ENERGY CLUB
IIT BOMBAY

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THE CARBON CODE: TRADING, TRACKING AND TRANSFORMING EMISSIONS

CASE STUDIES

1. Climeworks Orca — Direct Air Capture + Geological Storage (Iceland)

2. Kasigau Corridor REDD+ Project (Kenya)

CLIMEWORKS ORCA – ICELAND

Type: Direct Air Capture + Carbon Storage (DACCS)
Launched: Sep 2021 | Capacity: ~4,000 tCO_2/year
Operators: Climeworks (capture), Carbfix (storage)
Energy: 100% geothermal
Buyers: Microsoft, Shopify, Stripe, Swiss Re, Klarna
Standard: ISO 14064, Puro.earth

Key Benefits

High additionality: CO_2 directly pulled from air
No leakage: Renewable-powered, no land-use impact
Permanent storage: Mineralized in basalt (>10,000 yrs)

How Carbon Credits Are Crafted

1. Baseline Setting

Assumes “business as usual” (CO_2 stays in air without capture)

2. Leakage Safeguards

No forest/agriculture disruption

Full lifecycle emissions tracked

Zero fossil fuels used

3. Monitoring & Verification (MRV)

Real-time sensors track capture & injection

Carbfix monitors underground mineralization

Independently verified by DNV; ISO & Puro.earth compliant

4. Credit Issuance

1 tonne CO_2 removed = 1 carbon credit

High integrity, premium pricing ($600–$1,200/t)

Storage Tech, Impact & Challenges

Rock Solid Storage

CO_2 dissolved in water and injected into basalt

Becomes stone (calcite, magnesite) within 2 years

No re-release risk, no long-term liability

Technical Snapshot

Modular DAC units use geothermal waste heat

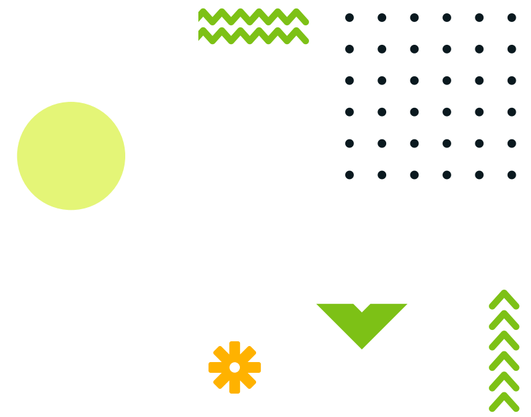
8 collectors = 4,000 tCO_2/year

Costs & Limitations

$10–15M build cost

Expensive per ton, but scalable

Energy-intensive despite renewables



Why Orca Matters

Proof-of-concept for commercial DAC

Transparent, permanent, and verifiable

Blueprint for larger projects (e.g., Mammoth)

KASIGAU CORRIDOR REDD+ – KENYA

Type: Avoided deforestation + community development
Location: 500,000+ acres, SE Kenya
Annual CO_2 Reduction: ~1.2 million tons
Standards: Verra (VCS), CCBS Gold Level
Partners: Wildlife Works, local communities, DNV
Certification: VM0009 methodology, updated every 5 years

Why It Matters

Protects endangered dryland forest
Integrates carbon finance with rural development
40% premium credits ($12–15/t) due to high co-benefits

Credit Crafting & MRV

Baseline Setting

Based on 20 years of satellite & economic data

Deforestation drivers: charcoal, slash-and-burn farming

Without action: 60% forest loss by 2030 = 30+ $MtCO_2$

Leakage Safeguards

10-km monitored buffer zone (deducts leakage from credits)

80+ community livelihood projects (beekeeping, eco-tourism)

Aligned with Kenya’s national REDD+ strategy

Monitoring & Verification

Daily 3m satellite imagery + AI alerts

200+ field sensors, drone LiDAR cross-checks

Verified annually by DNV; public on Verra registry

Co-Benefits, Tech & Challenges

Co-Benefits

Protects 50+ endangered species (e.g., elephants, zebras)

Reaches 120,000+ people with schools, clinics, clean water

Smart contracts + blockchain ensure fair, transparent payouts

Challenges & Solutions

Wildfires: Firebreaks + patrols = <1% credit reversal

Market Scrutiny: Full MRV transparency + ICVCM alignment

Why Kasigau Stands Out

Robust science + social equity = high-integrity REDD+

Proven model for scaling nature-based carbon solutions

THANK YOU