



SDG BLOCKCHAIN ACCELERATOR

MENTORSHIP FEEDBACK FORM

Project Team / Company: Thallo

Project Title: Inclusive Climate Finance & Tokenized Carbon Credits – UNDP Tanzania

Mentor: Ahmed Hadded Tech & Product Lead @ Elabs

Dates: September – October 2025

Number of Sessions: 2

Executive Summary

The mentorship with *Thallo* centered on guiding the transition of its established EVM-based carbon-credit tokenization platform toward the Cardano EUTxO model, supporting the design of a proof-of-concept national carbon registry for Tanzania. The sessions focused on UTxO-based architecture, smart-contract refactoring, API orchestration, and hybrid compliance integration aligned with the country's evolving regulatory frameworks.

Through a combination of structured technical review and iterative design feedback, *Thallo* successfully deployed a functional Cardano proof-of-concept, demonstrating token issuance, transfer, and retirement workflows. The solution adopted a hybrid model where off-chain registries and verifier documentation remain linked through Cardano metadata, ensuring traceability and regulatory compliance while national carbon-registry policies are finalized.

Session 1 – PoC Architecture and Integration Design

Overview:

The first session examined Thallo's approach to mapping its EVM-based logic to Cardano's EUTxO paradigm. The mentoring team reviewed the tokenization lifecycle, issuance, trade, and retirement, and advised on metadata structuring, API bridging, and validator logic separation.

Discussion Points:

- Alignment of token schema with emerging carbon-registry data standards.
- Adaptation of existing *Nexchange* APIs for Cardano-based mint, trade, and retire flows.

- Configuration of Aiken-based validator templates for credit issuance and signature enforcement.
- Introduction of a hybrid off-chain registry linkage for regulatory compliance.

Challenges Addressed:

- Limited prior experience with UTxO-style concurrency and batch transaction handling.
- Maintaining multi-stakeholder coordination among registry operators, verifiers, and UNDP partners.

Key Findings:

- Three distinct validators (Project Registry, Vintage Registry, Carbon Credit) were correctly modularized.
- Protocol-owner enforcement was implemented, with advice to extend to **multi-signature governance**.
- Build, test, and deployment scripts were clear but primarily covered happy-path scenarios; additional edge-case coverage was recommended.

Recommendations:

- Expand unit- and integration-test coverage to include concurrent issuance, transaction-reordering, and marketplace-error cases.
- Introduce a **multi-sig authorization layer** to reflect real-world multi-party governance.
- Establish audit logging for off-chain verifier signatures and carbon-project documentation.

Risks and Cautions:

- Regulatory ambiguity in Tanzania requires ongoing flexibility in hybrid system design.

- Edge-case testing gaps may affect stability during scale-up.

Action Items for Next Session:

1. Review batch-transaction optimization within EUTxO constraints.
2. Validate “Retirement” endpoint linkage with off-chain registry.
3. Define roadmap for gradual Cardano-native transition.

Session 2 – Hybrid Model Validation and Compliance Alignment

Overview:

The second session evaluated the implemented proof-of-concept and validated its compliance and audit-linkage features. The team demonstrated full lifecycle flows, issuance, transfer, and retirement, integrated with metadata referencing verifiable off-chain project data.

Discussion Points:

- Optimization of batch processing under EUTxO.
- Off-chain computation model for verifier approvals and regulatory sign-offs.
- Integration of [Nexchange](#) APIs and Thallo infrastructure for token lifecycle management.
- Roadmap for integrating stablecoins and multi-chain visibility.

Progress Observed:

- Successful demonstration of hybrid tokenization on Cardano.
- Custom “Retirement” API endpoint deployed, linking retired tokens to verifier metadata.
- Real-time dashboard with issuance/retirement tracking and downloadable audit logs.

Recommendations:

- Transition from hybrid API structure to fully Cardano-native Aiken contracts once regulatory clarity is achieved.
- Optimize batch-transaction logic to handle multi-party updates.
- Expand analytics for project-level impact reporting and registry dashboards.
- Continue early coordination with Tanzanian regulatory bodies to define compliance procedures.

Risks and Mitigations:

- Future regulatory revisions may require smart-contract updates, maintain version-controlled schema documentation.
- Multi-chain complexity can increase maintenance load; adopt standardized data schemas across networks.

Action Items for Continued Development:

1. Refactor validator logic for improved concurrency handling.
2. Extend audit log coverage to off-chain verifier approvals.
3. Develop unified dashboard for EVM + Cardano credit visibility.

Engagement Evaluation (1 – 5 Scale):

1. Openness to Mentorship – 5
2. Preparedness – 4
3. Responsiveness – 4.5
4. Implementation – 4
5. Collaboration – 5

Mentor Remarks:

The team demonstrated strong execution capacity and openness to architectural feedback. Their disciplined documentation practices and proactive regulatory engagement were highlighted as significant enablers of future full-chain deployment.

Mentor's Overall Reflections

Thallo exhibited a high level of technical competence and adaptability throughout the mentorship. The project validated that **hybrid architectures** can serve as effective interim solutions when regulatory frameworks are still forming. The team gained a solid understanding of Cardano's EUTxO semantics, metadata management, and validator design principles.

Overall Outlook:

Promising → **Strong** – The project has established a clear technical foundation for future national-registry integration and demonstrates consistent progress toward Cardano-native deployment once regulatory conditions permit.

Post-Accelerator Continuation:

Ongoing collaboration is expected as *Thallo* proceeds to:

- Transition validators to fully Cardano-native Aiken contracts.
- Implement multi-sig governance and enhanced testing coverage.
- Maintain coordination with UNDP Tanzania and government agencies for compliance certification.