



# TowerGuard

Data-driven restoration intelligence for Kenya's forests

# Protecting Kenya's Future, One Seedling at a Time

## Who We Are

TowerGuard transforms forest restoration through intelligent monitoring systems that prove conservation impact with trustworthy, verifiable metrics.

## Our Mission

Competing in the Wangari Maathai Hackathon Track 2: Data-Driven Impact Measurement, we're building the infrastructure to amplify conservation success across Kenya.



# The Crisis in Kenya's Forests

**50K**

**\$3**

**70%**

## Hectares Lost

Over 50,000 hectares of Kenyan forest disappear every year while monitoring budgets continue to shrink

## Per Hectare

Average monitoring spend leaves roughly 70% of restoration plots completely unverified each year

## Unverified

Most restoration sites lack reliable data

Counties, community groups, and financiers lack a shared system of record to unlock climate finance and ESG deals. Global restoration pledges—including 15 billion trees in Kenya alone—require verifiable metrics before billions in funding can flow.



# Our Vision: Every Seedling Measurable



## Nursery to Canopy

Track every seedling from germination through mature forest growth using automated monitoring systems



## Unified Intelligence

Combine satellite imagery, field apps, and AI into one streamlined M&E workflow delivering alerts within 24 hours



## Track 2 Alignment

Survival tracking, dashboards, nursery mapping, biodiversity visualization, AI impact prediction—all integrated

TowerGuard will provide trusted data for the first 250,000 hectares of Kenya's 15 billion tree pledge and scale far beyond.



# Built for Everyone in the Restoration Ecosystem

## Community Groups

Forest associations gain real-time insights to optimize planting strategies and demonstrate impact to funders

01

### Survival Intelligence

Anomaly detection refreshed every five days using 10-meter Sentinel satellite scenes

04

### Biodiversity Lens

Species richness monitoring and camera-trap integrations tracking 5,000+ annual observations

## Regulators & Counties

KFS and county governments access unified dashboards for oversight, compliance, and resource allocation

02

### M&E Control Room

Comprehensive dashboards, reporting packs, and exports with complete audit trails to raw imagery

05

### AI Impact Studio

Scenario planning models projecting five-year ecological and financial outcomes

## Investors & CSR

Carbon developers and ESG investors receive verifiable metrics with full audit trails for confident financing

03

### Nursery Atlas

Species mix optimization, capacity forecasts, and procurement workflows covering 40+ nurseries



# Enterprise-Grade Technology Stack

## Lightning-Fast Processing

FastAPI microservices with Celery workers complete ingestion jobs in just 15 minutes, keeping data fresh and actionable

## Intelligent AI Models

TorchGeo + PyTorch models process approximately 1 TB of raster data annually with hectare-level explainability for transparent insights

## Robust Infrastructure

PostgreSQL + PostGIS feature store, Redis queues handling 10,000+ daily events, React + MapLibre dashboards with 50+ KPI widgets

## Seamless Data Pipeline

1

### Satellite Ingestion

Sentinel/Landsat + rainfall/soil APIs refresh hourly

2

### Field Collection

USSD/Kobo/LoRa capture 2,000+ monthly observations

3

### Intelligence Engine

Feature store snapshots power scoring with <10s latency

4

### Evidence Locker

Tamper-proof PDF/CSV exports for audits



# Measurable Impact Where It Matters Most



## Target Survival Rate

Lift pilot sites from 55% to 75% seedling survival with precise interventions



## Shortage Reduction

Reduce seedling supply gaps across monitored regions



## Biodiversity Growth

Year-over-year increase in indicator species across restoration zones

## Real Success: Nyeri Block 7

TowerGuard alerts enabled our team to identify and replant a failing section within one week. Expected survival jumped from 48% to 71%, protecting both our investment and the forest's future.



### 25,000 hectares monitored by 2026

Scaling intelligent oversight across Kenya's most critical restoration zones



### 2,000 seasonal jobs documented per county

Proving the socioeconomic impact of restoration alongside ecological gains

# Sustainable Business Model



## Multiple Revenue Streams

Diversified approach ensures long-term sustainability while serving diverse stakeholders across the restoration ecosystem.

### SaaS Subscriptions

Pilot tier at \$18K/year, enterprise at \$75K/year with >70% gross margins providing predictable, scalable revenue

### Usage Credits

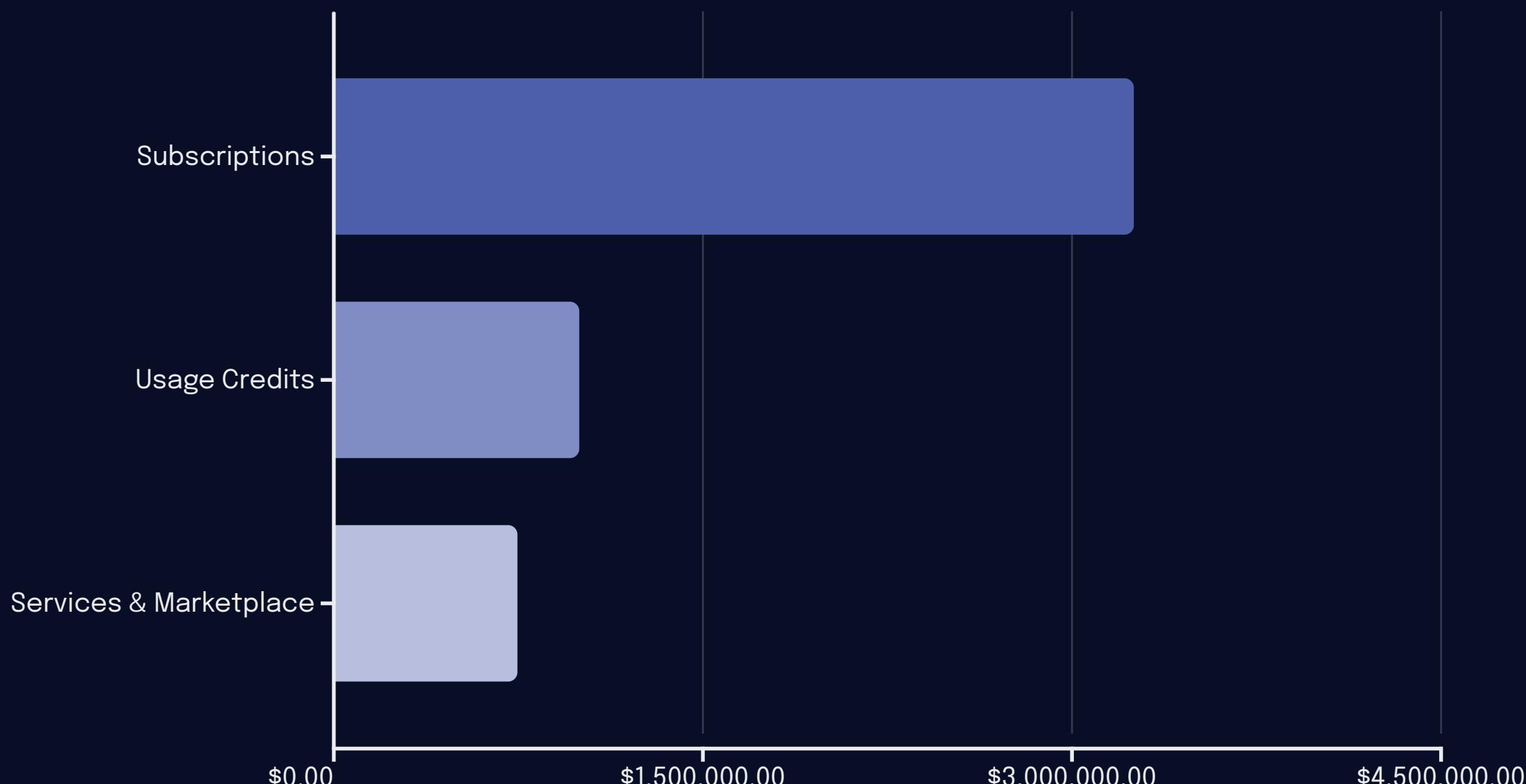
Pay-as-you-grow model at \$0.04 per data event ensures accessibility for smaller organizations

### Premium Services

AI scenarios, audits, and custom integrations billed at \$150/hour for specialized needs

## Future Growth: Restoration Marketplace

By 2027, a 5% facilitation fee on nursery supply and restoration services will create a marketplace targeting \$2M GMV, connecting buyers and sellers while generating platform revenue.



**Path to \$5M ARR by year three** with a balanced mix delivering resilience and growth.

# Strategic Go-To-Market Approach

## Phase 1: Pilot Launch

Nyeri & Elgeyo-Marakwet covering 12,000 hectares via hackathon partners, mobilizing 200 enumerators through KEFRI/KFS networks

## Phase 3: Regional Expansion

Expand beyond Kenya once ARR exceeds \$1M, bringing proven model to neighboring countries

1

2

3

## Phase 2: Commercial Scale

Layer carbon developers and CSR teams to secure 10 paying tenants in year one, proving business model viability

## Our Competitive Edge

### Offline-First Design

Field teams work seamlessly in remote areas without internet connectivity, syncing when connection returns

### Transparent Metrics

Every calculation includes explainability and audit trails, building trust with regulators and investors

### Unified Platform

Single system covering survival, nurseries, biodiversity, and finance—eliminating fragmented tools

### Privileged Partnerships

Deep collaboration with KEFRI, KFS, and county governments provides unique data access and validation

# From Hackathon to Scale: Our Roadmap



## Hackathon Sprint: Foundation

Delivered prototype data model, dashboard wireframes, and 18 stakeholder interviews validating product-market fit



## Q1 2025: MVP Launch

Ingest Sentinel scenes, deploy MVP dashboards, onboard 20 pilot nurseries across initial counties



## Q2 2025: Intelligence Layer

Launch AI impact prediction studio and donor evidence packs covering 50,000 hectares



## Q3 2025: Monetization & Expansion

Activate subscription tiers, integrate payment systems, expand to Rwanda with 3 paying counties



## Join Us in Restoring Kenya's Forests

TowerGuard transforms ambitious restoration pledges into verified reality. With transparent data, intelligent automation, and a sustainable business model, we're building the infrastructure for Kenya's 15 billion tree future.

Together, we can make every seedling count.

