent output.

Canada is also home to an extensive network of seed banks and has ongoing connections with KEW gardens London as well as nurseries, providing access to a wide range of species and ensuring a steady supply of seeds and seedlings. This eliminates the risks of supply chain disruptions that might be encountered in less developed regions, particularly during the inception phase when the project requires smooth operations to meet its ambitious timeline. By locating the facility in Canada, the project secures a strategic advantage, ensuring that the supply of aeroponically grown trees is uninterrupted and of the highest quality from the start.

Ecological Impact and Requirements

The importance of the preservation of natural biodiversity

Preserving natural biodiversity is key for several reasons:

1. Ecosystem Stability: Biodiversity helps maintain the stability and resilience of ecosystems. Diverse ecosystems can better withstand environmental changes and recover from disturbances.
2. Human Health: Many medicines are derived from natural compounds found in diverse ecosystems. Loss of biodiversity can reduce the potential for new medical discoveries.
3. Soil health: Biodiversity contributes to soil fertility and structure, crucial for agriculture and preventing erosion.
4. Climate Regulation: Diverse ecosystems, such as forests ad wetlands, play a significant role in regulating the climate by absorbing carbon dioxide, producing oxygen, cooling and preventing soil erosion.
5. Cultural and Aesthetic Value: Biodiversity contributes to the cultural and spiritual well-being of many communities. It also enhances the aesthetic value of natural environments.
6. Ecosystem Services: Biodiverse ecosystems provide essential services like pollination, water purification, soil fertility, and pest control, which are vital for human survival and agriculture.

In summary, preserving natural biodiversity is essential for ecological balance, human health, economic stability, climate regulation, cultural heritage, and the continued provision of vital ecosystem services.

Integration of Indigenous Tree Species

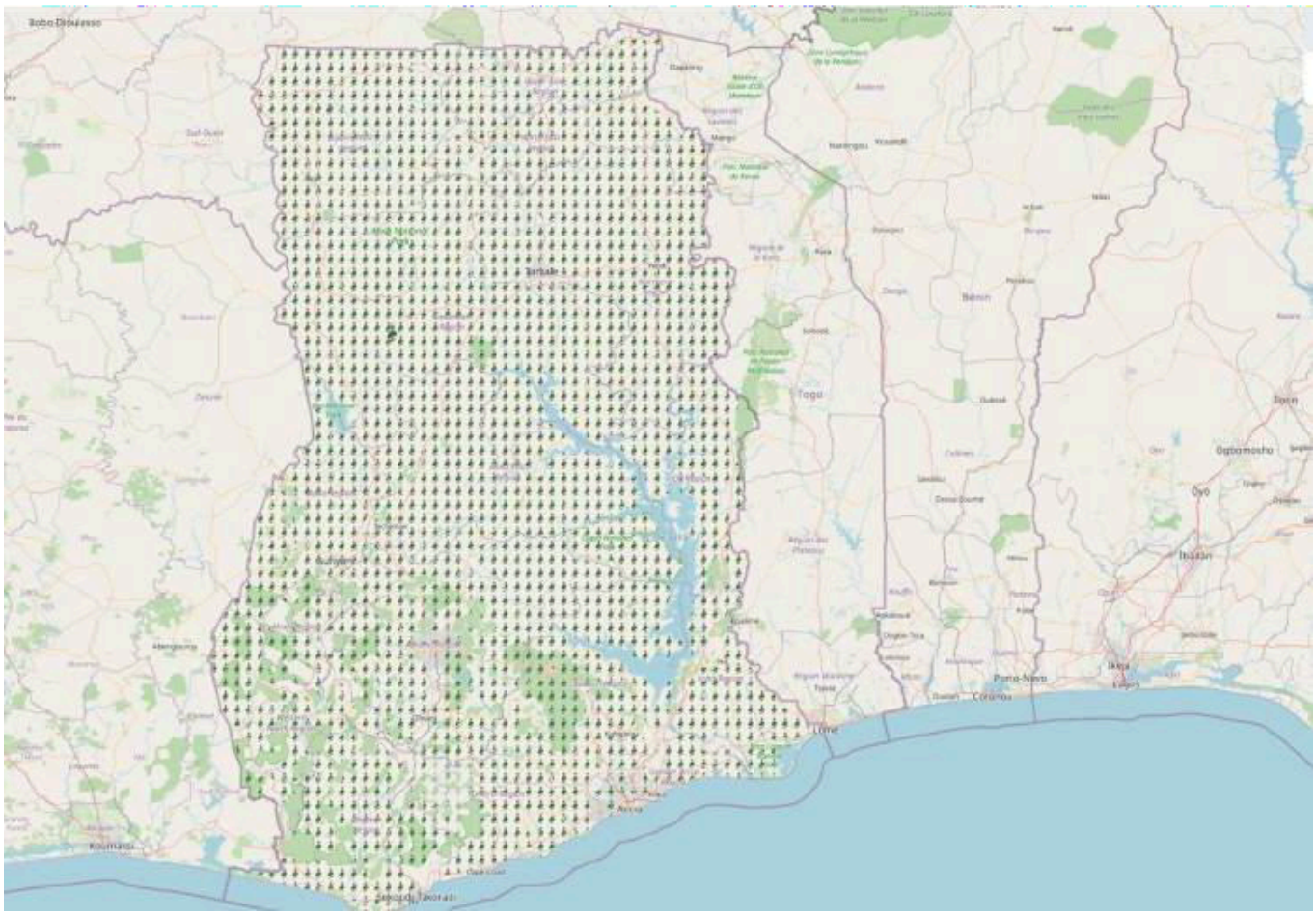
Approximately 3,000 indigenous tree species will be integrated into this project. These species will be sourced from regional seed banks and nurseries, ensuring ecological diversity and adaptation. The focus on indigenous species 90% of which can be cultivated aeroponically, aligns with regional ecological standards and promotes sustainable development. Notably, the following 3 species occur naturally in West Africa and are considered the largest in this region:

- Tieghemella heckelii (Makore or African Cherry): This species can grow up to 45 meters (148 feet) tall on average. The most notable specimen, known as the "Big Tree of Oda" in Ghana, reaches an impressive height of 66.5 meters (218 feet) and is believed to be the tallest tree in West Africa.
- Khaya senegalensis (African Mahogany): This deciduous evergreen tree can grow to heights of 15-30 meters (49-98 feet).
- Milicia excelsa (African Teak or Iroko): This impressive tree can grow up to 50 meters (164 feet) tall

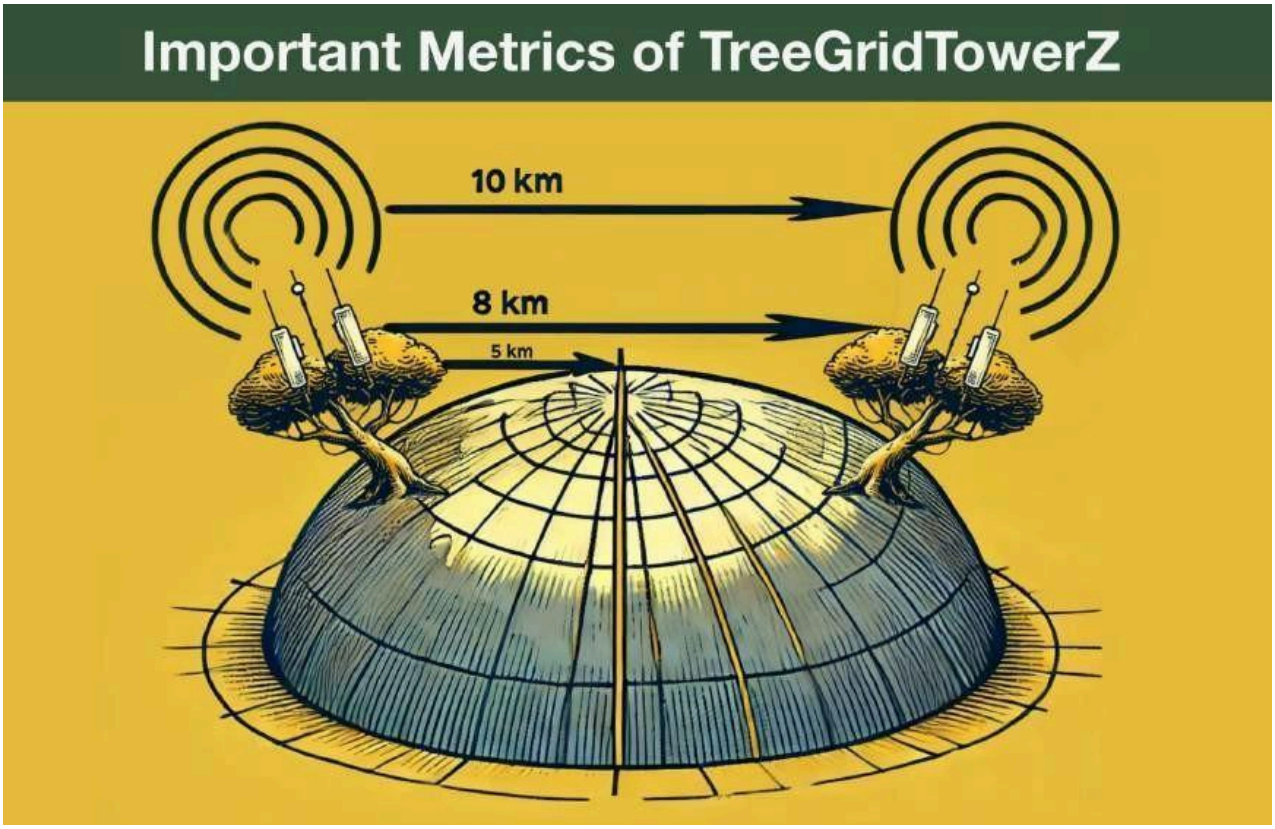
Key Optics & Insights

The highlighted point pertains to the project's optics, while the question focuses on safety considerations.

This map looks quite dense and overloaded, but remember that this is only how we see Ghana from space. From the ground, the optics are radically different!




MITCH
The next TreeGridTower is NOT
beyond MITCH'S horizon line
The next TreeGridTower is
beyond Mendel's horizon line.
MENDEL


Important Metrics of TreeGridTowerZ
10 km
8 km
5 km

Land and Resource Allocation

To support the construction of 5,000 towers as part of the LandShifterZ TreeGridTowerZ project, each tower requires 5 aeroponically grown trees. This equates to a total of 25,000 trees over the next eight years, with a yearly need of 3,125 trees. To meet this demand, an aeroponic facility will be established in Vancouver to ensure a consistent supply of long flexible trees..

The growth process for each seedling requires 1 square meter per tree in the aeroponic system to receive sufficient photons for optimal growth. The limiting factor in tree development is the photon availability, and each tree's roots grow at a rate of approximately 1 cm per day, To accommodate the

3,125 seedlings needed annually, the facility will need to cover an area of 80 meters by 80 meters. This space will provide 3,125 square meters for the aeroponic growth system, while the additional space surrounding the seedlings will double the size of the facility, ensuring smooth operations and support for the aeroponic infrastructure.

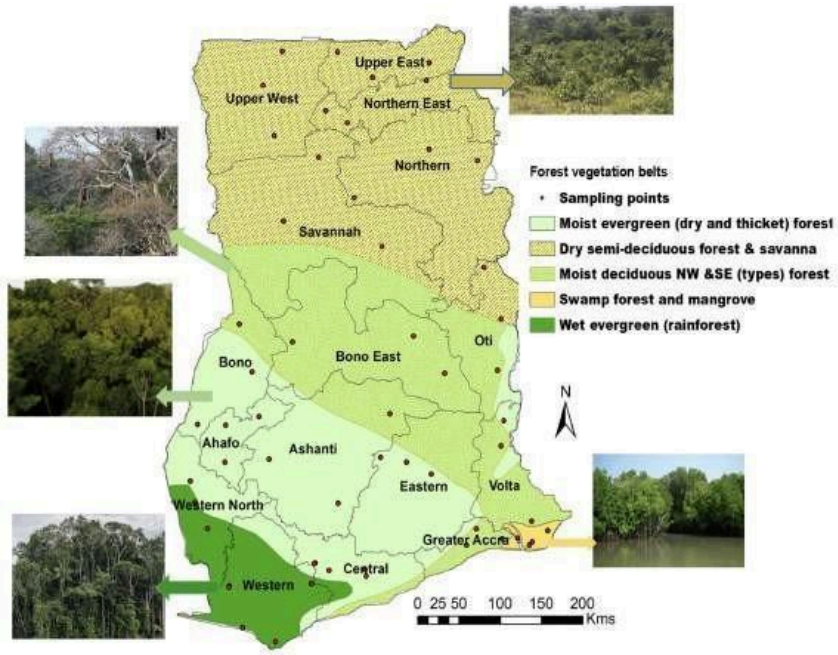
By utilizing this system, the LandShifterZ project secures a reliable supply of trees necessary for tower construction while promoting a sustainable approach to resource allocation. This strategy aligns with the project's eco-conscious objectives, integrating technology and nature effectively.

Tower and Tree Installation

Structure Of The Tower Task Force

A signal from a communications tower can travel for ~10 km without losing fidelity. The TreeGridTowerZ project is conceptualized upon a lattice of North-South and East-West lines. These lines are placed 8 kilometers apart from one another and at their intersections is where towers are to be located.

Geographically, the mission statement of the Ghana TreeGridTowerZ project is to place a tower at every junction map of the country (Ghana) that has been superimposed with horizontal and vertical lines 8 km apart from one another.
Each region of Ghana will have a regional Tower task force that is responsible for running each tower in each region. There will be 2 people working in each regional office.



The regional office also deals with the owners of the land and the possession of management rights of land by Tower Managers towards these allocated land units. Tower Managers are practical and handy at solving practical problems.

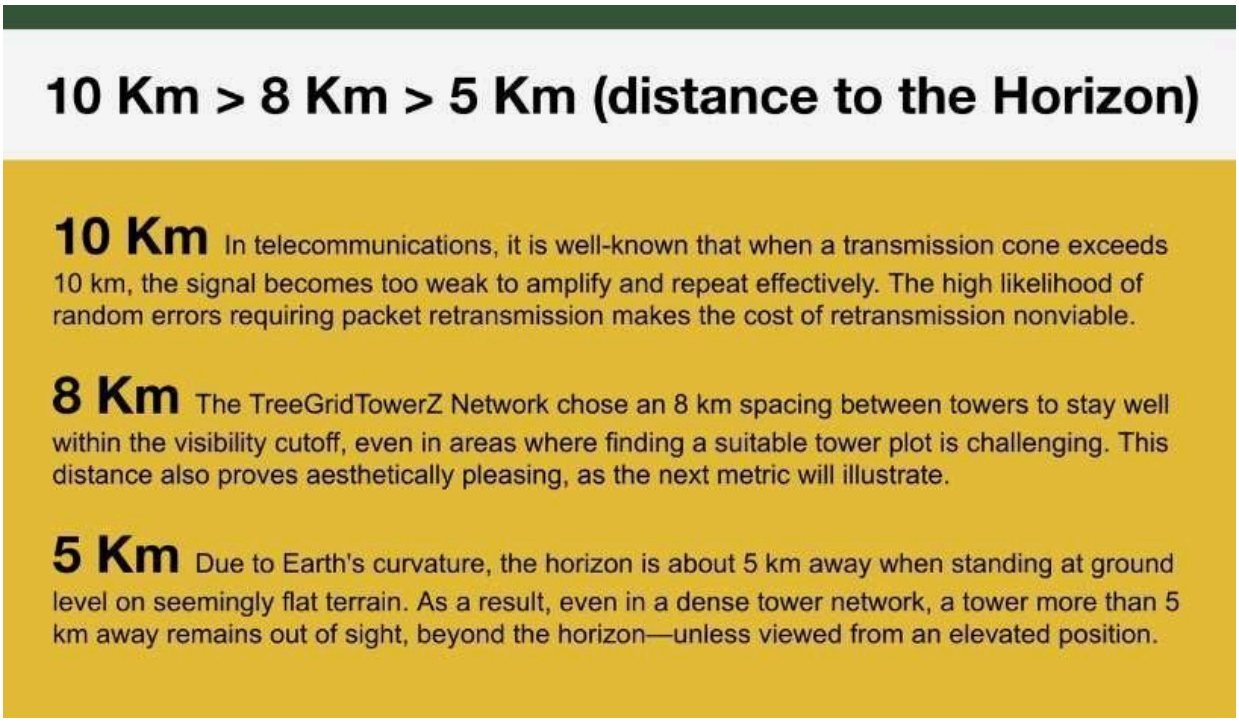
There is a warehouse unit at strategic locations where templates can be obtained that is a “base camp” for all the towers in that section. These will deal with making sure a Tower Manager has everything they need to make a tower thrive. They are management clerks who keep proper administration and keep a good record of things.

CEO is responsible for everything and acts as a director with sole authority to open bank accounts and conduct all business decisions

including hiring, procedures, corporate governance etc.
Regional managers are responsible for ensuring that the zoning changes (allowing the landowners to construct the towers on all the grid points in their region) are ready on time (according to project timelines).
The secretary reports to the CEO and all his needs as an executive assistant.
The Police and Ghana Revenue Authority are responsible for ensuring that Tower Managers act in a transparent manner when collecting revenue from telecom companies.
The entire project has an inherent corruption-proof mechanism built into the very fabric of the project.

The built-in corruption-proof mechanism of the TreeGridTowerZ project relies on several factors. The rent collection and license fees paid by telecommunications companies (TelCos) act as a central pillar of this system. These TelCos are bound by strict accounting standards, ensuring financial transparency and operational efficiency. The fact that TelCos adhere to robust financial controls adds an additional layer of protection against mismanagement. Furthermore, the project's decentralized network of 3,500 towers enhances its resiliency. Each tower's encryption can be changed by the Ministry of Communications, rendering it useless if compromised, thus preventing any unauthorized takeover of individual towers. This dual-pronged system—strong financial controls from TelCos and technological safeguards from the ministry—makes it highly resistant to corruption or unauthorized control.

The TreeGridTowerZ project benefits from an inherent corruption-proof mechanism by deriving most of its value from the use of hardened trees, which, being non-human living organisms, do not engage in monetary transactions. These trees act as the primary infrastructure, requiring no financial upkeep in terms of wages or profit incentives. Their biological resilience provides a stable and low-cost backbone to the project, reducing the need for complex financial controls. By minimizing the reliance on monetary transactions for critical components of the network, the project maintains an efficient and sustainable model, significantly limiting the risk of corruption.



Labour Costs

Name	Monthly Salary GHC	Monthly Salary USD	Number Of Employees	Monthly Cost	Annual cost
Task Force CEO	GHS 13,500.00	$900.00	1	$900	$10,800
Regional Manager	GHS 4,500.00	$299.20	32	$9,574.40	$114,892.80
Warehouse workers	GHS 2,000.00	$132.98	60	$7,978.80	$95,745.60
			Total	**$18,453.20**	***$221,438.4***

Assumptions

Number of Regional Managers	32
Number of Regions in Ghana	16
Number of Warehouses	15
Number of Warehouse Workers	60

This management and organizational structure is an actionable suggestion to what would work though in practice real-world solutions that are a means to the same ends are applicable and so actual implementation may be different - if different management and organizational structures are actually decided upon.

What are the risks?

The answer to this question is best assessed in the context of a comparison. Japan and Canada have both embarked on full-coverage communications projects. Japan has completed its projects in Canada had completed up to 99% of its coverage mission. By comparison, the project in Ghana carries far less risk because it costs a tiny fraction of the cost of Japan's and Canada's projects.

Risk Assessment and Comparative Analysis

What Are the Risks?

Implementing this project in Ghana carries a significantly lower risk profile compared to similar global initiatives, such as those in Japan and Canada. These countries have embarked on extensive full-coverage communications projects, with Japan having completed its project and Canada achieving 99% coverage.

Here is a detailed risk assessment for the Ghana Tree Grid

Tower Project: Financial Risk:

Comparison to Developed Countries: The cost of implementing the project in Ghana is estimated to be a fraction of the costs incurred by Japan and Canada, reducing the financial risk.

Funding Challenges: Securing the necessary funding remains a risk. A comprehensive financial strategy, including potential partnerships with environmental organizations and access to green building grants, is important.

Project Execution: Ensuring timely execution of the project phases is essential. Delays in construction, tree cultivation, or technology implementation could affect the overall timeline.

Maintenance and Upkeep: Regular maintenance is vital for the longevity of the tree towers. Failure to adequately maintain the trees and structures could lead to increased costs and potential operational downtime.

Biodiversity Preservation: The project focuses on using indigenous tree species, which aligns with regional ecological standards and promotes biodiversity. However, there is a risk of unintended impacts on local ecosystems if not managed properly.
Tree Health: Ensuring the health of the trees is paramount. Issues like pests, diseases, and adverse weather conditions can affect tree vitality, requiring robust tree care and monitoring protocols.
Technological Risk:

Integration with Existing Infrastructure: Ensuring seamless integration of new tree towers with existing communication infrastructure is crucial. Compatibility issues could arise, necessitating additional technical adjustments.

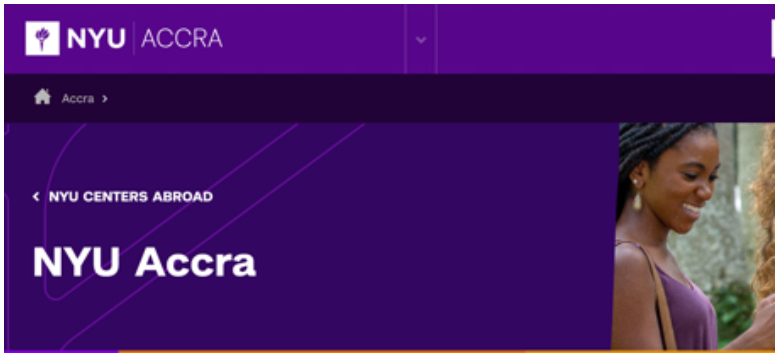
Innovation Challenges: The innovative nature of the project means there are few precedents to follow. Unanticipated technical challenges may emerge during the implementation.
Regulatory and Compliance Risk:

Transparency and Accountability: Ensuring that Tower Managers and other personnel act transparently, especially when collecting revenue from telecom companies, is vital. Collaboration with local authorities like the Ghana Revenue Authority and the police is essential for maintaining integrity.

By addressing these risks through meticulous planning, strategic partnerships, and robust maintenance protocols, the Ghana Tree Grid Tower Project aims to provide comprehensive communication coverage with minimal risk, setting a new standard for eco-innovative infrastructure. Implementing this project will provide Ghana with full communication coverage, a status currently held only by Japan and Canada, along with benefits for both agricultural and untouched regions of the country. Compared to similar global projects. The Ghanaian initiative carries a much lower risk profile, estimated to be just around 0.1% of projects in developed countries like Japan and China

Project Lead Mitchell Joachim is Professor of Practice at NYU

in



We are hopeful that NYU Accra will be able to train and draw specific wisdom pertaining to the integration of living trees infrastructural towers due to the close relationship through NYU of the project lead and be teaching establishment in Accra.

Contingency Plan for Default by Telcos on License Fees

Overview: This plan addresses the scenario in which telecommunications companies (TelCos) operating under the TreeGridTowerZ project in Ghana default on their license fee payments to the government. It outlines the process for handling defaults and the subsequent actions by the Ministry of Communications, including the technical recourse of changing the encryption code of the Node. The goal is to ensure continuous service without unduly affecting customers while holding TelCos accountable.

1. Notice of Default

Upon failure by a TelCo to make a license fee payment, the Ministry of Communications shall issue a formal written notice of default. This notice shall include:

- The date of default.
- The outstanding amount.
- A grace period of 30 calendar days for the TelCo to rectify the default and make full payment.

2. Grace Period and Communications

During the 30-day grace period:

- The Ministry will maintain contact with the TelCo, ensuring they are reminded of the payment deadline through weekly communications.
- The TelCo will have the opportunity to engage with the Ministry to negotiate repayment terms or seek clarifications regarding the default.

3. Action on Continued Default

If the TelCo fails to rectify the default within 30 days:

- The Ministry of Communications reserves the right to **change the encryption code of the Node** associated with the TelCo's equipment on the communication towers.
- A formal notice shall be issued to the TelCo 7 days before this encryption change, informing them of the impending action unless payment is made in full.

4. Changing the Encryption Code

The process of changing the encryption code will be as follows:

- The encryption will be changed within 48 hours after the final 7-day notice has lapsed.
- This action will prevent the TelCo from accessing the Node, thereby disrupting their network operations temporarily until the payment issue is resolved.
- However, emergency services and critical infrastructure communication will remain operational through a default override encryption to avoid any public safety risks.

5. Restoring Service

Once the default is resolved (i.e., the TelCo makes the full payment):

- The Ministry will restore access by informing the TelCo of the new code within 24 hours of receiving confirmation of payment.
- A notice confirming the restoration of services will be issued to the TelCo immediately after the encryption is restored.

Contingency Plan for Default by TelCos Towards Tower Managers

Overview: This plan addresses scenarios where TelCos default on their obligations towards Tower Managers responsible for maintaining the infrastructure of communication towers. It outlines the steps for granting Tower Managers the authority to unplug equipment to mitigate losses caused by TeNotice of Default

Upon failure by a TelCo to make a payment to the Tower Manager:

- The Tower Manager shall issue a formal written notice to the TelCo, clearly outlining the default amount and payment terms.
- The TelCo will be given a grace period of 21 calendar days to resolve the issue by making the required payment.

2. Communication During Grace Period

- Tower Managers will engage in weekly reminders with the TelCo during the grace period, notifying them of the impending consequences should they fail to meet their obligations.
- The Tower Manager will also notify the Ministry of Communications of the default and the potential consequences.

3. Action on Continued Default

If the TelCo fails to meet its payment obligations within the 21-day period:

- The Tower Manager will issue a final 7-day notice to the TelCo, warning them of the impending action of **unplugging the TelCo's equipment** from the Node.
- Simultaneously, the Tower Manager will seek formal approval from the Ministry of Communications to proceed with unplugging the equipment.

4. Authority to Unplug Equipment

If the TelCo remains in default after the final 7-day notice:

- The Tower Manager, upon receiving approval from the Ministry, will **unplug the TelCo's equipment** from the Node.
- This action will sever the TelCo's communication services until payment is made.
- The Tower Manager will ensure that any critical services (emergency lines, etc.) remain functional to avoid public disruption.

5. Restoring Equipment and Service

Once the TelCo resolves the payment issue:

- The Tower Manager will reconnect the equipment within 24 hours of receiving confirmation of full payment.
- A notice of restored services will be issued to both the TelCo and the Ministry of Communications.

General Provisions for Both Contingency Plans

○ Any disputes arising from these processes will be subject to arbitration under Ghanaian law, with the Ministry of Communications acting as the primary mediator.

2. **Force Majeure:**

○ In the event of force majeure, both plans will be temporarily suspended, and the TelCos will be granted extended grace periods until the issue is resolved.

3. **Notices:**

○ All formal notices under these plans will be sent via electronic mail, with confirmation of receipt required.

Clarification on Non-Conditional Nature of Disconnection

In both the **Encryption Code Change** and **Unplugging of Equipment** scenarios, the **notice to the TelCo is a courtesy**, **not a condition** for the government or Tower Managers to act. This ensures that TelCos cannot avoid or delay the disconnection process by making themselves unavailable.

Non-Conditional Disconnection Clause:

It is expressly clarified that:

- **The notice provided to the TelCo is not a precondition** to the execution of the enforcement actions (changing the encryption code or unplugging equipment).
- Failure by the TelCo to respond, acknowledge, or make themselves available after receiving notice will **not prevent** the Ministry of Communications or the Tower Manager from proceeding with disconnection or encryption changes.
- The Ministry and Tower Managers retain the **unilateral authority** to act upon the expiry of the notice periods without the requirement of further interaction or confirmation from the TelCo.

This provision ensures that the government and Tower Managers are **not hindered by non-cooperation** from the TelCo, and they retain the full legal right to enforce actions as necessary to protect their interests and infrastructure.

This clause is intended to prevent TelCos from exploiting legal loopholes by refusing communication and ensures that enforcement of penalties is swift and effective.

Traction:

LandShifterZ owns **3 patent** families in Horticulture that demonstrate our expertise to innovate and invent in the domain of sustainable construction, these include:

1. A method and a kit for shaping a portion of a woody plant into a desired form

2. Plant with differential altitude and distributed root system, elevating facade including a plant with distributed root system and methods of producing the plant and facade
3. Methods of cultivating ectomycorrhizal fungi

Communication Coverage Projects in Canada and Japan

- **Japan:** Heavy investment in cutting-edge technologies like 5G and future networks, supported by both government and private sectors.

Technological Innovations

- **Canada:** Mix of traditional and innovative solutions, including satellite and fixed wireless technologies.
- **Japan:** Advanced fiber optic and mobile networks, with a forward-looking approach towards 6G.Overview

Canada, with its vast geography and diverse population, has embarked on several ambitious projects to enhance communication coverage across the nation. The primary focus is on extending broadband internet and mobile connectivity to underserved and rural areas.

Key Projects

1. Connecting Canadians Initiative (CCI)
- Objective: To provide broadband internet access to rural and remote areas.
- Budget: CAD 305 million.
- Impact:By 2017, this initiative had connected over 300,000 households to high-speed internet.

2. Universal Broadband Fund (UBF)
- Objective: Aims to connect 98% of Canadians to high-speed internet 2026 and 100% by 2030.
- Budget:CAD 2.75 billion.
- Focus Areas:Remote and Indigenous communities.
- Recent Developments:Announced in 2020, it has already started funding various projects, including satellite and wireless technologies to cover hard-to-reach areas.

by

3. Rural and Northern Communities Infrastructure Stream
- Objective:Improve connectivity in rural and northern communities.
- Budget:Part of a larger CAD 2 billion investment under the Investing in Canada Infrastructure Program.
- Features:Includes funding for broadband projects that support better education, healthcare, and economic opportunities.

Technological Approaches

- Fiber Optics:Deployment of fiber optic cables to provide high-speed internet.
- Satellite Technology:Utilizing low-earth orbit satellites to reach remote areas.
- Fixed Wireless Access:Using radio signals to deliver internet services where laying cables is not feasible.

Japan

Overview

Japan, known for its technological advancements, has also made significant strides in ensuring widespread communication coverage. The country focuses on maintaining its position as a global leader in technology while addressing the needs of its aging and urbanized populationKey Projects

1. 5G Infrastructure Expansion

- Objective:To establish a nationwide 5G network by 2025.
- Budget:JPY 1.7 trillion (approx. CAD 20 billion).
- Impact:Expected to revolutionize industries such as autonomous driving, telemedicine, and smart cities.

2. Digital Divide Elimination Program

- Objective:Reduce the digital divide between urban and rural areas.
- Strategies:Subsidies for infrastructure development in less populated areas.
- Recent Developments:Partnerships with local governments and private companies to accelerate deployment.

3. Hikari Collaboration Model

- Objective:Promote fiber optic internet through partnerships between NTT (Nippon Telegraph and Telephone Corporation) and various ISPs.
- Impact: Increased competition and lower prices for consumers.
- Reach: Over 90% of households have access to high-speed fiber optic internet.

Technological Approaches

- Fiber to the Home (FTTH): Extensive deployment of fiber optics directly to residences.
- 5G and Beyond: Investment in next-generation mobile networks, including 6G research.
- Public Wi-Fi Initiatives:Expansion of free Wi-Fi services in public spaces and transportation hubs.

Comparative Analysis Coverage and Accessibility

- Canada: Focuses heavily on rural and remote areas, leveraging a mix of technologies to overcome geographical challenges.
- Japan: Prioritizes maintaining technological leadership, with significant investments in urban as well as rural infrastructure.

Funding and Budget

- Canada: Large-scale funding from federal programs with a significant portion dedicated to indigenous and northern communities.

This appendix provides an overview of the communication coverage projects in Canada and Japan, highlighting their objectives, budgets, impacts, and technological approaches. it also highlights the Finders agreement and a case study of Thailand.

This document is intended for outlining a transformative plan for a comprehensive data infrastructure to support a 24-hour economy and position Ghana as the first African country with full data coverage. Central to this vision is the Ghana Terreform1 LandShifterZ TreeGridTowerZ Project, which integrates communication towers with living trees, promoting environmental sustainability and enhancing community acceptance.

By embracing this ambitious plan, Ghana can become a leader in digital excellence, empowering businesses, facilitating education, enhancing healthcare, and improving governance. We invite you to explore how this visionary project can turn this vision into reality, leaving a lasting legacy for future generations.

Appendix B - Thailand as a Use Case

Thailand's communications infrastructure revolution is notable for its leapfrogging from minimal wired infrastructure to an advanced wireless communication network. In the late 20th century, while many countries were investing heavily in traditional landline systems, Thailand faced geographical and financial barriers that limited the expansion of wired infrastructure, especially in rural areas. Instead of focusing on costly landline development, Thailand capitalized on emerging wireless technologies to fast-track its communication capabilities.

In the early 2000s, the Thai government, in collaboration with private telecom operators, accelerated the deployment of mobile networks. This shift was fueled by the increasing affordability of mobile phones and the rapid growth of cellular technology. Mobile penetration surged, bypassing the need for a nationwide wired network and bringing telecommunication access to millions who had never had landlines. The introduction of 3G and 4G further expanded internet accessibility, transforming Thailand into one of Southeast Asia's digital leaders.

By focusing on wireless communication, Thailand enabled faster, more cost-effective connectivity across its diverse and often challenging landscape. This strategic decision has allowed the country to bridge the digital divide, particularly in rural areas, and laid the foundation for its ongoing 5G rollout, positioning Thailand at the forefront of the digital age.

Figures depicting Thailand's Communication Infrastructure more recently

Appendix C: PATENT Family 1

PCT: A method and a kit for shaping a portion of a woody plant into a desired form

US: A method and a kit for shaping a portion of a woody plant into a desired form

AU: A method and a kit for shaping a portion of a woody plant into a desired form

Appendix F: Press Releases

This Document was produced by:

TERREFORM

LandShifterZ