SUBNATIONAL CLIMATE FUND

# Request for Proposals
# Power to Share: A Study on Battery Interoperability in East Africa

*Version 7. October 2025*

This document serves to provide an overview of the underlying project relevant to the Subnational Climate Fund (SCF), context on data availability and goals of the mandate, as well as an estimated scope of work requested from the consultant. Final details of the mandate should be covered by the subsequent proposal submitted by the consultant.

## 1. The Subnational Climate Fund

The SCF is a blended finance impact fund formed to pursue attractive risk-adjusted returns for private investors while generating measurable and certified environmental and social impacts. The Fund is focused exclusively on pursuing investments in mid-size climate infrastructure with nature-based solutions in various developing countries across Latin America and the Caribbean, Africa, the Mediterranean, and Asia. The Fund is managed by Pegasus Capital Advisors, a commercial Private Equity impact fund manager and further benefits from a separate, grant-funded Technical Assistance facility managed by The International Union for the Conservation of Nature (IUCN) and implemented by Catalytic, IUCN, and Gold Standard.

## 2. Context of the Potential Study Agreement

East Africa is experiencing rapid growth in electric mobility, particularly in the two- and three-wheeler segments, driven by rising fuel costs, urbanization, and climate commitments. Countries including Rwanda, Kenya, Uganda, and Tanzania have seen the emergence of multiple e-mobility operators offering Battery-as-a-Service (BaaS) models, where customers lease batteries rather than purchasing them outright. This approach significantly reduces upfront vehicle costs and has proven critical to adoption in price-sensitive markets.

However, the current landscape is characterized by proprietary, non-interoperable battery systems. Each original equipment manufacturer (OEM) and operator deploy their own battery specifications, swapping infrastructure, and software platforms. This fragmentation creates several market barriers:

- **Consumer lock-in**: Riders cannot switch between service providers or use batteries across different vehicle brands
- **Infrastructure inefficiency:** Duplicate charging and swapping networks increase costs and limit geographic coverage
- **Investment risk:** Financiers face uncertainty around asset utilization, residual values, and cross-platform standardization
- **Regulatory gaps:** Governments lack regional standards to enforce safety, quality, or interoperability requirements

These challenges constrain the scale and bankability of BaaS deployments, limiting the sector's potential to contribute meaningfully to climate mitigation and economic development goals.

In 2024, the SCF commissioned a feasibility study that assessed the commercial viability of Battery-as-a-Service models in Rwanda and Kenya as part of its due diligence on a potential e-mobility investment. The study concluded that BaaS is economically viable and identified **battery interoperability as a critical enabler** for sector-wide scale. It recommended standardizing both

hardware and software components, fostering partnerships among OEMs, and engaging regulators to establish enforceable standards.

Since then, various technical initiatives have emerged to develop interoperable battery solutions. However, **sector-wide adoption requires complementary frameworks** that extend beyond hardware design. Specifically, the market needs:

- Regional regulatory standards and certification processes
- Transparent lifecycle cost models to support financing decisions
- Institutional pathways for multi-stakeholder coordination
- Policy mechanisms to de-risk investment and ensure consumer protection

**Objectives**

This study seeks to bridge the gap between technical feasibility and market-ready implementation. Unlike the earlier company-specific work, this initiative is designed as a **sector-wide effort** that will benefit multiple OEMs, operators, financiers, and regulators across East Africa.

The study will deliver public knowledge products—including baseline interoperability standards, certification frameworks, and policy recommendations—that can inform regulatory processes in Rwanda, Kenya, and other countries in the region. These outputs will complement ongoing technical assistance efforts for e-mobility projects in Sub-Saharan Africa that are of interest for the SCF, creating alignment across multiple initiatives.

By establishing clear technical specifications, transparent economics, and actionable regulatory pathways, this study aims to unlock the conditions necessary for large-scale, bankable deployment of interoperable battery systems. This, in turn, will accelerate electric vehicle adoption, reduce greenhouse gas emissions, create green jobs, and improve energy access across the region.

The study's overarching aim is to **establish the technical, economic, and policy requirements for interoperable and swappable batteries for light electric vehicles in East Africa**, and to deliver a draft interoperability framework and readiness roadmap that lay the foundation for:

- Cross-OEM battery compatibility
- Scalable and bankable Battery-as-a-Service deployments
- Regulatory frameworks that support sector growth while ensuring safety and consumer protection
- Transparent investment models that attract private capital

The study will serve as a foundation for coordinated action among manufacturers, service providers, financial institutions, and government agencies, ultimately accelerating the transition to sustainable transport in the region.

## 3. Scope of Work for a Feasibility Study

The consultant shall establish the technical, economic, and policy requirements for interoperable and swappable batteries for light electric vehicles in East Africa. The study will deliver two key deliverables: (1) develop a **draft technical interoperability framework and consultation roadmap** for interoperable and swappable batteries, and (2) a practical **investment and implementation roadmap** that makes Battery-as-a-Service propositions bankable and scalable. These outputs will lay the foundation for widespread EV adoption across the region.

The study shall focus primarily on **Rwanda and Kenya**, with consideration of applicability to broader East African markets including **Uganda** and **Tanzania**. Consultants should propose a phased approach to geographic coverage that maximizes impact within the available budget.

**Key Activities and Deliverables**
The consultant is expected to undertake the following activities and produce corresponding deliverables:

**Activity 1: Assessment of Current State of Interoperability**

- Map existing battery specifications, swapping infrastructure, and BaaS models across major operators in the region
- Identify technical, commercial, and regulatory barriers to interoperability
- Analyze comparable interoperability initiatives globally (e.g., battery swapping standards in Asia, Europe)

**Deliverable:** Baseline assessment report on current state of battery interoperability in East African e-mobility sector

**Activity 2: Assessment of Market Implications of Interoperability**

- Analyze impact of interoperability on vehicle affordability, consumer adoption, and market competition
- Assess implications for infrastructure efficiency, operator economics, and service coverage
- Evaluate consumer preferences and willingness to adopt interoperable systems

**Deliverable:** Market analysis report quantifying economic and social benefits of interoperability

**Activity 3: Development of Regional Interoperability Framework**

- Develop technical specifications for interoperable battery packs (physical dimensions, electrical interfaces, communication protocols, safety requirements)
- Propose hardware and software standardization frameworks compatible with existing and emerging technologies
- Design standards that enable cross-OEM compatibility while allowing for innovation

**Deliverable:** Draft regional interoperability framework and specification for stakeholder consultation (structured for later regulatory adoption).

**Activity 4: Total Cost of Ownership (TCO) and Lifecycle Costing Models**

- Develop transparent TCO models comparing interoperable vs. proprietary battery systems from consumer, operator, and investor perspectives
- Create lifecycle costing frameworks for modular battery packs including manufacturing, operation, maintenance, and end-of-life considerations
- Model financial viability under various scenarios (utilization rates, fleet sizes, regulatory environments)

**Deliverable:** TCO and lifecycle costing toolkit with worked examples and sensitivity analyses to support financing and investment decisions

**Activity 5: Technical Validation Specifications and Certification Framework**

- Define testing protocols and performance criteria for interoperable batteries (safety, durability, efficiency, compatibility)
- Develop certification framework for manufacturers and operators to ensure compliance with standards
- Propose quality assurance mechanisms and enforcement procedures
- Identify laboratory and testing infrastructure requirements in the region

**Deliverable: Draft** technical validation and certification framework document with phased implementation guidelines and options for pilot testing.

**Activity 6: Institutional Pathway for Adoption**

- Map stakeholder landscape (regulators, OEMs, operators, financiers, industry associations)
- Propose mechanisms for multi-stakeholder engagement and coordination.
- Propose regulatory consultation roadmap with phased implementation milestones for Rwanda, Kenya, and potentially other East African countries
- Design dissemination strategy to ensure study findings inform regulatory processes (RURA, ERA, etc.)
- Identify capacity-building needs for regulators and industry actors

**Deliverable:** Institutional adoption roadmap with stakeholder engagement plan and policy recommendations

**Activity 7: Knowledge Transfer**

The study outputs must be designed for practical application and subsequent refinement by diverse stakeholders. The consultant shall develop comprehensive knowledge transfer materials that enable regulators, OEMs, operators, and financiers to understand, adopt, and implement the standards and frameworks developed.

- Implementation guides tailored to different stakeholder groups:
  - Regulator's guide to standards adoption and enforcement
  - OEM compliance roadmap and certification guide
  - Investor's guide to evaluating interoperable BaaS projects
  - Operator's handbook for transitioning to interoperable systems
- Functional tools and templates (Working TCO model with user documentation, Certification checklists and compliance matrices Self-assessment tools for operators and OEMs).
- Methodology documentation explaining how standards were developed and validated, enabling future updates and refinements
- Online repository or platform for accessing all study material

**Deliverable:** Knowledge transfer package including all guidance documents, tools, templates, and methodology documentation. Proposals should specify approach to knowledge transfer and indicate whether capacity building workshops can be included within budget.

**Stakeholder Engagement Requirements**

The consultant should engage and consult the following stakeholder groups:

- Regulators: Rwanda Utilities Regulatory Authority (RURA), Electricty Regulatory Authority of Uganda (ERA), KEBS (Kenya Bureau of Standards), Rwanda Standards Board (RSB) and other relevant national authorities
- E-mobility operators in the region
- OEMs and technology partners
- Financial institutions: Banks, impact investors, and development finance institutions active in the sector
- Industry associations and consumer representatives

All outputs from this study—including standards, certification frameworks, TCO models, and policy recommendations—shall be designed as public knowledge products for the benefit of the broader e-

mobility sector. The consultant must clearly delineate any confidential or proprietary information from public outputs in the final deliverables.

The study findings should be presented in formats accessible to multiple audiences:

- Technical specifications for engineers and OEMs
- Policy briefs for regulators and government officials
- Investment summaries for financiers
- User-friendly guides for operators and consumers

## 4. Requirements and Evaluation Criteria

Applicants must demonstrate that their project team possesses the following core competencies:

**Core Competencies**

Applicants must demonstrate expertise in the following areas:

1. **Battery Systems & Standards Development** – Proven experience in battery and e-mobility technologies, interoperability challenges, and development of technical standards or certification frameworks aligned with international bodies (ISO, IEC, SAE).
2. **Financial & Investment Analysis** – Ability to design total cost of ownership (TCO) and lifecycle models, assess Battery-as-a-Service (BaaS) economics, and produce lender-ready financial tools.
3. **Policy & Regulatory Engagement** – Track record translating technical findings into actionable policy or regulatory outputs, ideally adopted or informing national processes.
4. **Regional Experience** – Demonstrated work in East Africa (Rwanda, Kenya, Uganda, Tanzania), strong understanding of local markets and institutions, and active partnerships with local entities.
5. **Stakeholder Engagement & Knowledge Transfer** – Experience facilitating multi-stakeholder consultations and producing accessible guidance and capacity-building materials.
6. **Integrated Team Delivery** – Effective coordination of technical, financial, and policy expertise with clear project management and quality-assurance mechanisms.

**Evaluation Priorities**

Proposals will be assessed and weighted based on:

1. **Standards Development Track Record** – Evidence of standards or certification frameworks adopted or implemented by industry or regulators.
2. **Regional Execution Capacity** – Local partnerships, in-country presence, and understanding of regional institutional processes.
3. **Investment-Ready Output Capability** – Demonstrated ability to produce bankable TCO tools, certification frameworks, and actionable policy roadmaps.
4. **Team Integration & Delivery** – Strength of multidisciplinary team, coordination mechanisms, and ability to deliver within timeline and budget.

**Team Structure**

Given the multidisciplinary nature of this work, consultants may propose:

- An integrated firm with in-house capabilities across all required areas
- A prime contractor with specialized sub-contractors covering standards development, financial modeling, and institutional adoption
- A formal consortium with clearly defined roles and coordination mechanisms

**Proposals must clearly specify:**

- Lead organization and overall project management responsibility
- Roles and responsibilities for each team member/sub-contractor
- Coordination and quality assurance mechanisms
- Single point of contact for SCF
- Level of effort per team member/task

**Methodological Requirements**

Consultants are expected to propose a comprehensive methodology that addresses all study objectives and produces the required deliverables. The methodology should demonstrate rigor, practicality, and strong stakeholder engagement.

**Given the ambitious scope of work, consultants should propose a realistic sequencing and prioritization plan within the 6-month timeframe,** indicating how activities will be phased to ensure high-quality and timely delivery of outputs. **At minimum, the proposed methodology must include:**

**Primary Research Components:**

- Field assessments in Rwanda and Kenya (site visits to operational facilities, infrastructure audits)
- Minimum 15-20 key informant interviews with stakeholders across OEMs, operators, regulators, financiers, and industry associations
- Consumer research to assess preferences, adoption barriers, and willingness to use interoperable systems (surveys, focus groups, or other appropriate methods)
- Documentation of data collection protocols and quality assurance processes

**Technical Analysis:**

- Assessment of existing battery specifications from major regional operators
- Gap analysis identifying technical barriers to cross-compatibility
- Benchmarking against global battery interoperability frameworks and lessons learned (e.g., China, India, Taiwan, Europe)

**Standards Development Approach:**

- Process for developing technology-neutral standards that allow for innovation while ensuring safety and compatibility
- Mechanism for incorporating feedback from OEMs, operators, and technical experts through iterative consultation
- Validation process with regulators before finalization
- Alignment strategy with relevant international standards (ISO, IEC, SAE, etc.)
- Approach to ensuring standards are practical and implementable in East African context

**Economic and Financial Modeling:**

- Total cost of ownership (TCO) analysis from multiple perspectives (consumers, operators, investors)
- Lifecycle costing framework for battery packs including end-of-life considerations
- Sensitivity analyses for key variables (utilization rates, financing terms, energy costs, battery lifespan)
- Clear documentation of assumptions and data sources
- Functional, adaptable tools that financiers and operators can use for their own analysis

**Stakeholder Validation:**

- Process for testing draft findings with technical and policy audiences
- Feedback incorporation mechanisms throughout the study period
- Multi-stage review process ensuring buy-in from regulators, OEMs, and operators

**Knowledge Transfer Approach:**

- Strategy for making study outputs accessible and actionable for different stakeholder groups
- Plan for developing implementation guides, tools, and templates such as Working TCO model (Excel or similar) with user documentation, Certification checklists and compliance matrices Self-assessment tools for operators and OEMs.

**Consultants should propose:**

- Detailed work plan with timeline and milestones
- Sampling strategy and sample sizes (if conducting surveys)
- Analytical frameworks and tools to be used
- Risk mitigation strategies
- Team allocation and level of effort per task
- Any innovative approaches or value-added elements beyond minimum requirements

**Proposals will be evaluated based on:**

- Appropriateness and rigor of proposed methodology
- Feasibility within 6-month timeline and budget constraints
- Evidence of similar work and successful track record
- Innovation and added value beyond minimum requirements
- Clarity and attention to detail in proposal

## 5. Indicative Timeline

Work is expected to commence immediately after the consultant is appointed. The work is expected to be completed within **six months** after signing the service contract. The delivery of services and reporting timeframes are anticipated to be as follows:

| Activity / Deliverable | Indicative timeline |
|---|---|
| **Inception & stakeholder mapping:** Work plan, methodology, stakeholder mapping, data collection approach | Month 1 |
| **Field research & baseline assessment:** Current state of interoperability, market analysis, barrier identification | Month 2 |
| **Draft Standards Framework:** Technical specifications for interoperable batteries, compatibility requirements | Month 3 |
| **TCO modeling & Financial Models:** Lifecycle costing models with worked examples and user toolkit | Month 4 |
| **Certification Framework:** Testing protocols, quality standards, enforcement mechanisms | Month 4 |
| **Institutional roadmap & policy engagement:** Adoption pathway, regulatory recommendations, stakeholder engagement plan | Month 5 |
| **Knowledge Transfer Materials & Workshops** | Month 5 - 6 |
| **Final Report:** Consolidated findings, recommendations, implementation plan | Month 6 |

## 6. Form of Proposal & Requirements

Please prepare a brief proposal for the performance of this work, including the scope of work, project team and qualifications, and estimated costs.

1) **Scope of Work:** The scope of work should include a description of the specific activities that will be performed in order to accomplish the required tasks identified in Section 3. This should include any proposed site visits/reconnaissance, documents to be reviewed, interviews, etc. If the Consultant feels that additional tasks or components within a required task are suggested or warranted, these should be stated and delineated as "Optional Tasks".
2) **Project team and qualifications:**
   This should include the name of the principal staff members and any sub-contractors, and a brief description of their role within the project team. Qualifications of staff should include relevant technical capabilities, full CVs, specific previous experience similar to this assignment, specific in-country experience and knowledge.
3) **Estimated costs:**
   A total time and expenses cost estimate (not to be exceeded), in US Dollars, must be provided for the required scope of work. A breakdown of the estimated costs by task must also be presented in tabular format and should include Direct Labour Costs (number of hours or days per staff and their associated unit costs). If field visits are necessary, travel costs will be covered by the SCF separately from the consultancy fee under "Indirect Labour Costs". Please note that "Per Diems" are not an eligible expense under our travel expense policy. Please also note that Catalytic is exempt from VAT. Your financial proposal should therefore not include VAT.
4) **Contract & payments:**
   The contract will be based on Catalytic's standard terms of engagement, fixing a total consultancy fee on lump-sum basis in US Dollars. Catalytic will pay the consultant in 2-3 instalments: E.g. one advance payment of 20% upon signature of the contract, one payment of 40% after delivery of the draft report, final payment of 40% after delivery of the final report.
5) **Conflicts of interest & KYC documentation:**
   As part of the proposal, the Consultant shall also confirm that they do not have a conflict of interest and that they are in a position to provide an adequate, accurate and objective review. In addition, we will request an extract from the commercial registry and passport copy for a KYC / DD check for shortlisted candidates.

## 7. Submission

Please submit your proposal before Monday, 20 October 2025 (23:59 CET) by sending it to **project@catalyticfinance.org**