SDG BLOCKCHAIN ACCELERATOR

Impact Measurement Framework – Template

1. Project Information

- **Project Name:** BlackFrog

- **Challenge & UNDP Office:** UNDP Istanbul Regional Hub

- **Document Version:** v1.0

2. SDG Alignment

1. SDG 9 – Industry, Innovation and Infrastructure

BlackFrog provides structured, regulated investment vehicles that channel capital into critical mineral projects in Kazakhstan and Central Asia. This supports the modernization of mining infrastructure, strengthens industrial capacity, improves resilience of supply chains and local economies.

2. SDG 8 – Decent Work and Economic Growth

By opening new financing pathways for the mining sector, BlackFrog stimulates economic diversification and job creation. This reduces dependency on informal or high-risk financing and promotes inclusive, sustainable growth in mineral-rich regions.

3. SDG 16 – Peace, Justice and Strong Institutions

BlackFrog reduces the role of opaque financing and unregulated capital flows in mineral supply chains. Through transparent, compliant investment structures, it fosters trust, strengthens governance, and limits risks of corruption or conflict financing.

4. SDG 12 – Responsible Consumption and Production

Investments made via BlackFrog integrate ESG standards and sustainability criteria, incentivizing responsible mineral extraction and production. This ensures that critical raw materials for global industries and the energy transition are sourced under higher social and environmental safeguards.

5. SDG 13 – Climate Action

Critical minerals such as cobalt, rare earths, tantalum and copper are essential for renewable energy technologies. By accelerating access to finance for these projects, BlackFrog directly contributes to scaling the material base required for the global energy transition.

3.Key Performance Indicators (KPIs)

KPI Category	Indicator	Baseline	Target (3–5 Years)	Relevant SDG
Economic Impact	Volume of investments mobilized into critical minerals (USD)	<$100M/year financing reaching projects	≥$100M/year financing reaching projects	SDG 8 – Decent Work, SDG 9 – Industry & Innovation
Social Impact	Number of mining projects financed with ESG criteria	<3projects/year with sustainable financing	10–15 projects financed annually, 100% ESG aligned	SDG 12 – Responsible Consumption, SDG 16 – Institutions
Employment Impact	Jobs supported or created (direct + indirect)	Informal/unrecorded jobs, limited benefits	≥1,000 formalized jobs supported by projects	SDG 8 – Decent Work
Environmental Impact	Share of investments screened for environmental compliance (EU taxonomy)	Minimal application of ESG/environmental standards	100% of financed projects screened and compliant	SDG 13 – Climate Action, SDG 12 – Responsible Consumption

Supply Chain Impact	Tons of critical minerals (e.g., cobalt, rare earths, uranium) financed & delivered	Opaque supply chains; inconsistent deliveries	≥50,000 tons traceable and financed responsibly	SDG 9 – Industry & Innovation, SDG 7 – Clean Energy

4. Tracking Methods

- **On-chain Metrics:**

    - **Volume of tokenized critical mineral investments (SDG 9, 12): Tracked through minted tokens, used stablecoins representing project financing.**

    - **Number and size of transactions (SDG 8, 9): Captures capital flows into sustainable mining and processing activities.**

    - **Smart contract yield distributions (SDG 8): Proof of transparent returns and fair revenue sharing with local stakeholders.**

    - **Number of registered investors (SDG 8, 17):**
      Monitoring platform adoption, institutional participation, and diversification of capital sources.

    - **Number of onboarded projects (SDG 9, 12):**
      ESG-verified projects financed through the platform, reflecting real-world adoption.

- **Off-chain Metrics:**

  - **ESG compliance reports (SDG 12, 13):** Verified by third-party auditors to ensure projects meet EU Taxonomy and IFC standards.

  - **Job creation and local economic impact (SDG 8):** Collected through project-level reporting and independent surveys.

  - **Partner dashboards with UNDP & government agencies (SDG 16):** Ensures transparent data sharing and accountability.

  - **Surveys & community assessments (SDG 1, 8):** Track improvements in livelihoods, financial inclusion, and social outcomes in mining regions.

  - **Geopolitical resilience (SDG 7, 9):** Data on diversification of supply chains, particularly in Kazakhstan and Central Asia.

Example: $10M Tokenized Bond for Cobalt Project in Kazakhstan

On-Chain Tracking

- **$10M tokenized bond issued → 10M security tokens minted on Cardano, each representing $1 investment.** *(SDG 9: Industry, Innovation, Infrastructure)*

- **Quarterly yield payouts of 3% → Smart contracts distribute $300k every quarter to token holders, logged as immutable transactions.** *(SDG 8: Decent Work and Economic Growth)*

- **End of year repayment → $10M principal repaid on redemption, visible via UTxO state change.**

- **Wallet interaction tracking → System records number of active token holders, transaction frequency, and wallet balances to measure adoption and liquidity.**

Off-Chain Tracking

- **ESG report confirms project achieved:**

    - **500 jobs created locally**

    - **ESG**

5. Baseline vs Projected Outcomes

see chapter 3

6. Monitoring & Reporting Plan

Frequency
 Reporting is conducted on a quarterly basis, with additional ad-hoc reports produced in case of critical incidents or deviations.

Responsible Parties

- The Blockchain Operations Team captures and validates all on-chain data.

- The External Auditor conducts independent verification to ensure transparency and compliance.

- Partner organizations and regulatory bodies receive reporting deliverables as defined in the stakeholder engagement plan.

Format

- On-chain logs provide immutable and transparent records.

- The internal dashboard summary presents real-time KPIs and operational status.

- A formal PDF report is delivered to stakeholders, including management summaries, deviation analyses, and corrective action plans.

Tools and Infrastructure

- Ogmios is used as the interface for Cardano node interactions.

- Kupo provides indexing and querying of on-chain data.

- Internal reporting dashboards visualize data and enable real-time monitoring.

- The External Auditor applies dedicated audit tools and verification software.
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7. Risks & Mitigation

- **Risk: Delayed oracle updates**
  Mitigation: Redundant oracle feeds are deployed to ensure continuity and minimize downtime.

- **Risk: Data inconsistency between on-chain and off-chain sources**
  Mitigation: A monthly reconciliation process is executed, supported by automated scripts and manual verification.

- **Risk: Auditor availability or delayed verification**
  Mitigation: Reporting timelines include buffer periods, and at least one secondary auditor is contracted to guarantee continuity.

- **Risk: System downtime or infrastructure failure**
  Mitigation: High-availability architecture with failover nodes and continuous monitoring ensures service resilience.

- **Risk: Misreporting or human error in manual data entry**
  Mitigation: Dual-control validation and automated data ingestion pipelines are implemented to minimize manual intervention.